

Department of Energy

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

April 9, 1997

Mr. Randy Gordon, Chair
Oak Ridge Reservation Environmental
Management Site Specific Advisory Board
3602 River Road
Ten Mile, Tennessee 37880

Dear Mr. Gordon:

**RESPONSE TO COMMENTS ON INTERIM ACTION FOR UNION VALLEY UPPER
EAST FORK POPLAR CREEK CHARACTERIZATION AREA, OAK RIDGE,
TENNESSEE**

This is a follow up letter to my January 22, 1997, letter concerning comments of the Oak Ridge Reservation Environmental Management Site Specific Advisory Board (ORREMSSAB) on the Union Valley Upper East Fork Poplar Creek Proposed Plan.

The ORREMSSAB's comments are being addressed individually and are enclosed. If you have any questions, please give me a call at 576-0742.

Sincerely,

A handwritten signature in black ink, appearing to read "Rodney R. Nelson".

Rodney R. Nelson
Assistant Manager for
Environmental Management

Enclosure



Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—
January 22, 1997

Mr. Randy Gordon, Chair
Oak Ridge Reservation
Environmental Management
Site Specific Advisory Board
130 Oklahoma Avenue
Oak Ridge, Tennessee 37830


Dear Mr. Gordon:

UNION VALLEY INTERIM PROPOSED PLAN

Your comments on the "Interim Proposed Plan for Union Valley, Upper East Fork Poplar Creek Characterization Area," have been considered and are being incorporated or responded to in the Record of Decision (ROD). The ROD, with its responsiveness summary, will address all of the comments. The ROD is scheduled to be available by the first of February 1997.

If you have any questions, please call Mike Travaglini at 576-0848.

Sincerely,



Rodney R. Nelson
Assistant Manager for
Environmental Management

cc:

M. Wilson, EW-911, ORO

RESPONSE TO COMMENTS ON INTERIM ACTION FOR UNION VALLEY UPPER EAST FORK POPLAR CREEK CHARACTERIZATION AREA, OAK RIDGE, TENNESSEE

Comment 1a: The plan seems adequate for the immediate future, but the five-year term seems questionable. If there is knowledge that no large quantity of carbon tetrachloride or other contaminant(s) exist(s) under the site so that future off-site concentrations will not increase, the plan would be more acceptable. The plan should include specific commitments for work in the near future if there is the possibility that concentrations will increase. The points of highest concentration on site must be sought, and corrective actions planned in the near future, not five years hence.

Response: The goals of this interim remedy are to prevent actions that would (1) put people at risk from existing contamination in Union Valley and (2) spread contamination farther than it has already reached. Existing data and projects are insufficient to predict whether contamination levels in Union Valley will increase or decrease. Final actions will be proposed through the CERCLA process under the Upper EFPC RI/FS, proposed plan, and ROD. The RI/FS, scheduled to be available for public review in April 1999 is underway and is investigating opportunities to remove or contain the groundwater contamination. Potential early actions are being investigated to determine whether effective, implementable, cost-effective actions can be taken before the final ROD that will not conflict with any potential findings in the ROD.

The analysis of the extent of the problem and the DOE contribution to that problem is incomplete. Additional interpretation of existing data, identification of additional data needs, collection of new data, and investigation of remediation options are still needed. If other sources contribute to groundwater contamination, then costly remediation efforts to remove or contain contamination sources at the Y-12 Plant could be wasted.

Source removal in the areas having the highest concentration of the carbon tetrachloride and associated contamination on site is not possible with any currently used or innovative technologies. Carbon tetrachloride is a DNAPL, which means that it is heavier than water, and has very low solubility. About 10 million gallons of carbon tetrachloride were unloaded from railroad tankers and used in the 1940s at the Y-12 Plant. Spills on the ground during the unloading process and other operations likely contaminated the soil. Tens or hundreds of gallons of carbon tetrachloride may have flowed by gravity into the limestone karst bedrock underlying the Y-12 Plant.

The bedrock is full of fractures, crevices, solution conduits, and caves through which groundwater flows. Groundwater may flow over a pool of DNAPL that has been caught in a low spot or pocket in a conduit in the bedrock. Although it is not very soluble, a small volume of this DNAPL could bleed off enough dissolved carbon tetrachloride to contaminate groundwater above regulatory concentration levels (ppb) for hundreds or thousands of years. There are no technologies currently in use or being studied that can detect a small volume of DNAPL that could be from 3 to 300 m (10 to 1,000 ft) deep over an area of 40 ha (100 acres). Even if a DNAPL source could be found, there are no technologies that could ensure complete removal of such a source. Because it is likely that large volumes could have been spilled during historical operations, there could be many widely separated small sources. If one source is missed, groundwater contamination at unacceptable levels could continue.

Because it may be technically impractical to remediate the source and prevent groundwater from being contaminated, the Upper EFPC RI/FS is investigating ways to contain the plume and prevent further migration of contaminated groundwater beyond the Y-12 Plant property line. This may be possible, and several containment methods are under investigation. However, containment may be technically or economically impractical in the karst bedrock system. All of the methods investigated require installation and operation of mechanical systems (e.g., wells, pumps, treatment plants). These systems would have to be reliable until all of the DNAPL sources have naturally disappeared, that is, dissolved into the water and collected and treated by the mechanical systems. If a large DNAPL pool exists, containment's may be required for hundreds of years.

