RI/FS-EIS DOCUMENT: DOE/EIS-0185F
RESPONSES TO COMMENTS: DOE/OR/21548-387

Responses to Comments on the Remedial Investigation/Feasibility Study-Environmental Impact Statement for Remedial Action at the Chemical Plant Area of the Weldon Spring Site (November 1992)

June 1993

U.S. Department of Energy
Oak Ridge Field Office
Weldon Spring Site Remedial Action Project

Documents Comprising the Final
Remedial Investigation/Feasibility Study-Environmental Impact Statement
for the Weldon Spring Site Remedial Action Project

DOE/EIS-0185F

Baseline Assessment for the Chemical Plant Area of the Weldon Spring Site, DOE/OR/21548-091, U.S. Department of Energy, Oak Ridge Field Office, Oak Ridge, Tennessee, November 1992.

Feasibility Study for Remedial Action at the Chemical Plant Area of the Weldon Spring Site, DOE/OR/21548-148, Volumes I-II, U.S. Department of Energy, Oak Ridge Field Office, Oak Ridge, Tennessee, November 1992.

Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site, DOE/OR/21548-160, U.S. Department of Energy, Oak Ridge Field Office, Oak Ridge, Tennessee, November 1992.

Remedial Investigation for the Chemical Plant Area of the Weldon Spring Site, DOE/OR/21548-074, Volumes I-II, U.S. Department of Energy, Oak Ridge Field Office, Oak Ridge, Tennessee, November 1992.

Addendum to the Remedial Investigation for the Chemical Plant Area of the Weldon Spring Site, DOE/OR/21548-272, U.S. Department of Energy, Oak Ridge Field Office, Oak Ridge, Tennessee, November 1992.

Responses to Comments on the Remedial Investigation/Feasibility Study-Environmental Impact Statement for Remedial Action at the Chemical Plant Area of the Weldon Spring Site (November 1992), DOE/OR/21548-387, U.S. Department of Energy, Oak Ridge Field Office, Oak Ridge, Tennessee, June 1993.

All documents except the *Responses to Comments* (DOE/OR/21548-387) comprised the Draft Remedial Investigation/Feasibility Study-Environmental Impact Statement (DOE/EIS-0185D).

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June 1993

prepared by

U.S. Department of Energy, Oak Ridge Field Office, Weldon Spring Site Remedial Action Project

with technical assistance from

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The following is a list of the acronyms, initialisms, and abbreviations (including units of measure) used in this document.

ACRONYMS, INITIALISMS, AND ABBREVIATIONS

ALARA	as low as reasonably achievable
ANL	Argonne National Laboratory
BA	baseline assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FS	feasibility study
FWS	Fish and Wildlife Service (U.S. Department of the Interior)
HEPA	high-efficiency-particulate-air (filter)
ICRP	International Commission on Radiological Protection
ISCST	Industrial Source Complex, Short Term (model)
MSA	material staging area
NEPA	National Environmental Policy Act of 1969
NPL	National Priorities List
NRC	U.S. Nuclear Regulatory Commission
PP	proposed plan
RI	remedial investigation
TSA	temporary storage area

UNITS OF MEASURE

Ci	curie	m^2	square meter
cm	centimeter	m^3	cubic meter
d	day	µCi	microcurie
ft	foot	mi	mile
g	gram	mL	milliliter
h	hour	mrem	millirem
ha	hectare	pCi	picocurie
in	inch	rem	roentgen equivalent man
km	kilometer	s	second
L	liter	yd^3	cubic yard
m	meter	yr	year

1 INTRODUCTION

The U.S. Department of Energy (DOE) is responsible for cleanup activities at the Weldon Spring site in St. Charles County, Missouri. The site consists of a chemical plant area and a noncontiguous limestone quarry; both areas are radioactively and chemically contaminated as a result of past processing and disposal activities. Explosives were produced by the U.S. Army at the chemical plant in the 1940s, and uranium and thorium materials were processed by DOE's predecessor agency in the 1950s and 1960s. During that time, various wastes were disposed of at both areas of the site. The Weldon Spring site is on the National Priorities List (NPL) of the U.S. Environmental Protection Agency (EPA). The DOE is conducting cleanup activities at the site under its Environmental Restoration and Waste Management Program.

