APPENDIX K

WEST END TREATMENT FACILITY
DOSE TECHNICAL MEMORANDUM

Technical Memorandum

To: Joe Birchfield
Alliant Corporation

Date: March 28, 2001

From: Lisa Stetar, CHP
Performance Technology Group

Subject: Dose Estimates for WETF Discharge of Uranium

As we discussed previously, the discharge of wastewater that contains only 2 mg/l (1350 pCi/l) of uranium from WETF into the Y-12 sewer system would not result in a measurable external exposure and does not represent a potential source of exposure via inhalation. Additionally, because the sewer connection is not accessible to the public, potential ingestion of the wastewater does not appear to be a plausible exposure pathway either.

If you have any questions or need additional information, please contact me.

PUBLIC COMMENTS RECEIVED

Many Voices Working for the Community

Oak Ridge Site Specific Advisory Board

November 14, 2002

Mr. David Allen
DOE Oak Ridge Operations
P.O. Box 2001, SE-30
Oak Ridge, TN 37831

Comments on the *Environmental Assessment for Proposed Changes to the Sanitary Biosolids Land Application Program on the Oak Ridge Reservation*, DOE/EA-1356

The Oak Ridge Site Specific Advisory Board (ORSSAB) has reviewed the subject environmental assessment. We offer the following comments and questions, which should be addressed in determining whether an environmental impact statement will be prepared or a Finding of No Significant Impact will be issued to proceed with the proposed action:

1. More information is needed on the soil hydraulic conductivity and other physical properties of the soils for the six active sites, which total 329 acres.

2. The map on page 1-6 needs to be revised and enlarged to show soils (i.e., recent soils map showing soil application series).

3. The map should have corresponding tables and legends, which identify the six active sites with data that incorporate estimates of exposure under worst scenario antecedent moisture conditions and lowest hydraulic conductivity.

4. More history on the six active sites as well as the inactive sites would be helpful in narrative form. Site history should also be taken into account in the estimation of the margin of safety for the maximally exposed individuals.

5. What were the prior uses and proximity of individuals over time to the sites? This information needs to be provided for the other sites: Watson Road, Scarboro Road, Rogers, McCoy, Cottonwood, and Site 8.

6. On page 1-5, the paragraph relating to the city of Oak Ridge's plans, as of the summer 2001, needs to be updated. Some discussion of what has transpired since then is needed. Change the tense from "plans" to "planned."

7. In light of the August 2002 referendum's defeat, the financial status of the city's operations and planned improvements needs to be re-evaluated and discussed. Some cost data on the new system and also on its long-term maintenance are necessary.

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E-mail: blacksl@oro.doe.gov • Web: http://www.oakridge.doe.gov/em/ssab

8. Please explain the statement on page 1-5 that refers to the city's planned new treatment system, which would "increase solids content and sterilize biosolids ... resulting in more manageable and safer material." What is meant by "more manageable and safer?"

9. The Executive Summary identifies an alternative to the proposed dose rate increase being "to leave the existing Oak Ridge Reservation land application sites altogether in favor of free distribution of the biosolids material to the public." It would seem that this option could be a cheap and easy alternative, and it should be evaluated.

10. How close to the 4 mrem/yr are we actually now? Or does the gamma monitoring not give enough data for this to be calculated?

11. Appendix D is based on a 20-year program, and it is also stated that we have 7 years remaining in that program; this would give a start date of 1989. What does 1989 correspond to, in reference to the Land Application Program started in 1984 and Oak Ridge National Laboratory (ORNL) adding waste in 1999?

12. Europium-155 has a higher limit than uranium (Table D.3). Does this imply that europium is a fairly large contributor? What is its source?

13. Why does the Rogers site have 56.8 percent of the allocated dose, according to Table 4.2?

14. Why are the cesium-137 concentrations in 1999 increased, uranium-235 concentration in 1996 high, and the uranium-238 concentration usually low compared to the limit (Table B.4)?

15. Section 1.0, page 1-1, 2nd paragraph. The ORSSAB presentations and tour of the biosolids land application sites involved the ORSSAB Waste Management Committee, not the full Board, and were informational. ORSSAB has taken no previous position on this proposal.

16. Section 1.1, page 1-2, 3rd paragraph. The 4 mrem/yr limit is coincidentally a drinking water maximum contaminant level for beta particles and photon radioactivity from man-made radionuclides. Use of the descriptor "self-imposed" oversimplifies the issue of setting a standard for radionuclides in sewage sludge and conveys a lack of objectivity in preparation of this environmental assessment.

17. Section 1.2.1, page 1-5, 2nd paragraph. More details on the proposed thermal treatment system need to be provided and the fate of radionuclides undergoing thermal treatment in the proposed system evaluated as part of this environmental assessment.

18. Section 1.2.1, page 1-7, 2nd paragraph. The results of the survey of publicly owned treatment works for baseline radioactivity associated with biosolid products needs to be discussed in this document if available from late 2001.

19. Section 1.2.1, page 1-8, 2nd paragraph. The letter from the Tennessee Department of Environment and Conservation–Division of Radiological Health claimed as approving the increase to 10 mrem/yr appears to only acknowledge concurrence at a planning level. The letter provided in Appendix A does not appear to be personally signed by the past division director.

20. Section 1.2.2, page 1-11, 1st paragraph. According to the *Oak Ridge Reservation Annual Site Environmental Report for 2001*, Outfall 502 (West End Treatment Facility) had zero discharge for the calendar year. Please provide details on what portions of the approximately $133,000 cost are due to effluent monitoring and treatment process changes, and be clear whether the proposal comparison is based on past or current operations.

21. Section 1.3, page 1-11, 1st paragraph. Why not evaluate additional alternatives, such as retaining the 4 mrem/yr limit with addition of Y-12 West End Treatment Facility discharge and excluding ORNL or East Tennessee Technology Park biosolids or other problematic discharges?

We appreciate the opportunity to provide comments and questions on this environmental assessment and look forward to learning about their resolution.

Sincerely,

David N. Mosby, Chair

cc: Gerald Boyd, DOE-ORO
Martha Crosland, DOE-HQ
Sherry Gibson, DOE-ORO
Pat Halsey, DOE-ORO
Connie Jones, EPA Region 4
John Owsley, TDEC
John Patterson, Bechtel Jacobs

CITY OF
OAK RIDGE

OFFICE OF THE MAYOR

POST OFFICE BOX 1 • OAK RIDGE, TENNESSEE 378

October 20, 2002

Mr. David Allen
U.S. Department of Energy
Oak Ridge Operations
SE-30, P. O. Box 2001
Oak Ridge, TN 37831

Comments on the Draft Environmental Assessment on Proposed Changes to the Sanitary Biosolids Land Application Program on the Oak Ridge Reservation (DOE/EA-1356, August 2002)

Dear Mr. Allen:

Enclosed is a copy of Resolution Number 11-149-02 as adopted by the Oak Ridge City Council on November 18, 2002. This resolution authorizes transmittal of the comments of our Environmental Quality Advisory Board on the subject draft environmental assessment as the official comments of the City of Oak Ridge.

Please ensure that our comments are given due consideration as you proceed with this project.

Very truly yours,

David R. Bradshaw

David R. Bradshaw
Mayor

jb

Enclosure

OFFICIAL FILE COPY
LOG NO. 86505
DATE RECEIVED NOV 2 4 2002
File Code

NUMBER 11-149-02

RESOLUTION

WHEREAS, the U.S. Department of Energy's (DOE) Oak Ridge Operations (ORO) office is proposing to increase approved radionuclide land loading limits for the Oak Ridge Reservation (ORI Biosolids Land Application Sites from a cumulative dose of 4 mrem/yr to 10 mrem/yr and to add treated, effluent discharges from the Y-12 West End Treatment Facility (WETF) into the Y-12 and Ci of Oak Ridge Sanitary Sewer Systems; and

WHEREAS, the DOE ORO has prepared a document entitled *Draft Environmental Assessment Proposed Changes to the Sanitary Biosolids Land Application Program on the Oak Ridg Reservation (DOE/EA-1356, August 2002);* and

WHEREAS, the DOE is soliciting comments on the Environmental Assessment (EA); and

WHEREAS, the City of Oak Ridge desires to officially comment to DOE on the EA; and

WHEREAS, the City of Oak Ridge's Environmental Quality Advisory Board (EQAB) has reviewed the EA and prepared a report to City Council with comments and recommendations for DOE's consideration in preparation of the final EA; and

WHEREAS, the assessment in the EA supports a conclusion that the proposed action does not pose a threat to human health and safety, regardless of future land use; and

WHEREAS, EQAB concludes that the proposed action appears to be environmentally responsible; and

WHEREAS, the City Manager recommends transmittal of the attached document entitled *Report on Environmental Quality Advisory Board Review of DOE Draft Environmental Assessment c Proposed Changes to the Sanitary Biosolids Land Application Program on the Oak Ridge Reservatic (DOE/EA-1356, August 2002).*

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCILMEN OF THE CIT OF OAK RIDGE, TENNESSEE:

That the recommendation of the City Manager is approved and the attached comments entitled *Report on Environmental Quality Advisory Board Review of DOE Draft Environmental Assessment on Proposed Changes to the Sanitary Biosolids Land Application Program on the Oak Ridge Reservation (DOE/EA-1356, August 2002)* be transmitted to the U.S. Department of Energy a the official comments of the City of Oak Ridge.

This the 18th day of November 2002.