Comment 1b: The overall effort should include the region where Scarboro Creek reenters Oak Ridge Reservation (ORR) south of the arboretum.

Response: The area in question has been studied and is not considered to pose any hazards. The RI/FS for the South Campus Facility (DOE/OR/02-174/V1&D2) investigated DOE property west of and including Scarboro Creek. No unacceptable hazards were found in the creek, and a no action ROD (DOE/OR/02-1383&D3) was issued in December 1995. The property east of Scarboro Creek was evaluated in September 1996 in the ER footprint reduction process, evaluation of Scarboro/East Haw Ridge study area (DOE/OR/01-1496&D1) and has been approved for release to the public. This document states A Findings indicate that no public health concern should arise because of past and present federal activities within the study area. Also, a possibility of groundwater contamination from other affected areas of the ORR exists, and future groundwater use restrictions may be determined necessary. When and if the study area is considered for transfer to a non-DOE use, additional sampling will be necessary to determine the need for groundwater use restrictions. DOE does not consider it necessary to expand the scope of the Union Valley interim action to include this area because (1) the water in the creek presently meets regulatory requirements, (2) TDEC is monitoring the creek and would recognize if contamination could migrate onto this property, and (3) the existing foot print reduction process would ensure investigation of future uses and protection from any projected risk.

Comment 2: Many small readings are reported and then discounted. When questionable readings are obtained, they should be checked using more sensitive or reliable apparatus.

Response: The Upper EFPC remedial investigation is analyzing existing and new data outside the scope of this interim action. Results of analyses that report low concentrations are not discounted. The concentrations are compared to risk-based standards promulgated either by the state or federal government. When concentrations do not exceed these standards, they are not considered to be an imminent concern. DOE evaluates low-level readings to determine whether they represent the leading edge of a plume. Multiple rounds of data have been collected from some of the Union Valley sampling locations. The data typically are compiled and plotted to evaluate trends. Therefore, if a low concentration is followed by successively higher concentrations, the significance is noted and considered during data analysis.

Comment 3: The proposed license system resembles buying short-term rights to pollute groundwater under the grantor's land, an unacceptable concept used alone for a five year period.

Response: The license system does not purchase rights to pollute. It protects the public from existing pollution caused by historic releases of contaminants. To the best of our knowledge, most of the carbon tetrachloride was likely released before 1946 during the Manhattan Project when ER and waste management were not given a high priority. Significant effort and expenditure are underway to investigate existing contamination, determine its risk, evaluate risks from other potential sources, and develop responsible and cost-effective remedial actions that will protect human health and the environment.

Comment 4: Plans to notify local government are too vague. Recording the licenses at the Registrar of Deeds office should be considered.

Response: The responsibilities for notification are clearly established in the A Selected Remedy section of this ROD. This is a tripartite agreement among DOE, EPA, and TDEC with sufficient checks and balances to ensure compliance for the approximately four-year interim action.

Comment 5: A revised document should be made more understandable to the general public.

Response: Per CERCLA guidelines and schedules, the interim proposed plan will not be reissued. The plan has been advertised and presented in a public availability session. All interested parties have had an opportunity to comment. This responsiveness summary addresses all questions expressed by every group or individual who expressed an interest in this interim action.

Comment 6: Please indicate the source of standards and the method used to obtain contaminant standards.

Response: Three sets of standards were used for comparison in the evaluation of the Union Valley data. The first set is the EPA primary drinking water standards, called the Maximum Contaminant Limits (40 CR 141). The risk-based set of standards is promulgated by the federal government. The second set is a set of background values for naturally occurring inorganic constituents in groundwater. The background values were established by the Lockheed Martin Energy Systems (Energy Systems) Groundwater Protection Office on the basis of statistical analysis of data from monitoring wells at the Y-12 Plant (Energy Systems 1996b). The third set of standards is the list of preliminary remediation goals developed by Energy Systems for the preliminary risk evaluation (ORNL 1995).

Comment 7: The above comments are based on a concern that the reported observations show the leading edge of a serious groundwater plume.

Response: It is not yet clear whether the contaminants detected indicate the leading edge of a plume that is expanding eastward in Union Valley. As described in Part 2 under A Summary of Site Characteristics, Public-1 Response (see below), and Public-7 (see below) Response, it is believed that the plume does not continue past the groundwater discharge point at the Scarborough Creek springs. Additional investigation is underway for the Upper EFPC CA that will more clearly define the fate and transport of contaminants in the plume.

[PUBLIC-1 COMMENT To what extent has the source term impacted the Union Valley area?

Response: Contaminants associated with the Y-12 Plant have been detected in samples from two monitoring wells and two springs in Union Valley. The two monitoring wells, GW-169 and GW-170, are located on City of Oak Ridge property just west of the Remote property. GW-169 monitors groundwater at depths of 9.1B10.6 m (29.7B34.7 ft) below ground surface (bgs). GW-170 monitors groundwater at depths of 31.7B47.8 m (104B156.9 ft) bgs. The contaminants have been detected in these two monitoring wells since 1990; reported concentrations have been variable, with higher concentrations in GW-170, the deeper well. Carbon tetrachloride and chloroform, the primary components of the source term originating from the Y-12 Plant (see Public-2 and Public-5 Responses), have been detected only in GW-170 at maximum concentrations of 200 and 95 ppb, respectively.