For remedial action sites, it is DOE's policy to integrate values of the National Environmental Policy Act (NEPA) into the procedural and documentational requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, wherever practicable. Thus, cleanup activities at the Weldon Spring site are being conducted in accordance with both CERCLA and NEPA. To support cleanup decisions for contaminated material at the chemical plant area, the DOE prepared an integrated remedial investigation/feasibility study-environmental impact statement (RI/FS-EIS) in accordance with the DOE policy. That is, the RI/FS documents prepared under CERCLA were written to incorporate NEPA values at the level of an EIS. The content of the documents prepared for the project is not intended to represent a statement on the legal applicability of NEPA to remedial actions conducted under CERCLA.

The integrated RI/FS-EIS documents for the chemical plant area were issued to the public in November 1992 as the draft RI/FS-EIS. (The CERCLA RI/FS is considered final when issued to the public, whereas per the NEPA process, an EIS is initially issued as a draft and is finalized after substantive public comments have been addressed.) Four documents made up the draft RI/FS-EIS, which is hereafter referred to as the RI/FS-EIS: (1) the RI (DOE 1992d), which presents general information on the site environment and the nature and extent of contamination; (2) the baseline assessment (BA) (DOE 1992a), which evaluates human health and environmental effects that might occur if no cleanup actions were taken; (3) the FS (DOE 1992b), which develops and evaluates alternatives for site cleanup; and (4) the proposed plan (PP) (DOE 1992c), which summarizes key information from the RI, BA, and FS reports and identifies DOE's preferred alternative for remedial action. This comment response document combined with those four documents constitutes the final RI/FS-EIS for the chemical plant area.

On the basis of an evaluation of seven preliminary alternatives for remedial action at the chemical plant area, four final alternatives were selected for evaluation in detail in the FS: Alternatives 6a, 7a, 7b, and 7c. Under all of these alternatives, material would be removed from contaminated areas and treated as appropriate. Each alternative would comply with environmental requirements (with limited waivers as appropriate), utilize treatment, and provide a permanent solution for the site problems. The two basic differences among the final alternatives were (1) the type of treatment for highly contaminated material and (2) the location of the disposal facility for all site waste. From the analyses in the RI/FS-EIS, the DOE identified

Alternative 6a as the preferred alternative. This determination was made on the basis of a comparative evaluation of potential impacts to human health and the environment, feasibility (including the availability of technical and administrative resources), and cost.

Under the preferred alternative, the highly contaminated material — including raffinate pit sludge, certain soil (e.g., soil previously in the quarry and soil from beneath the raffinate pits), and process wastes from the water treatment plants — would be treated by chemical stabilization/solidification; structural material would be compacted; and vegetation and wooden debris would be composted to enhance biodegradation. All site waste would be contained in an engineered disposal cell constructed on-site at a location having appropriate geologic conditions. This cell would be designed to withstand natural forces such as heavy rains and earthquakes, and it would be designed to last for at least 200 to 1,000 years. The cell would be maintained and its performance monitored for the long term. By removing contaminated material from the various source areas of the site, residual risks would be reduced toward background levels.

Alternative 7a is the same as the preferred alternative, except the highly contaminated material would be treated by a thermal process — vitrification — instead of a chemical process. (The two remaining final alternatives involve on-site vitrification of this material and transportation of all site waste to the Envirocare facility near Clive, Utah [Alternative 7b], or the Hanford facility near Richland, Washington [Alternative 7c] for disposal.) Although a number of problems are associated with trying to implement vitrification, this process would better reduce the mobility and volume of that portion of the waste being treated and would reduce the toxicity of certain nonradioactive contaminants in that fraction. For example, vitrification would destroy nitroaromatic compounds present in certain quarry waste. However, neither vitrification nor the chemical treatment method of Alternative 6a would affect the toxicity of radiation from the site waste. Both treatment methods would immobilize contaminants in a solid product; however, vitrification would reduce the overall waste volume by 24%, whereas the disposal volume would increase by 12% under Alternative 6a. In addition to the benefits that would result from successful implementation of vitrification, this technology is an innovative method for waste treatment and therefore merits special consideration under CERCLA. For these reasons, and to ensure that a plan would be in place if the chemical treatment process did not consistently meet the expected performance for all site waste (which will be evaluated during the detailed design and pilot testing phases of this remedial action), Alternative 7a was proposed to be carried forward with Alternative 6a into the design phase of this action as a contingency remedy.