APPROVED AS TO FORM AND LEGALITY:

Kenneth R. Krushenski
City Attorney

David R Brockman
Mayor

Jacqueline J. Bernard
City Clerk

Report on Environmental Quality Advisory Board Review of DOE Draft Environmental Assessment on Proposed Changes to the Sanitary Biosolids Land Application Program on the Oak Ridge Reservation (DOE/EA-1356, August 2002)

Background

This DOE Environmental Assessment (EA) discusses the environmental aspects of a proposal to increase the allowable amounts of radioactive substances in City of Oak Ridge sanitary sewage sludge that is applied on lands on the DOE Oak Ridge Reservation. It also discusses a related proposal for a specialized industrial wastewater treatment unit at the Y-12 Plant to discharge treated wastewater to the City sanitary sewer system instead of discharging directly to Upper East Fork Poplar Creek.

As EQAB understands it, the City and DOE have a long-standing arrangement in which the DOE Y-12 Plant discharges its sanitary wastewater into the City sewer system and DOE allows the City to apply wastewater sludge (the solid residue from wastewater treatment) on DOE land. The City also has agreed to process sludge from the ORNL (X-10) sanitary wastewater facility and apply this sludge on DOE land.

Currently, the sludge program operates under criteria that limit land application of radionuclides to ensure that a hypothetical resident farmer would receive a radiological dose of no more than 4 millirems (mrem) per year. The proposal would increase this dose ceiling to 10 mrem per year. The proposed higher radionuclide limit would give the program flexibility under which the City could continue to apply sludge on the current land-application sites until these areas have reached "lifetime" limits of 50 tons of sludge per acre (this means the existing sites could be used for an additional 20 years), the City could consider requests for increased discharges of radioactivity by industrial wastewater customers, and ORNL sludge could be processed together with the City sludge. Without an increase in the limit, the City might need to refuse to process ORNL sludge, refuse future requests for increases in radioactive discharges, or find new places to apply sludge.

The regulatory situation regarding land application of sewage sludge is unusual, particularly regarding radioactivity in sewage sludge. Land application of sewage sludge is subject to restrictions related to pathogens, nutrients, and metals, but there are no regulations on radionuclides in sewage sludge. Therefore, the City and DOE must (in effect) set our own standards. All sanitary wastewater and sludge contains some radioactive substances (from natural sources, medical procedures, and other sources), but few wastewater utilities have any information on the radioactivity in their wastewater and sludge. Oak Ridge is unique in having extensive data on these topics, and the City and DOE conduct extensive monitoring of sludge application activities.

Land application of metals in sewage sludge is regulated by the Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) to ensure that the total amounts of heavy metals applied to a site would not cause future exceedances of health-

based standards for people using crops grown on that land. DOE has used a risk analysis approach to derive a comparable set of standards for radionuclides, but this must be done without regulatory direction on a "safe" level of exposure. However, the TDEC Division of Radiological Health, has concurred that a hypothetical radiological dose of 10 mem per year is a reasonable value to use. For comparison, the average person's annual background radiation dose from natural sources is 300 mrem, the Nuclear Regulatory Commission (NRC) dose limit for members of the public exposed to radiation from NRC or state-licensed facilities is 100 mrem per year, the NRC limit for deriving radiological criteria for unrestricted use following decontamination and decommissioning of a licensed facility is 25 mrem per year, the EPA dose limit on radioactive air emissions is 10 mrem per year, and the EPA dose limit for certain radionuclides in drinking water is 4 mrem per year.

Recommendations from EQAB review

The assessment in the EA supports a conclusion that the proposed action does not pose a threat to human health and safety, regardless of future land use. Thus, it appears to be environmentally responsible. However, in adopting the higher limit, it is prudent for the City to seek assurance that sludge application at the higher radiological loading levels would not add to the local inventory of lands that future regulators might consider to be "contaminated." The analysis in the EA and the 10 mrem per year limit are both intended to avoid future restrictions on land use. Unfortunately, TDEC concurrence in the 10 mrem per year value does not necessarily guarantee that land where sludge was applied might not be considered "contaminated" at some time in the future.

We have some specific concerns and recommendations for DOE to consider in finalizing this document, to provide a more accurate record and to help inform DOE's and the City's decisions on this proposal.

1. It is not completely accurate to call the November 3, 1999, letter from Michael Mobley of TDEC an "approval," since there is no state regulatory authority under which TDEC could approve or deny radiological criteria for land application of sewage sludge. It would be more accurate to describe this letter by quoting the words it contains: "TDEC concurred in the use of 10 mrem/year as a planning level." Therefore, references to this letter in Page 6-1, paragraph 2, and elsewhere in the EA should be revised to quote this language or describe the letter as a "concurrence letter."

2. The EA should be revised to eliminate the statements that suggest that the purpose of the proposed action is to enable a private radioactive laundry facility to locate in Oak Ridge. Instead, state that a relaxation in the current 4 mrem/year standard would give the City flexibility to allow increases in discharges of radioactive substances to the sanitary wastewater system, while continuing to accept ORNL sewage sludge in the biosolids program.

3. The EA should be revised to eliminate statements that imply that existing restrictions on people's access to solids application sites on the Oak Ridge Reservation would continue forever.

However, we suggest that if these sites are ever transferred into private ownership, prospective owners should be made aware that the land was used for biosolids application.

4. To supplement the risk assessment in the EA, the EA should compare projected radionuclide concentrations in the top 6 inches of soil at the various land application sites with EPA's preliminary remediation goals (PRGs) for radionuclides. The EPA PRGs were cited and discussed in the recent EPA report on soils investigations in Oak Ridge's Scarboro neighborhood. These values are used by EPA to determine whether a site requires additional assessment under the Superfund program. It would be useful to have assurance that EPA would not come in and identify the sludge application areas as sites requiring Superfund investigation. Additional information about the PRGs for radionuclides is available on the Internet at http://epa-prgs.ornl.gov/radionuclides/.

5. An alternative approach to reducing average radionuclide loading at any individual site would be to add additional sludge application sites to the program and set lower limits on sludge loading at each site. The EA should consider and explore the potential impact of this alternative.

Specific comments

Page 7-2, lines 5-6. The 1996 EA is DOE/EA-1042. Please include the document number in the reference citation.

LOC INC
Oak Ridge Reservation
Local Oversight Committee

November 14, 2002

David R. Allen
U.S. Department of Energy
Oak Ridge Operations Office
SE-30-1
PO Box 2001
Oak Ridge, Tennessee 37831

Subject: Comments on Draft Environmental Assessment Proposed Changes to the Sanitary Biosolids Land Application Program on the Oak Ridge Reservation (August 2002; DOE/EA-1356)

Dear Mr. Allen:

The Citizens' Advisory Panel of the Oak Ridge Reservation Local Oversight Committee, Inc. submits the comments below on the subject document. These comments were approved by the CAP at its regular meeting of November 12, 2002. These comments have not been reviewed or approved by the LOC Board, thus they should be considered as being submitted by the CAP only.

In general, the document doesn't do a good job of separating the two issues under consideration (discharge of West End Treatment Facility [WETF] effluents into the Oak Ridge sanitary sewer system and increase of dose limit from biosolids land application). The CAP comments will deal with these separately.

The CAP supports adding the WETF effluents to the Oak Ridge sanitary sewer system. This not only saves DOE money by eliminating a costly NPDES permit, but it removes what in the past had been one of the more problematic discharges into Upper East Fork Poplar Creek. Treatment via the sanitary sewer system, including any required pretreatment, helps ensure that the ultimate discharge is much cleaner.

The question of dose limit increase at first seems inconsequential; however, this raises questions regarding whether other alternatives were adequately investigated. The no-action alternative is vaguely stated, and one scenario includes possible exclusion of sludge from ORNL, forcing it to dispose of it as low-level waste. It's not clear why ORNL sludge could not be applied to ORR lands under a separate program.

No other alternatives are proposed, and that is a deficiency of the document. One may be that the City of Oak Ridge ensures that dischargers have adequate measures in place to reduce radioactive discharges, which would eliminate the need for raising the limit. The other is to model the influence of sewer rehabilitation, which has already substantially decreased the uranium content of biosolids (page B-4).

Further, the comparison of alternatives do not discuss one of the largest classes of generators in a community—medical facilities. It would be helpful to know the relative contribution of radionuclides by Methodist Medical Center, the typical half-life, and whether this is a significant contribution to the dose rate calculation.

In addition, the reviewers found it difficult to follow the analysis of loading at application sites (Appendix E). What is the "lifetime" of the system? Does this assume that dispersion and decay will be in steady state with respect to application rates? The results as summarized on page E-2 do not support

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raising the limit; the Rogers Site, which has the greatest percentage of the proposed radionuclide loading limits, attains just 56.8% of the existing 4 mrem/yr limit under the predictive model.

The inclusion of Potassium-40 in Table G.3. is puzzling. Since that is a common naturally occurring radionuclide, does the amount listed represent the additional K-40 added to the system by other sources? If not, what proportion is considered natural background vs. what is added? K-40 is not known to be produced at any of the DOE sites.