PCE and TCE have been detected in Union Valley monitoring wells, but available data suggest that the shallow PCE and TCE contamination may not be from the same source as the carbon tetrachloride and chloroform. Maximum PCE and TCE concentrations in GW-170 are 11 and 4 ppb, respectively. The maximum concentrations of PCE and TCE from GW-169 are 4 and 6 ppb, respectively.

The two springs where carbon tetrachloride was detected are near Illinois Avenue. Spring SCR7.1SP is south of Union Valley Road and west of Illinois Avenue. Carbon tetrachloride has been detected in this spring over the past several years, with a maximum concentration of 7 ppb. Spring SCR7.18SP is just east of Illinois Avenue and south of Union Valley Road. Carbon tetrachloride has been detected in one sample collected in March 1996 from this spring at a concentration of 4 ppb. PCE and TCE have been detected in these springs at maximum concentrations of 2 ppb.

The locations where the source term has been detected in Union Valley are underlain by the Maynardville Limestone, which is one of several geologic units that comprise Bear Creek Valley and Union Valley. The area at the surface that is underlain by the Maynardville Limestone is a relatively narrow band that extends along Bear Creek Valley and Union Valley. The Maynardville Limestone consists of limestone and dolostone, with interbedded shales. The unit is highly fractured and contains numerous cavities or karst features formed by the dissolution of the rock. Most of the karst features occur in the top 30 m (100 ft) of the limestone. The Maynardville Limestone transports groundwater and its associated contaminants eastward and acts as a drain for the Y-12 Plant (ORNL 1995).

The current assumption is that the springs in Union Valley and Scarboro Creek are discharge points for the groundwater in the Maynardville Limestone. Because Scarboro Creek is a discharge point, it is unlikely that the plume will move eastward beyond the creek. As noted in a June 2, 1995, letter from TDEC (see SSAB-13 Comment, OREPA-2 Comment, and SSAB-13 Response), the highly fractured nature of the bedrock underlying Union Valley suggests that it could transport contaminants in other directions; however, data from numerous wells at variable depths across the Y-12 Plant support the interpretation that the transport direction from the plant is almost exclusively eastward and is contained in the Maynardville Limestone. The hydraulic

gradient and, therefore, the flow direction is from other formations toward the Maynardville Limestone. GW-382, which monitors groundwater 38.1 - 52.7 m (125 - 173 ft) bgs, has had maximum carbon tetrachloride and chloroform (a degradation product of carbon tetrachloride) concentrations of 7,400 and 1,100 ppb, respectively.

The maximum concentrations of carbon tetrachloride in these wells are high enough (greater than 1 percent of the solubility limit) to suggest that the source is a nonaqueous-phase liquid. In other words, the carbon tetrachloride at these locations is concentrated enough to be in a liquid phase distinct from the groundwater in which it occurs. Because the density of carbon tetrachloride is greater than water, it is termed a dense nonaqueous-phase liquid (DNAPL). DNAPLs can act as secondary sources of groundwater contamination after the primary source of the contamination has been removed. In general, DNAPLs are difficult to remediate, especially in a fractured bedrock setting like the Y-12 Plant. Containment is a possible treatment option that will be evaluated in the FS.

In contrast, the highest PCE and TCE concentrations are in monitoring wells just to the north and west of New Hope Pond. Well GW-762, which is west of New Hope Pond and monitors groundwater 14.7 - 17.8 m (48.2 - 58.5 ft) bgs, has had maximum PCE and TCE concentrations of 1,400 and 75 ppb, respectively. Well GW-383, which is north of New Hope Pond and monitors groundwater 5.5 - 7.0 m (18.1 - 23.1 ft) bgs, has had maximum PCE and TCE concentrations of 510 and 190 ppb, respectively.

Public-7 Comment: Does continued quarrying accelerate the movement of the plume or increase the contamination leaving the site?

Response: Our current understanding is that quarrying has not had an effect on plume movement. The quarry is approximately 2.4 km (1.5 miles) east of Scarboro Creek, which is thought to be a local groundwater discharge point. In other words, groundwater east of Scarboro Creek flows west toward the creek and discharges into it; groundwater west of Scarboro Creek flows east toward the creek and also discharges into it. The amount of pumping at the quarry is probably not significant enough to affect plume movement. The activities outlined in the interim proposed plan for Union Valley include a license agreement with property owners that would require the owners to notify DOE 90 days before any new extraction or use of groundwater. Any additional use of water or changes in water use, therefore, would be evaluated in advance.

[OREPA-2 Comment: The two assumptions of concern are that the plume is contained in the Maynardville Limestone. A tracer test conducted by the state indicated that groundwater flow in the Knox Group could be up-dip, cross strike or along dissolutionally enhanced joints in three directions. And that "little contamination is expected at 300 m (1,000 ft) and below, because there are fewer developed karst features and the formation is tighter." Have core samples been collected to confirm this theory?

Response: Please see SSAB Comment 13 Response.

Comment 8: The Interim Proposed Plan for the Union Valley Upper EFPC CA is based on the "Union Valley Interim Study Remedial Site Evaluation" (Y/ER-206/R1, February 1995). The TDEC, DOE Oversight Division, commented on this document in a letter dated June 1, 1995. The "UV Interim Study Remedial Site Evaluation" has not been redrafted in response to these comments. In this letter, a number of significant concerns were described, including questionable analyses of data and assumptions on the hydro geology of the site. How have the concerns in this letter been addressed?

Response: Responses to the comments were prepared and submitted to TDEC shortly after the comments were received. The Union Valley Interim Study suggested that there were no current risks, only potential future risk if groundwater use changed. The study recommended no interim action. TDEC responded that the potential risk and potential for additional expansion of the groundwater plume justifies the need for interim action. This ROD was prepared to address TDEC's concerns. TDEC concurs with this ROD. The interim study will not be revised and reissued, and the analysis and evaluation of contamination in Union Valley originating from the Upper EFPC CA, incorporating other valid concerns of TDEC, will be completed as part of the Upper EFPC RO. Analytical methods have been changed based on TDEC comments, and more reliable radionuclide analyses are now being conducted. TDEC will approve all CERCLA documentation for Upper EFPC CA and will sign the final ROD.

Comment 9: Page 1, Introduction, paragraph 3: The word "limit" as used here suggests that DOE would approve of some level of "unacceptable activities". The word "limit" should be replaced with the word "prohibit".

Response: The interim proposed plan has been issued to the public and will not be revised. Similar language in this ROD has been modified as suggested.

Comment 10: Page 3, Paragraph 1: In this paragraph, It is stated that there are six groundwater monitoring wells in Union Valley. These six wells actually consist of two locations, with three wells at each location (each well monitoring a different depth). These wells appear to be inadequate to characterize and monitor change since the plume and should be supplemented. Please explain clearly that only two locations are involved and why only two locations are adequate.

In the last line of this paragraph it is stated that "No contamination has been found in the groundwater at the quarry." Please describe the extent of sampling activities that have been conducted at the quarry and how certain DOE is that no contamination exists there.

Response: Refer to Public-9 response (see below) for the issue of the adequacy of the six wells. With respect to the issue of contaminants in the quarry, five samples have been taken from a spring that is discharging groundwater from one of the quarry walls. The most recent sample taken from the quarry was in early June 1996. The samples have been analyzed for volatile organic compounds (VOCs), which include carbon tetrachloride and other chlorinated solvents in the plume, as well as inorganic (such as nitrate), metals, and radionuclides that have been detected at very low concentrations, either below the background values or below the standards described in SSAB-6 response.

[Public-9 Comment: Stakeholder stated that she is surprised that DOE is using only six wells for monitoring the groundwater. Where are the six wells that DOE is using? Are they at two separate locations?

Response: The U. S. Geological Survey installed the six monitoring wells in Union Valley as part of a hydrologic investigation in 1986. The wells are at two locations: on the City of Oak Ridge property just west of the Remotec property and on the UT Arboretum property. The wells on city property include GW-169, GW-170 and GW-232, and the UT Arboretum wells include GW-171, GW-172, and GW-230. At each site, the three wells comprise a cluster that monitors discrete depth intervals. Wells GW-169 [total depth 13m (42 ft)] and GW-171 [total depth 9.4 m (31 ft)] monitor the unconsolidated zone above bedrock. GW-170 [total depth 47.9 m (157 ft)] and GW-172 [total depth 40.8 m (134 ft)] monitor shallow bedrock. GW-232 [total depth 126 m (412 ft)] and GW-230 [total depth 124 m (406 ft)] monitor deeper bedrock.

The six wells are located within the relatively narrow band at the surface that is underlain by the Maynardville Limestone, which is the primary groundwater transport pathway from the Y-12 Plant (see the response to Public 1 below). In addition, DOE regularly monitors springs in Union Valley which are discharge points for groundwater. The six wells at variable depths combined with the springs provide an accurate network to monitor in Union Valley. The TDEC DOE Oversight division also monitors the same wells and springs and other locations in Scarboro Creek and the TDEC Division of Superfund is initiating additional monitoring at potential source areas in Union Valley.

[PUBLIC-1 COMMENT To what extent has the source term impacted the Union Valley area?

Response: Contaminants associated with the Y-12 Plant have been detected in samples from two monitoring wells and two springs in Union Valley. The two monitoring wells, GW-169 and GW-170, are located on City of Oak Ridge property just west of the Remotec property. GW-169 monitors groundwater at depths of 9.1B10.6 m (29.7B34.7 ft) below ground surface (bgs). GW-170 monitors groundwater at depths of 31.7B47.8 m (104B156.9 ft) bgs. The contaminants have been detected in these two monitoring wells since 1990; reported concentrations have been variable, with higher concentrations in GW-170, the deeper well. Carbon tetrachloride and chloroform, the primary components of the source term originating from the Y-12 Plant (see Public-2 and Public-5 Responses), have been detected only in GW-170 at maximum concentrations of 200 and 95 ppb, respectively.

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concentration of 4 ppb. PCE and TCE have been detected in these springs at maximum concentrations of 2 ppb.

The locations where the source term has been detected in Union Valley are underlain by the Maynardville Limestone, which is one of several geologic units that comprise Bear Creek Valley and Union Valley. The area at the surface that is underlain by the Maynardville Limestone is a relatively narrow band that extends along Bear Creek Valley and Union Valley. The Maynardville Limestone consists of limestone and dolostone, with interbedded shales. The unit is highly fractured and contains numerous cavities or karst features formed by the dissolution of the rock. Most of the karst features occur in the top 30 m (100 ft) of the limestone. The Maynardville Limestone transports groundwater and its associated contaminants eastward and acts as a drain for the Y-12 Plant (ORNL 1995).