Also confusing is that the lists of radionuclides of interest in various sampling schemes and models do not correspond to each other. This leads the reviewer to doubt whether the models are comparable and applicable. Tables 4.1 and 4.4 list Co-60, Cs-137, U-235, and U-238 for known radionuclides currently monitored. In Appendix B, four additional radionuclides (I-131, Be-7, K-40, Ra-228) are listed in Table B.4. as being found in city biosolids, although it is noted on page B-4 that medical facilities also contribute Tc-99m (not mentioned elsewhere). The RESRAD model in Appendix D addresses a suite of radionuclides that drop some of the ones in the previous tables (I-131, Be-7, K-40, Ra-228) and add others not noted previously (Eu-152, Eu-154, Eu-155, U-234, Mn-54, Zn-65, Sr-90, Cs-134), apparently based on the possibility that they might in the future demonstrate detectable levels. The Appendix E model is apparently based on historical average radionuclide levels observed in the sewer system—it is unknown whether these are the ones listed in the Section 4 tables or in Appendix B. The human health risk assessment in Appendix G uses six radionuclides, including all from Section 4 tables and two (K-40, Ra-228) from Appendix B. The Appendix G risk assessment notes that Be-7 and I-131 have half-lives of less than two months and so they were not considered (although one would expect that the risk from these could have been calculated based on application rate as their presence is being consistently renewed). The NPDES risk assessment in Appendix H only looks at the radiological risk from uranium. The dose impact model in Appendix I and the biological assessment in Appendix J consider only the four radionuclides listed in the Section 4 tables.

Similarly, the models that deal with the hazardous constituents also vary widely and thus may not be comparable and applicable.

The document refers to many actions that were to have happened in 2001. It needs to be updated to reflect all actions that have occurred up to the time that the draft EA was released for comment.

The CAP does not object to either of the actions. The proposed discharge of WETF effluents into the Oak Ridge sewer system is probably a net benefit. Certainly the decision to raise the dose limit from biosolids land application is more a value judgment than a significant technical or regulatory issue. The models and their underlying assumptions seem to be extremely conservative, calling into question the real need for the administrative action.

The CAP appreciates the opportunity to comment on the subject EA. If you have any questions on these comments, please contact the LOC office at 483-1333.

Sincerely,

Norman A. Mulvenon

Norman A. Mulvenon
Chair, LOC Citizens' Advisory Panel

cc: LOC Document Register
LOC CAP
LOC Board
John Owsley, Director, TDEC DOE-O
Jim Turi, Acting Manager, DOE ORO
Gerald Boyd, Assistant Manager for EM, DOE ORO
Pat Halsey, FFA Coordinator, DOE ORO
David Adler, Team Leader, Integrated Waste Disposition Planning and External Interface
Andrea Perkins, Acting Team Leader, Y-12/ORNL Projects
William Brumley, Manager, Y-12 Area Office
David Mosby, Chair, ORSSAB
Amy Fitzgerald, City of Oak Ridge

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

November 22, 2002

David Allen
NEPA Compliance Officer
DOE Oak Ridge Operations
PO Box 2001, SE-32
Oak Ridge, TN 37831-8739

Dear Mr. Allen

Draft Environmental Assessment (EA) for proposed changes to the sanitary biosolids land application program on the Oak Ridge Reservation

The Tennessee Department of Environment and Conservation (TDEC), DOE Oversight Division and the Division of Radiological Health (DRH) have reviewed the above subject document in accordance with the requirements of the National Environmental Policy Act and associated regulations of 40 CFR 1500-1508 and 10 CFR 1021 as implemented.

General Comments:

It should be noted that the subject sludge fails to meet the definition of Class A sludge according to 40 CFR 503 regulations in view of the proposed changes to add radiological constituents in the sludge. Class A sludge by definition are sludge with pathogens or other non- radiological constituents.

A map to identify areas of interest is necessary for this document. The wetlands, springs, and other pertinent topographical features are not obviously located on Figure 1.1 (the only map in the document). Perhaps a 1/2000 scale of the six application sites (include topography, streams, wetlands, sinkholes, ponds, buildings, roads, etc.) would be useful as a supplement to Figure 1.1. The lack of detail of Figure 1.1 does not allow for the projection of the Division of Natural Heritage Threatened and Endangered Species map data upon the biosolids map sites. This information is necessary to help determine potential impacts.

How often is the site sprayed with radioactive waste?

If the West End Treatment Facility (WETF) becomes a pretreatment facility before discharging wastewater to the sanitary sewer system, the city of Oak Ridge (COR) could require sampling and analysis at the facility. Costs would still be associated with this sampling and analysis.

Although the city requires monthly sampling of a 24-hour composite at the East End Sanitary Sewer Monitoring Station, this sampling is not continuous. Therefore, it is very likely that an upset condition of elevated radionuclide levels would not be recognized. Also, an exceedance of the derived concentration guideline (DCG) for radionuclides in DOE Order 5400.5 would not be recognized until after the elevated levels have entered the COR sewer system. This situation was seen in February 2000 when the Y-12 Central Pollution Control Facility (CPCF) batch discharge exceeded the DOE 5400.5 DCG for uranium by 14 fold. Due to dilution, this exceedance was not seen at the Station 17 sampling station and was not recognized until after receipt of the NPDES data results.

Since pretreatment requirements are usually less stringent than National Pollution Discharge Elimination System (NPDES) permit requirements; it is likely that there will be a decrease in the removal efficiency of the WETF. An interim goal of the NPDES program is to ensure that treatment facilities improve treatment capabilities over the life of the NPDES program. Maximum efficiency of the WETF will not be achieved when the sampling is performed at the East End Sanitary Sewer Monitoring Station after mixing with other Y-12 wastewater (including the landfill leachate).

Since Y-12's sanitary sewage, the Y-12 Steam Plant Wastewater Treatment Facility, the Y-12 Landfill V leachate, and now potentially the Y-12 West End Treatment Facility all discharge to the COR's sewer system, DOE Orders are applicable to the Biosolids Program. How does DOE intend to ensure that the Biosolids Program is in compliance with the applicable DOE Orders?

References were made as to TDEC-approved land application sites. The TDEC approval for the land application sites expired in 1999. TDEC does not provide lifetime approvals for sludge application sites. It should be noted that the 40 CFR 503 sludge concentration tables are based upon a lifetime application of 20 years. The city of Oak Ridge's program has been conducted for 19 years.

The Y-12 Modernization Program includes the addition of the Highly Enriched Uranium Facility, the Special Materials Complex, and the Enriched Uranium Manufacturing Facility. What wastewater will be produced from these facilities and does DOE plan to discharge wastewater from these facilities to the sanitary sewer system?

Specific Comments:

Page vii, 1st Paragraph, Last Sentence: states that *"In addition, ...discharge of treated wastewater from the West End Treatment Facility (WETF)...resulting in an operational cost savings of approximately $133,000 per year."* This statement and a similar statement on Page 2-5, Second Paragraph is incorrect or misleading because during the June 2002 Biosolids Working Group meeting DOE stated that the operational cost savings associated with the WETF have already been achieved by changes in the sampling and analysis strategy.

Page 1-2, Paragraph 30-32: states *"The long-term solution recommended by TDEC involved increasing land application site loading criteria from a cumulative dose-based on 4 mrem/yr to one based on 10 mrem/yr for a maximally exposed individual. The approval letter from TDEC is available in Appendix A."* The implication of this statement is misleading to the public and misguiding to COR and DOE in that TDEC does not recommend or provide long-term planning strategies or solutions for localities in this context of waste management.

Page 1-5, 1st Sentence: *"In the summer of 2001 the COR plans to implement a new de-watering and thermal treatment systems..."* The sentence is written in the future tense. What is the present status of the new system?

Page 1-7, Line 23: refers to a 2001 NRC survey that will be available to the public. The sentence is written in the future tense. What are the results of the survey?

Page 2-2, Lines 1-2: states *"Since contaminant levels are very low, DOE proposes a controlled, monitored discharge to the Y-12 Sanitary Sewer System..."* Please provide estimates or averages of the contaminant levels.

Page 2-2, Lines 9-11: states *"only a small portion of the total uranium... would be land applied."* Please explain the process that removes the greater portion of uranium before land application.

Page 2-6, Lines 7-13: *"The city could leave the ORR land application sites in favor of freely distributing the treated biosolids material to public outlets consistent with EPA regulations. All, present and future DOE sanitary wastewater and biosolids bearing any level of radionuclides requiring treatment in all likelihood, would not be accepted... forcing DOE to explore other more costly treatment alternatives... The acceptance and treatment of ORNL biosolids could also be discontinued."*

The above statement is made in reference to the No Action Alternative.

(1) If the biosolids are freely distributed to the public, will the public be aware of the radioactive constituents in the biosolids? The current EPA regulations for biosolids do not address radiological contamination in the biosolids.

(2) What is meant by "freely distributing?" Does this phrase mean cost free or widely distribute?
(3) Due to operational difficulties with the renovations of the POTW, it should be noted that the COR has not accepted or treated ORNL biosolids since the spring of 2001, which is approximately 19 months. The reason given for the non-acceptance is due to the operational difficulties with the current renovations to the POTW.
(4) Currently, the COR is experiencing operational difficulties with its renovations and is still producing Class B sludge during these difficulties. What is the COR contingency for land application sites during these and future operational difficulties?

Page 2-6, Lines 23-24: states *"An estimated cost savings of $133,000 projected in the Sanitary Sewer Assessment (WSMS 2000) would not be realized."* During the June 2002 Biosolids Working Group meeting DOE stated that the operational cost savings associated with the WETF have already been achieved by changes in the sampling and analysis strategy.

Pages 3-10, Lines 25-26: states *"Watson Road and Rogers sites do provide listed plant habitat for shade tolerant species."* and **Pages 3-11, Lines 14-16:** states *"One site, Rogers, is planted with a diverse array of shrubs, trees, and grasses which provide abundant wildlife and food habitat, but do not contain listed species or habitat."* There appears to be a contradiction between these statements. It is confusing to the reader as to whether Rogers site contains listed species or does not contain listed species or habitat. These statements need more explanation or clarification.