The current assumption is that the springs in Union Valley and Scarboro Creek are discharge points for the groundwater in the Maynardville Limestone. Because Scarboro Creek is a discharge point, it is unlikely that the plume will move eastward beyond the creek. As noted in a June 2, 1995, letter from TDEC (see SSAB-13 Comment, OREPA-2 Comment, and SSAB-13 Response), the highly fractured nature of the bedrock underlying Union Valley suggests that it could transport contaminants in other directions; however, data from numerous wells at variable depths across the Y-12 Plant support the interpretation that the transport direction from the plant is almost exclusively eastward and is contained in the Maynardville Limestone. The hydraulic gradient and, therefore, the flow direction are from other formations toward the Maynardville Limestone. GW-382, which monitors groundwater 38.1 - 52.7 m (125 - 173 ft) bgs, has had maximum carbon tetrachloride and chloroform (a degradation product of carbon tetrachloride) concentrations of 7,400 and 1,100 ppb, respectively.

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In contrast, the highest PCE and TCE concentrations are in monitoring wells just to the north and west of New Hope Pond. Well GW-762, which is west of New Hope Pond and monitors groundwater 14.7 - 17.8 m (48.2 - 58.5 ft) bgs, has had maximum PCE and TCE concentrations of 1,400 and 75 ppb, respectively. Well GW-383, which is north of New Hope Pond and monitors groundwater 5.5 - 7.0 m (18.1 - 23.1 ft) bgs, has had maximum PCE and TCE concentrations of 510 and 190 ppb, respectively.

Comment 11: Page 3, Paragraph 2: In describing the use of water from Scarboro Creek for irrigation at the Arboretum, the text states that a some potentially hazardous constituents have been detected in the springs that feed Scarboro Creek, but the source of these constituents has not been confirmed, nor has any risk from those constituents been established. Please list which contaminants and the levels of contamination that have been found in Scarboro Creek and describe what actions are being taken to determine the source of these constituents. Also, please indicate what precautions are being taken to prevent adverse effects on human health and the environment from the use of water from Scarboro Creek. Human health and the environment should be protected even though the source of the contamination has not been confirmed.

Response: In addition to carbon tetrachloride, other VOCs, metals, and radio nuclides have been detected in surface water. A complete listing of contaminants and concentrations detected in groundwater and surface water in Union Valley is provided in the *Union Valley Interim Study Remedial Site Evaluation* (ORNL 1995). The relationship between the low levels of surface water contamination and releases from the Y-12 Plant is unclear. This relationship will be clarified in the Upper EFPC CA RI; however, identification of other potential sources in Union Valley is outside the scope of the RI. The State of Tennessee is initiating investigations of off-site sources.

At this time, no precautions to protect human health or the environment in Scarboro Creek are necessary. Should unacceptable contaminant levels be detected during monitoring by DOE or TDEC, precautions will be taken as described in SSAB-12 Response.

Comment 12: Page 3, Paragraph 3: Although this interim action is intended only to address contamination resulting from operations in the Upper EFPC CA, plans to investigate other potential sources either by DOE, TDEC, USEPA or another agency should be described.

Response: As described in Public 17 Response (shown below), the TDEC Division of Superfund is initiating an investigation of other potential sources in Union Valley. TDEC DOE Oversight Division and Division of Water Quality monitors contaminant levels in Scarboro Creek. Should contamination be detected above acceptable limits, TDEC could choose to post the creek, establishing the uses that are acceptable and those that are prohibited. To date, no such restrictions are necessary. Also, see SSAB-17 Response for a description of the DOE monitoring program.

[Public 17 - In the document, add statement regarding the landfill being a state Superfund site to the last paragraph under the summary of risks on page 5.

Response: The interim proposed plan has been issued to the public and will not be revised. The statement I the public meeting that the closed municipal landfill in Union Valley was included on the Tennessee Superfund list was incorrect; the reference was to a different landfill. The TDEC Division of Superfund has been notified of the Union Valley landfill and is initiating investigations into potential releases or other hazards. This is acknowledged in this ROD.]

Comment 13: Page 5, Paragraph 2: In this paragraph, it is stated that the plume is assumed to be contained the Maynardville Limestone. Please describe the basis of the assumption that the plume is contained n the Maynardville Limestone and the degree of certainty that this assumption is correct. The assumption is questioned in the letter dated June 2, 1995, from TDEC, DOE Oversight Division to DOE.

Also this paragraph, it is stated that a little contamination is expected at 300 m (1,000 ft) and below because there are fewer developed karst features at those depths and the formation is tighter. Is this conclusion based on a literature review or have core samples been collected in Union Valley to confirm this theory? This is especially important near the source of the plume where DNAPL is suspected to be present.

Response: Regarding containment of the plume in the Maynardville Limestone, please refer to Public-1 (paragraphs 4 and 5 shown below), Public 6, and Public 7 Responses. With respect to the reference to the TDEC comment from 1995, responses were prepared and submitted to TDEC and additional actions are being taken (See SSAB-8 response).

With respect to the depth of contamination, the statement is based upon our understanding of the groundwater flow and transport as summarized in the site conceptual model. Many lines of evidence and data, including core evaluation, entered into the development of the model. Deep multiport monitoring wells at the east end of the Y-12 Plant GW-722 and GW-131 confirm the vertical extent of contamination. GW-722, in particular, intersects the carbon tetrachloride plume, and samples below approximately 170 m (550 ft) do not exhibit contamination.

[Public Comment 6 - Will the plume continue to get worse/spread?

Response: It is believed that, under existing conditions the plume already has reached its terminus and is at a steady state. However, additional spreading cannot be dismissed, particularly if groundwater flow is altered, for example, through extraction of groundwater from new wells east of the plume.

Comment 14: Page 5, Summary of Risks, Paragraph 1: In this paragraph, it is stated that a number of organic, inorganic, and radioactive constituents were detected n Union Valley groundwater and surface water, but that the carbon tetrachloride-dominated plume is of particular interest because it originates from the Upper EFPC CA. Please include in the document what the source(s) of the other contaminants is (are) and how they are being addressed.

Response: Identification of other source(s) of contaminants is beyond the scope of the Upper EFPC CA RI, and these sources, if any, have not yet been evaluated. TDEC is investigating other potential sources (see Public-17 and SSAB-12 Responses). The institutional controls in the interim selected remedy should prevent unacceptable human exposure regardless of the source of contamination.

[Public Comment 17 - In the document, add statement regarding the landfill being a state Superfund site to the last paragraph under the summary of risks on page 5.

Response: The interim proposed plan has been issued to the public and will not be revised. The statement in the public meeting that the closed municipal landfill in Union Valley as included in the Tennessee Superfund list was incorrect; the reference was to a different landfill. The TDEC Division of Superfund has been notified of the Union Valley landfill and in initiating investigations into potential releases or other hazards. This is acknowledged in this ROD.

Comment 15: Page 5, Summary of Risks, Paragraph 3: The last sentence says that a ecological risk evaluations were not included in the Union Valley interim study. Please state whether ecological risk evaluations will be included in the Upper EFPC CA remedial investigation.

Response: Ecological risk evaluation is part of the Upper EFPC RI and results of the evaluation will be included in the RI report.

Comment 16: Page 5, Summary of Risks, Paragraph 4: In the last sentence, it is stated that A...some constituents could be found to originate from the municipal landfill or from other sources and would be outside the scope of this interim proposed plan. Although the municipal landfill and other sources may be outside of the scope of the plan, they are still a concern of the public. Therefore, the responsible local government agency should be notified and reference to this notification should be included in the plan. Please identify the municipal landfill and show the location.

Response: The golf driving range (119 Union Valley Road), which is north of and adjacent to the UT Arboretum, is located on the former Oak Ridge landfill. The location is shown in Figure 2.2 in the ROD. The landfill reportedly received municipal solid wastes. According to the Oak Ridge Community Development Office, Management Services, Inc., managed the landfill from the 1940s until it was acquired by the City in 1961. The exact closure date of the landfill is uncertain, but the lease to the driving range started on July 31, 1967. The TDEC Division of supervised is investigating the landfill.

Comment 17: Page 6, Description of alternative 2 (Institutional Controls): There is no mention of a groundwater or surface water monitoring program to ensure that the proposed institutional controls are adequate. The monitoring program that will be in place should be described (e.g., which monitoring wells and surface water locations would be sampled, sample frequency, constituents analyzed).

Response: The purpose of this ROD for interim actions is to protect human health by ensuring that no one drinks potentially contaminated groundwater or surface water. The only monitoring needed to ensure this protectiveness is of water use, not contamination levels. Institutional actions are intended to preclude and monitor use. Outside the scope of this interim action ROD, an integrated monitoring plan for the ORR has been drafted and is being reviewed by DOE. In that plan, Union Valley monitoring includes the six monitoring wells (GW-169, GW-170, GS-171, GW-172, GW-230 and GW-232) sampled twice a year with analysis for VOCs and gross alpha and beta activity. Springs SCR7.1SP, SCR7.18SP, and the Rogers Group Inc., quarry spring also would be sampled twice a year with analysis for VOCs and gross alpha and beta

activity. Spring SCRR7.8SP would be sampled twice a year for VOCs. Note that the plan is in review and these locations, frequencies, and analyses could change. TDEC will perform additional sampling at the wells, springs, landfill and in Scarboro Creek.

Comment 18: Page 6 (A Institutional Controls) and Page 8 (A short-term Effectiveness): Annual title searches are discussed on Page 6 (A...DOE would institute an annual title search..) and on Page 8 (A... ensure by DOEs annual title searches and notifications). Please explain exactly who would do the title searches and describe what mechanisms will be in place to ensure that annual title searches are conducted.

Response: The responsibilities for performing the title searches are described in the A Selected Remedy section of the ROD. Ensuring compliance with this requirement is addressed in SSAB-4 Response.

Comment 19: Page 9, Costs, Paragraph 1: In this paragraph, the assumed 6-year duration of the interim actions is referenced. Please explain why the license term is six (6) years instead of five (5) years as stated in Item 2 of the license?