Page 4-4, Table 4.1: Cobalt-60 is shown with a risk of 2 X 10-4 for both 4 mrem/yr and 10 mrem/yr risk factors. Cobalt 60, although a short half-life (5.3 years) is a higher energy radionuclide than the others on the list. Is the chart correct?

Page 4-22, Line 33: *"Impacts of any additional pip installation."* Is this supposed to be pipe installation?

The following comments were provided by the Division of Radiological Health (DRH):

Page vii, Line 18-22
Recommend to include the 10 mrem/yr composite of 10 years of deposition in the resrad calculation. Does the calculation include what has already been deposited with the 4mrem limit? If not, why not?

Page viii, Line 31
Does the cost savings $133,000 come from the reduction of the utilization of the EPS?

Page 2-1, Lines 17-21
Include the composite of 10+years of deposition, current deposition plus expected.

Page 4-17, Line 21
Refers to concentration release limits or regulated concentration limits

Page 4-19
Can add risk factor from background radiation.

Page 4-19, Lines 30-33, and Page 4-20, Lines 1-5
Explain if the resrad calculation includes the sludge from the WETF and the POTW together, if your intention is for both sources of sludge to go on the same land area.

Page 5-4, Line 1-2
I don't understand why you state "no impacts" as oppose to negligible impacts.

Page 6-1, Line 33
Refers to release concentration limits.

Acknowledge documentation on:

1. Risk factors on page 4-4
2. CEDE to worker on page 4-12
3. External exposure for worker on page 4-17
4. POTW discharge to EFPC on page 4-8

If you have any questions concerning these comments, please contact Bill Childres or me at (865) 481-0995 or Sandra Szendy of DRH at (615) 532-0392.

Sincerely

John A. Owsley
Director

xc: Dodd Galbreath, TDEC-EPO
Eddie Nanny, TDEC-DRH
Paul Davis, TDEC-WPC

Jao686.99

COMMENT RESPONSES

DOE Oak Ridge Operations Environmental Management Comment Resolution for the Environmental Assessment for Proposed Changes to the Sanitary Biosolids Land Application Program on the Oak Ridge Reservation, DOE/EA-1356

Comment Number	Comment Author	Comment	Response
1	ORSSAB	More information is needed on the soil hydraulic conductivity and other physical properties of the soils for the six active sites, which total 329 acres.	All of the 6 active land application sites had full hydrogeologic evaluations (November 22, 1983 and August 24, 1989) that were performed by Mr. Glenn N. Pruitt, Geologist of TDEC-Division of Solid Waste Management and Mr. Terry Gupton of TDEC-Division of Water Pollution Control **prior** to commencement of biosolids land application operations. Each evaluation recommended the sites that are currently active for land application operations. Detailed descriptions of soils and geology on the sites are available in Section 3.4.2, Site-Specific Geology. References to the hydrogeologic evaluations that have been performed will be added to this section as well as to Section 7.0, References.
2	ORSSAB	The map on page 1-6 needs to be revised and enlarged to show soils (i.e., recent soils map showing soil application series).	The map that is provided on page 1-6 is the standard map that has been and is currently being used in documentation for the Oak Ridge Biosolids Land Application Program. The desired objective of the original map which is to simply show the location of the active land application sites on the Oak Ridge Reservation.
3	ORSSAB	The map should have corresponding tables and legends, which identify the six active sites with data that incorporate estimates of exposure under worst scenario antecedent moisture conditions and lowest hydraulic activity.	The map that is provided on page 1-6 is the standard map that has been and is currently being used in documentation for the Oak Ridge Biosolids Land Application Program. The desired objective of the original map which is to simply show the location of the active land application sites on the Oak Ridge Reservation. For the dose modeling the RESRAD default values for hydraulic conductivity were used which are 100 meters/year for the saturated zone and 10 meters/year for the unsaturated zone. In the RESRAD model, the volumetric water content of the contaminated zone is the product of the saturated water content of the contaminated zone (0.4) and the saturation ratio of the contaminated zone which is the ratio of the infiltration rate in meters/year and the saturated hydraulic conductivity raised to 1/(2b+3) where b is a soil-specific exponential parameter (default value for b = 5.3). As indicated by the sensitivity analysis, these parameters do not greatly influence the dose calculation. This is the reason the RESRAD defaults are used, they are generally considered conservative.

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4	ORSSAB	More history on the six active sites as well as the inactive sites would be helpful in narrative form. Site history should also be taken into account in the estimation of the margin of safety for the maximally exposed individuals.	Extensive work has gone into providing complete and detailed information relative to all active sites and is available in Section 3.0 and Appendix B, Section B.2, Tables B.5 through B.10. The tables condense the verbiage from various sections and tables into a fact sheet for each site, aiding the reader in the understanding of what levels of contaminants are currently found at what levels and other important environmental factors such as bodies of water, wetlands, etc. for each site. To the knowledge of the authors and DOE-ORO the sites that are currently being used for land application operations did not have any past historical experimental or operational projects conducted on them. Modeling assumptions for the land application site RESRAD and Risk Assessment portions of this EA utilize an extremely conservative 24-hour/365-day exposure scenario using 9 pathways for an on-site individual and are therefore considered "worst-case". Because there is no prior history on these sites, it is assumed that sites began with no contaminants. Therefore, application soil radionuclide limits for 23 separate nuclides utilizing a maximum dose of 10 mrem/yr for on-site individual was developed. Biosolids limits were back-calculated for these nuclides in Appendix D. The margin of safety is calculated by using the predictive modeling performed in Appendix E. This model predicts the concentration of radionuclide levels within the application site soils at the end of site life. The maximum projected level is at the Rogers Site which is 56.8% of the 4 mrem/yr limit or 20.1% of 10 mrem/yr limit. This demonstrates a safety factor of almost 80% for the proposed limit of 10 mrem/yr. Inactive sites are not discussed as they are not planned for future use and are therefore, not part of the scope of this EA.

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5	ORSSAB	What were the prior uses and proximity of individuals over time to the sites? This information need to be provided for the other sites: Watson Road, Scarboro Road, Rogers, McCoy, Cottonwood and Site 8.	Wording will be added to Section 1.2.1 regarding the past history of the application sites. To the knowledge of the authors and DOE-ORO the sites that are currently being used for land application operations did not have any past historical experimental or operational projects conducted on them. The sites are not adjacent to existing structures, houses, landmarks, recreational areas and are somewhat isolated from the public except for coordinated turkey and deer hunts and security personnel. Inactive sites are not discussed as they are not planned for future use and are therefore, not part of the scope of this EA.
6	ORSSAB	On page 1-5, the paragraph relating to the city of Oak Ridge's plans, as of the summer 2001, needs to be updated. Some discussion of what has transpired since then is needed. Change the tense from "plans" to "planned."	Wording has been changed to reflect the past tense. The city of Oak Ridge has already installed and begun processing the new biosolids product.
7	ORSSAB	In light of the August 2002 referendum's defeat, the financial status of the city's operations and planned improvements needs to be re-evaluated and discussed. Some cost data on the new system and also on its long-term maintenance are necessary.	This request is not within the current scope of this environmental assessment. The city of Oak Ridge is responsible for the treatment and processing of biosolids produced at the wastewater treatment plant. The active land application sites are authorized to accept Class B (lower classification of biosolids). The city's new system produces Class A (highest classification of biosolids) and can land apply biosolids produced from their wastewater treatment plant on the Oak Ridge Reservation or private property. How the city's system operates and what it costs is not relevant to this environmental assessment as long as all state and federal regulations are followed during the application of biosolids.

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8	ORSSAB	Please explain the statement on page 1-5 that refers to the city's planned new treatment system, which would "increase solids content and sterilize biosolids…resulting in more manageable and safer material." What is meant by "more manageable and safer?"	A detailed discussion of why the process is safer and more manageable is available on Pages 4-6 and 4-7 of the EA. The city of Oak Ridge produced liquid, Class B biosolids which had low biological activity and was difficult to handle due to the highly fluid mobility of the biosolids (approximately 98% water). The new biosolids treatment system produces >90% solids (<10% water) which can be easily transferred to the application vehicle and any spills of the material are immobile as compared to the highly manuervable liquid previously applied on the application sites. Also, solid biosolids produced by the city are sterilized or biologically inactive and can be land applied without the restrictions that Class B biosolids must meet. The result, a safer, more manageable material.
9	ORSSAB	The Executive Summary identifies an alternative to the proposed dose rate increase being "to leave the existing Oak Ridge Reservation land application sites altogether in favor of free distribution of the biosolids material to the public." It would seem that this option could be a cheap and easy alternative, and it should be evaluated.	This statement was made in regards to a potential city of Oak Ridge action not a DOE action. Non-federal activities conducted on private property are not required to undergo a NEPA evaluation.
10	ORSSAB	How close to the 4 mrem/yr are we actually now? Or does the gamma monitoring not give enough data for this to be calculated?	Appendix B, Tables B.5 through B.10 provides an up-to-date calculation of how much of each radionuclide has been applied on each active site. Each site level is well under the established 4 mrem/yr limit using the sum of fractions methodology (limit = 1).
11	ORSSAB	Appendix D is based on a 20-year program, and it is also stated that we have 7 years remaining in that program; this would give a start date of 1989. What does 1989 correspond to, in reference to the Land Application Program started in 1984 and Oak Ridge National Laboratory (ORNL) adding waste in 1999?	Although all of the sites received approval for the land application of biosolids in 1984, with the exception of the Watson Road site (1989), the city of Oak Ridge began using the active sites in 1989. From 1984 to 1989 other inactive program sites were used. The city of Oak Ridge began accepting ORNL biosolids in 1999.