Response: When the interim proposed plan was written, the projected date for issuing the Upper EFPC CA ROD was the year 2002. The 6-year period suggested in the proposed plan was intended to end approximately when the new ROD is issued. The current schedule expects completion of the final ROD by 2000. The draft license agreement attached to the proposed plan and the signed agreements have 5-year terms, and the provisions for canceling or renewing the license. The discrepancy was not intended, but should not affect the reliability of the license agreements in protecting public health or preventing actions that could spread the contamination.

The addition of WETF discharges results in a minimal 0.04 gram per kilogram increase in total uranium content of the city of Oak Ridge Biosolids and 0.002 milligram per kilogram increase in the life of the ORR Land Application Sites. There would be no significant impacts to geology and soils from the proposed actions.

Water Resources

Without the implementation of stringent biosolids land management practices specified by EPA, TDEC, DOE, and the COR, pathogenic, chemical, and/or radiological contaminants in biosolids could be transported to streams, ponds, and wetlands on the ORR. Such contamination could adversely affect aquatic organisms and ultimately man through bioaccumulation in the food chain. Management practices used to minimize the potential for significant impacts include limitations on land slope, prohibition of biosolids application sites in wetlands and floodplain, restrictions on application during precipitation and extreme cold, and establishment of minimum buffer zones between application sites and federal and state waterways. Vegetative cover is also used to reduce site runoff. To date, surface water monitoring on the ORR has shown no evidence of significant water quality degradation. Continuation of the program, as currently implemented, would not be expected to adversely impact ORR and offsite water resources.

Both WETF and the city of Oak Ridge discharge to East Fork Poplar Creek (EFPC). Removal of WETF discharges from NPDES Outfall #502 to the city of Oak Ridge Sewer System results in an additional maximum of 7.57 kilograms per year discharged to the city of Oak Ridge. A risk assessment was performed for the proposed discharge to the city of Oak Ridge sewer system and the total calculated risk was 10^{-9} , well below the acceptable EPA and DOE risk limit of 10^{-4} . Significant adverse impacts would not be encountered to water quality.

Air Quality

Atmospheric emissions from biosolids application are limited to dusts generated by spreading dried biosolids on land areas. Diffusion and deposition of radionuclide and chemical constituents in the dust particulates increases with time and distance from the application sites. Public access to the ORR is restricted, therefore, it is unlikely that humans would be affected by applications. An air dispersion model calculated that 0.00008 mrem/yr dose would be received for a person standing in an area receiving biosolids application. Significant impacts to air quality are not expected from the proposed actions.

Ecological Resources

Significant adverse effects to biota would not result from the proposed action. The physical presence of biosolids application vehicles would temporarily disturb and displace resident wildlife. Direct mortality would be minimal. Radionuclide and heavy metal monitoring of biota collected historically throughout the program do not indicate off-normal or elevated levels. Although listed threatened and endangered species are known to occur on the ORR, none have been adversely affected by biosolids application at specific ORR sites. DOE routinely and frequently consults with TDEC, the Tennessee Wildlife Resources Agency, and the U.S. Fish and Wildlife Service to ensure that protected species and habitat are not adversely impacted by the biosolids land application program and other DOE actions on the ORR. A full biological assessment was performed for the federally listed Gray and Indiana bats in which no impacts were projected from the proposed actions.

Another reasonable alternative considered was raising the dose-based radionuclide planning limit from 4 to 10 mrem/y and not allowing WETF discharges to the sanitary sewer system. This alternative was thoroughly evaluated and dismissed from consideration due to the extremely low levels of potential contaminants and the negligible impact upon city wastewater treatment operations and ORR Land Application Sites resulting from WETF discharges.

ENVIRONMENTAL IMPACTS:

Socioeconomics

Because additional personnel would not be needed to continue the biosolids land application program on the ORR, to operate the COR POTW or to operate WETF, a net change in employment would not be realized. The less than \$5,000 investment needed for construction of new wastewater pumps and a transfer line to the Y-12 Sanitary Sewer System would not impact the local economy. The increase in the radionuclide planning limits from 4 to 10 mrem/yr could have a major impact on the local economy; however, at the present time financial impacts from future industrial growth requiring radionuclide discharges to the sanitary sewer system is impossible to predict.

Environmental Justice

Potential impacts from the proposed action would be minor and would be restricted to the ORR. Thus, minority or low-income populations in the Oak Ridge area would not be disproportionately affected.

Land Use

Impacts to ORR land use would be unchanged. The resulting increase from 4 to 10 mrem/yr soil radionuclide limit and addition of WETF effluents to the Y-12 and city sewer systems would not effect the future use of the ORR land application sites.

Cultural Resources

In compliance with Section 106 of the National Historic Preservation Act, DOE consulted with the Tennessee State Historic Preservation Officer (SHPO) during the 1996 EA (DOE/EA-1042) regarding potential impacts to archaeological, historic, and cultural resources on the ORR. The SHPO determined that no adverse impacts would result from the proposed action. Biosolids application is prohibited in known archaeological and historic sites on the ORR. No further consultation was required with the SHPO because the same sites utilized in the proposed action for this EA were evaluated by the SHPO in the 1996 EA.