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12	ORSSAB	Europium-155 has a higher limit than uranium (Table D.3). Does this imply that europium is a fairly large contributor? What is its source?	A higher soil guideline value implies less of a contribution to dose (i.e., it takes more Eu-155 to give a 10 mrem/year dose (for our exposure scenario) than most of the other radionuclides. The soil guideline for Eu-155 and uranium are very similar (i.e., they both make comparable contributions to dose), but the biosolids limit for Eu-155 is much higher than the biosolids limit for uranium. The reason for this is that the Eu 155 has a much shorter half-life (less than 2 years) so you can put more on the site each year without it building up over time. The ORNL biosolids are the potential source of Eu-155 in the city system.
13	ORSSAB	Why does the Rogers site have 56.8 percent of the allocated dose, according to Table 4.2?	Table 4.2 represents the predictive model results that 56.8% of the established limit would be attained at the end of the Rogers Site application site life. This site has the highest amount of calculated radioactivity loading to date as demonstrated in Table B.8 and therefore, would project to attain the highest level of radioactivity in site soils at the end of application site life.
14	ORSSAB	Why are cesium-137 concentrations in 1999 increased, uranium-235 concentration in 1996 high, and the uranium-238 concentration usually low compared to the limit (Table B.4)?	The cesium-137 concentrations increased in 1999 due to the acceptance of the ORNL biosolids. The U-235 level of 1.85 pCi/g is 1.1% of the 4 mrem/yr limit and is not considered "high". The decrease of U-238 is due to the Y-12 Plant sewer system rehabilitation project that was completed in 1999.
15	ORSSAB	Section 1.0, page 1-1, 2nd paragraph. The ORSSAB presentations and tour of the biosolids land application sites involved the ORSSAB Waste Management Committee, not the full Board, and were informational. ORSSAB has taken no previous position on this proposal.	Reference will be changed to the ORSSAB Waste Management Committee and in no way implied that ORSSAB has taken a position on the environmental assessment being reviewed. The reference was simply stated to point out public involvement activities prior to the issuance of this document.

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16	ORSSAB	Section 1.1, page 1-2, 3rd paragraph. The 4 mrem/yr limit is coincidentally a drinking water maximum contaminant level for beta particles and photon radioactivity from man-made radionuclides. Use of the descriptor "self-imposed" oversimplifies the issue of setting a standard for radionuclides in sewage sludge and conveys a lack of objectivity in preparation of this environmental assessment.	There are no radionuclide limits for biosolids products in the United States. The original RESRAD modeling for radionuclides performed for the Oak Ridge Biosolids Land Application was originally based upon the 4 mrem/yr drinking water standard and expanded from 4 to 21 radionuclides in the 1996 environmental assessment on the program. This list was expanded to 23 radionuclides for the 10 mrem/yr planning limit in the current environmental assessment. Because of the fact that there are no radionuclide limits for the application of biosolids, the limits presented for the biosolids and application site soils are by definition "self-imposed", as no other regulatory body has developed and implemented these standards for any land application program in the nation.
17	ORSSAB	Section 1.2.1, page 1-5, 2nd paragraph. More details on the proposed thermal treatment system need to be provided and the fate of radionuclides undergoing thermal treatment in the proposed system evaluated as part of this environmental assessment.	Years of operational monitoring for radionuclides within the Oak Ridge Wastewater Treatment System have demonstrated that the vast majority of radionuclides contained within the discharges end up in the biosolids phase of the treatment process. This data was based upon a liquid biosolids treatment system. With the installation of the new solids treatment system, the system further enhances the removal of any residual nuclides from wastewaters and the "fate" of these nuclides is assumed to be the land application sites. All modeling assumes 100% of the radionuclides will go to the biosolids phase of the treatment process, which is extremely conservative as discussed on Page 4-9 of the EA. In reality, a loss of radionuclides could occur at the wastewater treatment plant; however, these treatment operations are conducted by a non-federal entity (city of Oak Ridge) on private property which is not required to be evaluated by a NEPA review. Moreover, specific details of the city biosolids treatment process equipment does not have any value added since 100% of the radionuclides are assumed to be land-applied on the active sites.
18	ORSSAB	Section 1.2.1, page 1-7, 2nd paragraph. The results of the survey of publicly owned treatment works for baseline radioactivity associated with biosolid products needs to be discussed in this document if available from late 2001.	The results of this survey were expected to be published by the EPA and NRC within the original referenced timeframe; however, they were not available at the time of publication of this environmental assessment. Reference will be changed to "in future months."

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19	ORSSAB	Section 1.2.1, page 1-8, 2nd paragraph. The letter from the Tennessee Department of Environment and Conservation-Division of Radiological Health claimed as approving the increase to 10 mrem/yr appears to only acknowledge concurrence at a planning level. The letter provided in Appendix A dose not appear to be personally signed by the past division director.	Acknowledged. The reference will be changed from "approval" to "concurrence". Both the 4 and 10 mrem/yr are "planning levels" as it is not expected that the maximum limit will ever be achieved especially given the fact that the active sites have been in use for some time and have varying levels of life expectancy remaining. Because of a lack of radionuclide standards for any land application program, "concurrence" rather than "approval" is appropriate. The letter provided by the city of Oak Ridge was produced on TDEC-Division of Radiological Health Letterhead and properly signed. There is no reason to doubt the authenticity or content of the concurrence letter in question.
20	ORSSAB	Section 1.2.2, page 1-11, 1st paragraph. According to the Oak Ridge Reservation Annual Site Environmental Report for 2001, Outfall 502 (West End Treatment Facility) had zero discharge for the calendar year. Please provide details on what portions of the approximately $133,000 cost are due to effluent monitoring and treatment process changes and be clear whether the proposal comparison is based on past or current operations.	The management and operations contractor for the West End Treatment Facility (WETF) is WSMS-MK. Since work began on the preparation of this environmental assessment, WSMS-MK gained approval from TDEC to begin bulking treated wastewaters for a bulk discharge through Outfall 502. In 2001, wastewaters were bulked and not discharged. Approximately $58,000 of estimated $133,000 in cost savings is based upon past operations and includes all analytical costs, additives, etc associated with the final WETF discharge operation.
21	ORSSAB	Section 1.3, page 1-11, 1st paragraph. Why not evaluate additional alternatives, such as retaining the 4 mrem/yr limit with addition of Y-12 West End Treatment Facility discharge and excluding ORNL or East Tennessee Technology Park biosolids or other problematic discharges?	Authorization to discharge to the city of Oak Ridge Sewer System is a city of Oak Ridge Management decision. The city of Oak Ridge has stated that if the 10 mrem/yr planning limit is not adopted, the city of Oak Ridge would have no choice but to reduce the radionuclide discharges to the city sewer system beginning with the most recent discharger (ORNL biosolids), not allow the addition of WETF and lower other DOE and commercial contributors in an effort to accommodate any new entities. This would severely limit all new and existing radionuclide discharges to the city system. The city could also leave the Oak Ridge Reservation and sell or give away Class A biosolids to anyone that expressed an interest in using the material.

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22	EQAB	It is not completely accurate to call the November 3, 1999, letter from Michael Mobley of TDEC an "approval," since there is no state regulatory authority under which TDEC could approve or deny radiological criteria for land application of sewage sludge. It would be more accurate to describe this letter by quoting the words it contains: "TDEC concurred in the use of the 10 mrem/year as a planning level." Therefore, references to this letter in Page 6-1, paragraph 2 and elsewhere in the EA should be revised to quote this language or describe the letter as a "concurrence letter."	Acknowledged. See response to comment #19. Wording will be revised on page 6-1 and elsewhere throughout the document.
23	EQAB	The EA should be revised to eliminate the statements that suggest that the purpose of the proposed action is to enable a private radioactive laundry facility to locate in Oak Ridge. Instead, state that a relaxation in the current 4 mrem/year standard would give the city flexibility to allow increases in discharges of radioactive substances to the sanitary wastewater system, while continuing to accept ORNL sewage sludge in the biosolids program.	Acknowledged. Reference to the laundry will be deleted throughout the document and the requested verbiage added where appropriate.
24	EQAB	The EA should be revised to eliminate the statements that imply existing restrictions on people's access to solids application sites on the Oak Ridge Reservation would continue forever. However, we suggest that if these sites are ever transferred into private ownership, prospective owners should be made aware that the land was used for biosolids application.	Modeling assumes a home-steader scenario which is a person that lives on the application sites 24-hours per day/365-days per year for 100 years. The wording referenced implied that access is restricted during normal biosolids land application operations and in no way implied the future use of the sites. Wording will be changed to clarify the reference. 40 CFR 503 regulations require notification that land application of biosolids has occurred on the property prior to change of ownership and all regulated contaminant levels be maintained.

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25	EQAB	To supplement the risk assessment in the EA, the EA should compare projected radionuclide concentrations in the top 6 inches of soil at the various land application sites with EPA's preliminary remediation goals (PRGs) for radionuclides. The EPA PRGs were cited and discussed in the recent EPA report on soils investigations in Oak Ridge's Scarboro neighborhood. These values are used by EPA to determine whether a site requires additional assessment under the Superfund program. It would be useful to have assurance that EPA would not come in and identify the sludge application areas as sites requiring Superfund investigation. Additional information about the PRGs for radionuclides is available on the Internet at http://epa-prgs.ornl.gov/radionuclides/.	The purpose of the EA is to evaluate land application of city Oak Ridge bisolids relative to a proposed 10 mrem/yr dose limit, not a risk-based cleanup level. The EPA's Risk Assessment Guidance for Superfund: Vol. 1 Human Health Evaluation Manual Part B notes that PRGs are established early in the scope phase of a CERCLA cleanup project, and are modified as more site specific data are collected during the RI/FS process. PRGs are meant to be used by remedial design staff during the RI/FS to focus the selection of remedial alternatives and may change as the RI/FS is completed. They are also an important tool for establishing data quality objectives early on in the cleanup process. The PRG is, therefore, not a fixed target during the cleanup process and may change as the RI/FS evolves. Inclusion of the PRGs would be very misleading because 1) the EA does not assess remedial actions under CERCLA and 2) there is not intention of refining the preliminary risk-based value. The Interagency Steering Committee on Radiation Standards (ISCORS), which includes EPA, DOE, NRC, DOD, DOT and DHHS released ISCORS Technical Report No. 1 in July 2002, reporting a does to risk conversion factor of approximately 8 x 10-7 to cancer risk/mrem, plus or minus an order of magnitude. A 10 mrem dose is therefore roughly equivalent to 8 x 10-6 risk of cancer incidents (30 year exposure). Even within the range of uncertainty, 10 mrem translated into 8 x 10-5 to 8 x 10-7: all within the National Contingency Plan acceptable risk range of 10-4 to 10-6.
26	EQAB	An alternative approach to reducing average radionuclide loading at any individual site would be to add additional sludge application sites to the program and set lower limits on sludge loading at each site. The EA should consider and explore the potential impact of this alternative.	This alternative has already been assessed in the previous EA, DOE/EA-1042, Dated October 1996 and use of the current sites was selected as the preferred alternative.
27	EQAB	Page 7-2, lines 5-6. The 1996 EA is DOE/EA-1042. Please include the document number in the reference citation.	Acknowledged. Document number has been added.
28	LOC	The no-action alternative is vaguely stated, and one scenario includes possible exclusion of sludge from ORNL, forcing it to dispose of it as low-level waste. It's not clear why ORNL sludge could not be applied to ORR lands under a separate program.	This alternative has already been assessed in the previous EA, DOE/EA-1042, Dated October 1996 and use of the city of Oak Ridge Biosolids Program was selected as the preferred alternative.

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29	LOC	No other alternatives are proposed, and that is a deficiency of the document. One may be that the city of Oak Ridge ensures that dischargers have adequate measures in place to reduce radioactive discharges, which would eliminate the need for raising the limit. The other is to model the influence of sewer rehabilitation, which has already substantially decreased the uranium content of biosolids (page B-4.)	This EA only addresses actions conducted by the federal government on federal property, in this case, the Oak Ridge Reservation. How the city of Oak Ridge administers their industrial pre-treatment program and maintenance activities of sewer system rehabilitation program is not within the scope of this EA.
30	LOC	Further, the comparison of alternatives do not discuss one of the larges classes of generators in a community - medical facilities. It would be helpful to know the relative contribution of radionuclides by Methodist Medical Center, the typical half-life and whether this is a significant contribution to the dose rate calculation.	Radionuclide discharges from medical facilities are exempt from EPA and NRC regulation. The chief nuclide of concern in the Oak Ridge sewer system from Methodist Medical Center is Iodine-131. Because I-131 has a half-life of only 8 days and the length of treatment and land application (60 to 90 days) at the wastewater treatment plant, it has virtually decayed off before it is land-applied; therefore, I-131 does not contribute to the dose rate calculation.

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31	LOC	In addition, the reviewers found it difficult to follow the analysis of loading at application sites (Appendix E). What is the "lifetime" of the system? Does this assume that dispersion and decay will be in steady state with respect to application rates? The results as summarized on page E-2 do not support raising the limit; the Rogers Site, which has the greatest percentage of the proposed radionuclide loading limits, attains just 56.8% of the existing 4 mrem/yr limit under the predictive model.	Appendix E represents a predictive modeling analysis that "predicts" what radionuclide levels each of the current land application sites will attain when they reach the end of their site life, which is 50 tons/acre. The model assumes no decay and even dispersion throughout the upper 6 inches of soil on each application site. The purpose of this model is demonstrate that the current and proposed radionuclide planning levels have an extremely low probability of attaining the soil radionuclide levels listed in Appendix D, Table D.3. Although only 56.8% of Rogers Site radionuclide limits would be achieved at the end of site life, the city of Oak Ridge uses "worst-case" discharge modeling for all dischargers and the authorized 4 mrem/yr planning level to determine how much and what radionuclides can be accepted in the sewer system. With the addition of ORNL in 1999, the maximum planning level of 4 mrem/yr for all dischargers both government and commercial, had been achieved. Although it is extremely unlikely that all permitted dischargers will discharge the maximum allocated radionuclide levels to the Oak Ridge Sewer System at one time, EPA requires municipal wastewater treatment plants to use "worst-case" planning to allocate front-end discharges. Front-end limits cannot exceed end-point limits. Put simply, the pre-treatment radionuclide planning levels must be increased to 10 mrem/yr in order to allow the city of Oak Ridge the flexibility to accept new commercial and government customers and therefore, the land application sites planning levels must be increased to 10 mrem/yr as well. This is explained on Pages 1-8 & 1-9 of the EA.
32	LOC	The inclusion of Potassium-40 in Table G.3 is puzzling. Since that is a common naturally occurring radionuclide, does the amount listed represent that additional K-40 added to the system by other sources? If not, what proportion is considered natural background vs. what is added? K-40 is not known be produced at any of the DOE sites.	ORNL has conducted independent testing and analysis of the city of Oak Ridge biosolids. Table G.3 represents historical levels noted in the Oak Ridge Biosolids and was provided as a background analysis by ORNL. The levels of K-40 displayed represent background values for the city of Oak Ridge Biosolids. K-40 is included in the 4 and 10 mrem/yr planning levels because it has the potential to be present in ORNL Biosolids.

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33	LOC	Also confusing is that the lists of radionuclides of interest in various sampling schemes and model do not correspond to each other. This leads the reviewer to doubt whether the models are comparable and applicable. Tables 4.1 and 4.4 list Co-60, Cs-137, U-235 and U-238 for known radionuclides currently monitored. In Appendix B, four additional radionuclides (I-131, Be-7, K-40 and Ra-228) are listed in Table B.4. as being found in city biosolids, although it is noted on page B-4 that medical facilities also contribute Tc-99m (not mentioned elsewhere).	As stated in the response to comment #32, ORNL has independently performed the city biosolids radionuclide. ORNL reports background radionuclides such as K-40, Be-7 and Ra-228 which are not discharged by any known discharger and are considered background values for the city of Oak Ridge Biosolids. I-131 is monitored also but because of its short half-life (8 days) it does not accumulate on the biosolids land application sites and does not contribute to the on-site dose. Tc-99m is a medical isotope that is used to destroy thyroid tissue. It has an extremely short half-life (6 hours) and typically degrades before it arrives at the wastewater treatment plant for treatment. Therefore, it is not monitored and does not contribute to the on-site dose. This is explained in Appendix D, Page D-5 of the EA.
34	LOC	The RESRAD model in Appendix D addresses a suite of radionuclides that drop some of the ones in the previous tables (I-131, Be-7, K-40, Ra-228) and add other not noted previously (Eu-152, Eu-154, Eu-155, U-234, Mn-54, Zn-65, Sr-90, Cs-134), apparently based on the possibility that they might in the future demonstrate detectable levels.	See responses for comments 32 & 33. The new nuclides were added because ORNL informed the city of Oak Ridge of the possibility that they may be present in their biosolids.
35	LOC	The Appendix E model is apparently based on historical average radionuclide levels observed in the sewer system-it is unknown whether these are the ones listed in the Section 4 tables or in Appendix B.	The Tables in Section 4 represent risk factors and dose rates. Appendix B provides characterization data for the Oak Ridge Biosolids. The predictive modeling performed in Appendix E uses historical averages of the nuclides over a 14 year period (since 1988) and includes the data presented in Appendix B for biosolids radionuclides. Appendix B only includes biosolids radionuclide data from 1996 to 2000.
36	LOC	The human health risk assessment in Appendix G uses six radionuclides, including all from Section 4 tables and two (K-40, Ra-228) from Appendix B. The Appendix G risk assessment notes that Be-7 and I-131 have half-lives of less than two months and so they were not considered (although one would expect that the risk from these could have been calculated based on application rate as their presence is being consistently renewed).	Short-lived radionuclides such as Be-7 and I-131 were not included in risk calculations because of their short half life and the time that is required for wastewater treatment and biosolids production to be completed (60 to 90 days from discharge point). By the time of land application, there are minimal amounts of these nuclides present and therefore, are not calculated in the long-term risk scenarios provided as a part of this EA.
37	LOC	The NPDES risk assessment in Appendix H only looks at the radiological risk from uranium.	This is due to the fact that this assessment was primarily for comparing risk factors for discharge of WETF wastewaters directly to EFPC vs. sanitary sewer. Only uranium is found in the WETF wastewaters.