Geology and Soils

Biosolids application sites are prohibited in areas with known geological features, such as sinkholes. Both positive and negative impacts to soils result from the biosolids land application program. In addition to the nutrients derived from the biosolids, soils also receive heavy metals and radionuclides in trace quantities. Monitoring of specific soil constituents is performed regularly as prescribed by EPA and TDEC to protect public health and the ecosystem. Hence, significant adverse effects would not be expected. In addition, predictive modeling performed as part of the EA indicates that the land application sites would never achieve the proposed 10 mrem/yr dose planning level.

FURTHER INFORMATION ON THE NEPA PROCESS: Further information on the NEPA process and DOE NEPA regulations may be obtained from

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BACKGROUND: The U.S. Environmental Protection Agency (EPA) supports the beneficial use of municipal sewage sludge (biosolids) for fertilizer and soil conditioner on federal lands (56 *Federal Register* 30448). Since 1983, with the approval of TDEC and the DOE, biosolids from the City of Oak Ridge (COR) Publicly Owned Treatment Works (POTW) has been applied as a beneficial soil amendment to sites on the Oak Ridge Reservation (ORR). An EA (DOE/EA-1042) was completed on this program in 1996 that recommended the use of the existing application sites as well as the addition of ORNL and ETPP biosolids in the city of Oak Ridge Biosolids Program.

Biosolids ranging from 60 to 90% solids are applied to ORR sites from a standard manure spreader at a calculated annual agronomic (nitrogen) loading rate. Like many municipal biosolids, the COR POTW biosolids contain trace amounts of heavy metals and radionuclides. However, by law, it is exempt from regulation as a hazardous substance under the Resource Conservation and Recovery Act (RCRA) and is regulated by TDEC, Division of Water Pollution Control, in accordance with Section 405 of the Clean Water Act. At the present time, radionuclides in biosolids are not regulated by any state or government agency. Results of varying degrees of analyses of biosolids application site soils and vegetation indicate that concentrations of heavy metals, organics, inorganics and pathogens are well below regulatory limits.

The proposed action consists of two changes in the current biosolids land application program: (1) a change in radionuclide planning limit from a dose-based 4 mrem/yr to 10 mrem/yr using a TDEC-approved, risk-based model and (2) allowing treated wastewaters that meet appropriate limits to be discharged to the Y-12 and city of Oak Ridge Sanitary Sewer Systems. DOE action is needed to allow future industrial growth within the city of Oak Ridge while still utilizing the approved ORR land application sites and reduce the operational costs associated with WETF.

ALTERNATIVES: The no-action alternative was considered in accordance with DOE NEPA regulations (10 CFR 1021) to provide a baseline for comparison with the proposed action and alternatives. If no action is taken, the city of Oak Ridge could utilize any or all of the following options: (1) reduce existing radionuclide sources to the sewer system, most notably, the ORNL biosolids, not allowing WETF discharges to the sewer system and severely limiting existing commercial and government radionuclide discharges to the sewer system to accommodate future industrial growth; (2) the city could leave the ORR and freely distribute or sell biosolids to members of the public as long as EPA 40 CFR 503 Class A biosolids regulations are met; and (3) refuse new commercial and government discharges altogether. As a consequence, future city of Oak Ridge commercial growth could be directly impacted and DOE operational cost savings at ORNL (\$67K) and WETF (\$133K) will not be fully realized.

FINDING OF NO SIGNIFICANT IMPACT

PROPOSED CHANGES TO THE SANITARY BIOSOLIDS LAND APPLICATION PROGRAM ON THE OAK RIDGE RESERVATION, OAK RIDGE, TENNESSEE

AGENCY: U.S. DEPARTMENT OF ENERGY

ACTION: FINDING OF NO SIGNIFICANT IMPACT

SUMMARY: The U.S. Department of Energy (DOE) has completed an environmental assessment (DOE/EA-1356) that evaluates potential impacts of proposed changes in the sanitary biosolids land application program on the DOE Oak Ridge Reservation (ORR), Oak Ridge, Tennessee. Changes in lifetime biosolids land application radionuclide loading and the discharge of treated wastewaters from the Y-12 Plant West End Treatment Facility (WETF) are proposed. Lifetime biosolids land application radionuclide planning limits would increase from a cumulative dose of 4 millirem (mrem)/yr to 10 mrem/yr, which have been concurred upon by the Tennessee Department of Environment and Conservation (TDEC)-Division of Radiological Health. The permissible radiological dose from biosolids land application would change from the current limit of maximum cumulative dose of 4 mrem/yr to 10 mrem/yr in receiving soils for the maximally exposed individual. Biosolids land application sites would not change from those that are currently part of the program. Treated WETF wastewater discharges would be rerouted from the current discharge point on Upper East Fork Poplar Creek (UEFPC) to the Y-12 Sanitary Sewer System. This discharge change will occur based upon agreed discharge limits determined by the city of Oak Ridge and the Y-12 Sanitary Sewer Coordinator. Based on the results of the analysis reported in the EA, DOE has determined that the proposed action is not a major federal action that would significantly affect the quality of the human environment within the context of the National Environmental Policy Act of 1969 (NEPA). Therefore, preparation of an environmental impact statement (EIS) is not necessary, and DOE is issuing this Finding of No Significant Impact (FONSI).

PUBLIC AVAILABILITY OF EA AND FONSI: The EA and FONSI may be reviewed at and copies obtained from

U.S. Department of Energy
DOE Information Center
475 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
Phone: (865) 241-4780.