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38	LOC	The dose impact model in Appendix I and the biological assessment in Appendix J consider only the four radionuclides listed in the Section 4 tables.	The four nuclides listed are the ones that are recognized to be present in the Oak Ridge Sewer System, are closely monitored and have the greatest potential to provide the majority of any dose received as a result of the land application of biosolids.
39	TDEC DOE Oversight	It should be noted that the subject sludge fails to meet the definition of Class A sludge according to 40 CFR 503 regulations in view of the proposed changes to add radiological constituents in the sludge. Class A sludge by definition are sludge with pathogens or other non-radiological constituents.	Class A biosolids per the referenced 40 CFR 503 regulations are biosolids that meet Table 3, 40 CFR 503.13 heavy metal pollutants limits, one of Class A Pathogen Reduction requirements as listed in 40 CFR 503.32(a)(1) through (a)(8) and one of vector attraction reduction requirements listed in 40 CFR 503.33(b)(1) through (b)(12). Radionuclides in biosolids are not regulated by the U.S. EPA, NRC or delegated states and are not included in the 40 CFR 503 regulations. Radionuclides are present in all biosolids products as evidence from the 1995 Association of Metropolitan Sewerage Agency survey. Survey results can be found at http://www.amsa-cleanwater.org/pubs/radioactivity/appendixc2.pdf. The presence or absence of radionuclides in biosolids have no bearing on the EPA classification of biosolids products at municipal wastewater treatment plants.
40	TDEC DOE Oversight	A map to identify areas of interest is necessary for this document. The wetlands, springs, and other pertinent topographical features are not obviously located on Figure 1.1 (the only map in the document). Perhaps a 1/2000 scale of the six application sites (include topography, streams, wetlands, sinkholes, ponds, buildings, roads, etc.) would be useful as a supplement to Figure 1.1. the lack of detail of Figure 1.1 does not allow for the projection of the Division of Natural Heritage Threatened and Endangered Species map data upon the biosolids map sites. This information is necessary to help determine potential impacts.	The map that is provided on page 1-6 is the standard map that has been and is currently being used in documentation for the Oak Ridge Biosolids Land Application Program. The requested change is viewed as adding additional information that complicates the desired objective of the original map which is to simply show the location of the active land application sites on the Oak Ridge Reservation. Detailed information on wetlands, threatened and endangered species, etc. is available in Section 3.0 of the EA and the U.S. Fish and Wildlife Service (FWS) has also reviewed the proposed changes with regards to impacts to Threatened and Endangered Species. FWS responded with a request for a biological assessment for the Gray and Indiana Bats. A full BA was performed in Appendix J and was concurred on by FWS on September 25, 2002.
41	TDEC DOE Oversight	How often is the site sprayed with radioactive waste?	The Oak Ridge Reservation Biosolids Land Application Sites are only authorized for use by the city of Oak Ridge to apply **sanitary** biosolids that meet or exceed all 40 CFR 503 requirements. Radioactive waste has never been "sprayed" on the application sites.

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42	TDEC DOE Oversight	If the West End Treatment Facility (WETF) becomes a pretreatment facility before discharging wastewater to the sanitary sewer system, the city of Oak Ridge (COR) could require sampling and analysis at the facility. Cost would still be associated with this sampling and analysis.	Regardless of whether WETF discharges to EFPC or the city sewer system, WETF will treat all wastewaters and is not considered a "pretreatment" facility. Use of this term indicates that the citys wastewater treatment will remove the majority of the WETF contaminants when in fact WETF removes 99.9% of all contaminants through its treatment process. Discharge to the city sewer system offers a more cost-efficient option for WETF operations. While the city could require additional sampling within WETF operable units, WETF operations performs a number of additional samples **prior** to wastewater bulking in order to assess whether treated wastewaters could potentially be discharged to the sewer system. In addition, a final compliance sample will be performed, analyzed and reported **prior** to authorization to proceed discharging which involves over 165 contaminant parameters, as opposed to approximately 25 that would normally be required to discharge to the sewer system. The cost of these analytical samples have been included in all cost savings calculations.
43	TDEC DOE Oversight	Although the city requires monthly sampling of a 24-hour composite at the East End Sanitary Sewer Monitoring Stations, this sampling is not continuous. Therefore, it is very likely that an upset condition of elevated radionuclide levels would not be recognized. Also, an exceedence of the derived concentration guideline (DCG) for radionuclides in DOE Order 5400.5 would not be recognized until after the elevated levels have entered the COR sewer system. This situation was seen in February 2000 when the Y-12 Central Pollution Control Facility (CPCF) batch discharge exceeded the DOE 5400.5 DCG for uranium by 14 fold. Due to dilution, this exceedence was not seen at the Station 17 sampling station and was not recognized until after receipt of the NPDES data results.	Each batch that is treated and bulked at WETF will undergo a 5400.5 evaluation **prior** to discharge to the sewer system. All contaminant data is also forwarded to the Y-12 Sanitary Sewer Coordinator, who will review and approve WETF for discharge, as well as the rate at which treated wastewater will be pumped into the sewer system. All radionuclide levels will be known before discharge and the rate at which it enters the sewer system is controlled such that if an upset situation from flooding, excess radionuclide discharges from any other source within the Y-12 plant sewer system or ruptures within the sewer lines occurs, WETF discharges can be instanteously halted.

Comment Number	Comment Author	Comment	Response
44	TDEC DOE Oversight	Since pretreatment requirements are usually less stringent than National Pollution Discharge Elimination System (NPDES) permit requirements; it is likely that there will be a decrease in the removal efficiency of the WETF. An interim goal of the NPDES program is to ensure that treatment facilities improve treatment capabilities over the life of the NPDES program. Maximum efficiency of the WETF will not be achieved when the sampling is performed at the East End Sanitary Sewer Monitoring Station after mixing with other Y-12 wastewater (including the landfill leachate).	All batches will undergo the same treatment and removal efficiencies because wastewaters that are candidates for sewer system discharge are not determined until extensive treatment on each batch has already been conducted. In addition, batches that are bulked for discharge to the city sewer system are sampled and analyzed for 165 priority pollutants **prior** to discharge. NPDES sampling requires less than 20 parameters to be monitored. WETF compliance sampling will not be taken at the East End Sanitary Sewer Monitoring Station but rather at Tank F-8 located at WETF and will be performed **prior** to discharge authorization. Additional information regarding 5400.5 compliance is available in Section 4.1.9 and 6.0 of the EA.
45	TDEC DOE Oversight	Since Y-12's sanitary sewage, the Y-12 Steam Plant Wastewater Treatment Facility, the Y-12 Landfill leachate, and now potentially the Y-12 West End Treatment Facility all discharge to the COR's sewer system, DOE Orders are applicable to the Biosolids Program. How does DOE intend to ensure that the Biosolids Program is in compliance with the applicable DOE Orders?	While all effluent discharges to the city of Oak Ridge Sewer System from Y-12 must meet DOE Order 5400.5 criteria, the Biosolids Program is operated by the city of Oak Ridge, a non-DOE entity. The city of Oak Ridge is not under the purview of any DOE Orders. While biosolids are applied on the Oak Ridge Reservation, DOE intends to ensure the Biosolids Program remains in compliance with all EPA requirements and the proposed 10 mrem/yr radionuclide planning levels through independent oversight activities such as assessments and audits. ORNL also performs independent testing of the biosolids and performs cross calibration analysis of city equipment to ensure radionuclide testing is adequate.
46	TDEC DOE Oversight	References were made as to TDEC-approved land application sites. The TDEC approval for the land application sites expired in 1999. TDEC does not provide lifetime approvals for sludge application sites. It should be noted that the 40 CFR 503 sludge concentration tables are based upon a lifetime application of 20 years. The city of Oak Ridge's program has been conducted for 19 years.	The existing application sites were approved by TDEC on November 28, 1983 and May 8, 1989 and state a limit of 50 tons per acre. There is no date of expiration stated in either letter and there is no letter in the Programs files stating that TDEC is no longer responsible for the Oak Ridge Reservation application sites. The 40 CFR 503 tables referenced are in Section 40 CFR 503.13, Tables 1 through 4 and are not based upon a specific timeframe. Rather, they are based upon pollutant concentrations. The only time-limited application parameters noted in the 503 regulations are for an Annual Pollutant Application Rate (heavy metals) and an Annual Agronomic Rate (nitrogen). While it is correct that they program has been in operation for 19 years, the active sites began use in 1989.

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47	TDEC DOE Oversight	The Y-12 Modernization Program includes the addition of the Highly Enriched Uranium Facility, the Specials Materials Complex, and the Enriched Uranium Manufacturing Facility. What wastewater will be produced from these facilities and does DOE plan to discharge wastewater from these facilities to the sanitary sewer system?	While it is conceivable that wastewaters discharged from the referenced facilities could be treated at WETF, wastewaters discharged from the referenced facilities directly to the Y-12 and city sewer systems are not within the scope of this EA. All treated wastewaters produced at WETF will be required to meet proposed sanitary sewer discharge limits listed in Appendix B, Table B.12 of the EA regardless of wastewater source.
48	TDEC DOE Oversight	Page vii, 1st Paragraph, Last Sentence: states that "In addition, …discharge of treated wastewater from the West End Treatment Facility (WETF)…resulting in an operational cost savings of approximately $133,00 per year." This statement and a similar statement on Page 2-5, Second Paragraph is incorrect or misleading because during the June 2002 Biosolids Working Group meeting DOE stated that the operational cost savings associated with the WETF have already been achieved by changes in the sampling and analysis strategy.	See comment response #20. Yes, a portion of the cost savings have already been realized by the contractor (WSMS-MK) because of authorization to bulk and sample wastewater batches for discharge through NPDES Outfall #502. These activities were accomplished while the proposed action to discharge to the sanitary sewer system are being evaluated in this EA.
49	TDEC DOE Oversight	Page 1-2, Paragraph 30-32: states "The long-term solution recommended by TDEC involved increasing land application site loading criteria from a cumulative dose-based on 4 mrem/yr to one based on 10 mrem/yr for a maximally exposed individual. The approval letter from TDEC is available in Appendix A." The implication of this statement is misleading to the public and misguiding to COR and DOE in that TDEC does not recommend or provide long-term planning strategies or solutions for localities in this context of waste management.	Acknowledged, wording will be changed to remove references that TDEC was involved in the planning strategy process. DOE did not request the proposed limit increase; however, DOE is assessing any potential environment impacts associated with this requested change in this EA.
50	TDEC DOE Oversight	Page 1-5, 1st Sentence: "in the summer of 2001 the COR plans to implement a new de-watering and thermal treatment systems…" The sentence is written in the future tense. What is the present status of the new system?	See comment response #6.
51	TDEC DOE Oversight	Page 1-7, Line 23: refers to a 2001 NRC survey that will be available to the public. The sentence is written in the future tense. What are the results of the survey?	See comment response #18.

Comment Number	Comment Author	Comment	Response
52	TDEC DOE Oversight	Page 2-2, Lines 1-2: states "Since contaminant levels are very low, DOE proposes a controlled, monitored discharge to the Y-12 Sanitary Sewer System…" Please provide estimates or averages of the contaminant levels.	Batches of wastewater are undergoing various stages of treatment continuously, therefore, contaminant levels will vary from batch to batch as pointed out on Page 1-9 of the EA. Presently there are no batches that are ready for discharge to the sewer system as this discharge option is not available due to the NEPA evaluation being conducted in this EA. All treated batches will be required to meet the proposed sanitary sewer discharge limits listed in Appendix B, Table B.12.
53	TDEC DOE Oversight	Page 2-2, Lines 9-11: states "only a small portion of the total uranium…would be land applied." Please explain the process that removes the greater portion of uranium before land application.	Heavy metals and radionuclides are removed at the head end modification unit within WETF. This is the 1st step of the treatment process within WETF and is 99.9% efficient at removing these contaminants. Wastewaters exiting the head end modification unit will then receive treatment for organics and nitrate removal, as well as residual solids removal **prior** to discharge to the Y-12 and city sewer systems.
54	TDEC DOE Oversight	Page 2-6, Lines 7-13: "The city could leave the ORR land application sites in favor of freely distributing the treated biosolids material to public outlets consistent with EPA regulations. All, present and future DOE sanitary wastewater and biosolids bearing any level of radionuclides requiring treatment in all likelihood, would not be accepted...forcing DOE to explore other more costly treatment alternatives...The acceptance and treatment of ORNL biosolids could also be discontinued." The above statement is made in reference to the No Action Alternative. (1) If the biosolids are freely distributed to the public, will the public be aware of the radioactive constituents in the biosolids? The current EPA regulations for biosolids do not address radiological contamination in the biosolids.	The decision to include radionuclide data in biosolids product information is a city of Oak Ridge management decision. The city of Oak Ridge is required by the 40 CFR 503.14(e) to affix a label to a bag or other container that states (1) The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land. (2) A statement that application of the sewage sludge is prohibited except in accordance with the instructions on the label or information sheet. (3) The annual whole sludge application rate for the sewage sludge that does not cause any of the annual pollutant loading rates in Table 4 of 40 CFR 503.13 to be exceeded.
		What is meant by "freely distributing?" Does this phrase mean cost fee or widely distribute?	The city of Oak Ridge could give away or sell Class A biosolids produced at their wastewater treatment plant to any private entity desiring to use their biosolids product.
		Due to operational difficulties with the renovations of the POTW, it should be noted that the COR has not accepted or treated ORNL biosolids since the spring of 2001, which is approximately 19 months. The reason given for the non-acceptance is due to the operational difficulties with the current renovations to the POTW.	The acceptance of ORNL biosolids is a city of Oak Ridge management decision.

Comment Number	Comment Author	Comment	Response
54	TDEC DOE Oversight	Currently, the COR is experiencing operational difficulties with its renovations and is still producing Class B sludge during these difficulties. What is the COR contingency for land application sites during these and future operational difficulties. What is the COR contingency for land application sites during these and future operational difficulties?	The operational difficulties are in reference with the Class A biosolids treatment system. The existing land application sites can either receive Class A or Class B biosolids. As long as the city of Oak Ridge meets minimum Class B biosolids treatment standards listed in the 40 CFR 503 regulations, the application sites can be utilized.
55	TDEC DOE Oversight	Page 2-6, Lines 23-24: states "An estimated cost savings of $133,000 projected in the Sanitary Sewer Assessment (WSMS 2000) would not be realized." During the June 2002 Biosolids Working Group meeting DOE stated that the operational cost savings associated with the WETF have already been achieved by changes in the sampling and analysis strategy.	See comment response #20.
56	TDEC DOE Oversight	Page 3-10, Lines 25-26: states "Watson Road and Rogers sites do not provide listed plant habitat for shade tolerant species." and Pages 3-11, Lines 14-16: states "One sites, Rogers is planted with a diverse array of shrubs, trees, and grasses which provide abundant wildlife and food habitat, but do not contain listed species or habitat." There appears to be a contradiction between these statements. It is confusing to the reader as to whether Rogers site contains listed species or does not contain listed species or habitat. These statements need more explanation or clarification.	Acknowledged. Wording changed to "possibly provide habitat for shade tolerant species" and "does not contain known listed habitats."
57	TDEC DOE Oversight	Page 4-4, Table 4.1: Cobalt-60 is shown with a risk of 2 x 10-4 for both 4 mrem/yr and 10 mrem/yr risk factors. Cobalt 60, although a short half-life (5.3 years) is a higher energy radionuclide than the others on the list. Is the chart correct?	There is an error in Table 4.1. The 4 mrem/yr risk factor is 9 x 10-5. The correction will be changed in the document.
58	TDEC DOE Oversight	Page 4-22, Line 33: "Impacts of any additional pip installation." Is this supposed to be pipe installation?	Acknowledged. Wording changed from pip to pipe.

Comment Number	Comment Author	Comment	Response
59	TDEC Radiological Health	Page vii, Line 18-22. Recommend to include the 10 mrem/yr composite of 10 years of deposition in the RESRAD calculation. Does the calculation include what has already been deposited with the 4 mrem limit? If not, why not?	The 10 mrem/yr RESRAD modeling assumes no radionuclides are present on a generic land application site. Radionuclide concentrations from past operations will not lower or raise the individual radionuclide planning levels as the maximum limit is 10 mrem/yr regardless or whether they are included in the modeling or not. Dose based limits are calculated using 9 different pathways and the most conservative pathway is utilized to develop application site soil and biosolids limits. Compliance with the established limits is demonstrated by tracking how much of each nuclide has been applied since site use began and comparing the respective nuclide to the established soil limit. By dividing the amount applied by the established limit, a fraction is calculated. All fractions of known, monitored nuclides are calculated and summed. The summed results are compared to a limit of 1 (100% of the proposed 10 mrem/yr limit). Therefore, this activity is being performed to determine compliance with the limit as opposed to developing the planning level.
60	TDEC Radiological Health	Page viii, Line 31. Does the cost savings $133,000 come from the reduction of the utilization of the EPS?	The estimated cost savings of $133,000 includes a reduction in operating materials from EPS and a reduction in sampling and analysis costs associated with NPDES Outfall #502.
61	TDEC Radiological Health	Page 2-1, Lines 17-21. Include the composite of 10+years of deposition, current deposition plus expected.	The proposed 10 mrem/yr planning level provides maximum limits for 23 radionuclides that are currently present or have the potential to occur in the Oak Ridge Sewer System. These limits are available in Appendix D. The calculated amount of radionuclides on each land application site is available in Appendix B, Tables B.5. through B.10. The proposed 10 mrem/yr limits will be evaluated against cumulative radionuclide limits since each site began use for the land application program.
62	TDEC Radiological Health	Page 4-17, Line 21. Refers to concentration release limits or regulated concentration limits.	Acknowledged. Wording will be changed to refer to "concentration release limits."

Comment Number	Comment Author	Comment	Response
63	TDEC Radiological Health	Page 4-19. Can add risk factor background radiation.	The purpose of the Table 4.5 is to show typical exposure rates from common everyday sources and to place into perspective the maximum dose (10 mrem/yr) being proposed for the land application sites. Because of the numerous pathways and complex variables associated with the common everyday sources of dose exposure, it is inappropriate to calculate risk for comparison with the risk values calculated for the proposed 10 mrem/yr planning level in this EA.
64	TDEC Radiological Health	Page 4-19, Lines 30-33, and Page 4-20, Lines 1-5. Explain if the RESRAD calculation includes the sludge from the WETF and the POTW together, if your intention is for both sources of sludge to go on the same land area.	Only sanitary biosolids (I.e. sludge) produced by the city of Oak Ridge will be land-applied on the active land application sites. Only treated wastewaters from WETF will be discharged to Y-12 and city of Oak Ridge Sewer Systems.
65	TDEC Radiological Health	Page 5-4, Line 1-2. I don't understand why you state "no impacts" as opposed to negligible impacts.	Acknowledged. Wording will be changed from no impacts to negligible impacts.
66	TDEC Radiological Health	Refers to release concentration limits.	Acknowledged. Wording will be changed to reflect release concentration limits.
67	TDEC Radiological Health	Acknowledge documentation on: 1. Risk factors on page 4-4. 2. CEDE to worker on page 4-12. 3. External exposure for worker on page 4-17. 4. POTW discharge to EFPC on page 4-8.	Acknowledged. Literature references added.