The RI/FS-EIS for remedial action at the chemical plant area of the Weldon Spring site was issued to the public on November 20, 1992. Copies of the RI/FS-EIS were also placed in the on-site public reading room and the four other information repositories for the project, and the public was notified of its availability by newspaper notices. The DOE and the EPA sponsored a public meeting on these documents and discussed the proposed action on December 16, 1992, at the Columns Banquet and Conference Center in St. Charles, Missouri; representatives from the state of Missouri were also in attendance. The DOE responded to oral comments made on the RI/FS-EIS at this meeting, and those responses are included in the

meeting transcript. The transcript is part of the administrative record for this remedial action, and it is on file at the information repositories for the Weldon Spring project. (The repositories are located in the project office reading room, at Francis Howell High School, and at several nearby libraries — as identified in Chapter 7 of the PP.)

At the public meeting, members of local labor unions made many additional statements and asked questions that were unrelated to the evaluations and conclusions presented in the RI/FS-EIS. The comments generally related to the training qualifications of site workers, the use of nonunion labor for cleanup activities, and the procedures DOE follows to award and oversee contracts; these issues are outside the scope of the RI/FS-EIS. Responses to most of these comments were provided orally at the public meeting and are included in the transcript. For those union issues not fully addressed at the meeting, a separate response report has been prepared (MK-Ferguson Company and Jacobs Engineering Group 1993). That report is also available in the administrative record for this action.

The public comment period for the RI/FS-EIS was initially scheduled to end January 20, 1993. However, the period was extended 30 days pursuant to several requests from local citizens and community interest groups. Thus, the comment period formally ended February 19, 1993. On March 19, 1993, DOE met with a small group of individuals representing the St. Charles Countians Against Hazardous Waste who had submitted comment letters on the RI/FS-EIS to the project office and/or presented comments orally at the formal public meeting. The purpose of this small meeting was to clarify those comments received within the formal comment period, and the intent was to ensure that the responses developed by DOE would address the underlying concerns of those commenters. At that meeting, additional written comments were received from one of the individuals to clarify those comments he had made during the formal comment period; both comment letters are included in this document.

This comment response document presents a summary of the major issues identified in both oral and written comments on the RI/FS-EIS and DOE's responses to those issues. This document also provides individual responses to the written comments. (Responses to oral comments were provided at the public meeting.) The summary of issues and responses is presented in Chapter 2. Copies of the letters received on the proposed action and responses to the individual comments in those letters are provided in Chapter 3. Following these letters are copies of comments submitted at the public meeting, for which oral responses were given. At the end of Chapter 3 are copies of three letters received from the U.S. Department of the Interior, Fish and Wildlife Service (FWS), on the biological assessment that accompanied the RI/FS-EIS. All written comments are also part of the administrative record for this action.

The floodplain statement of findings for the remedial action proposed in the RI/FS-EIS is presented in Chapter 4 of this document. The distribution list for the RI/FS-EIS is given in Chapter 5. Errata for the RI/FS-EIS are identified in Chapter 6. The contributors to this comment response document are provided in Chapter 7, and full citations for the reports referred to in this document are given in Chapter 8.

2 RESPONSES TO GENERAL ISSUES RAISED IN ORAL AND WRITTEN COMMENTS

For the following summary, the page number(s) of the transcript and/or the specific comment letter(s) in which the issues were raised are identified in parentheses at the end of each issue. The comment letters are referred to by the alphabetical codes presented in Section 3.1.

Issue 1

Comment. If the Weldon Spring site is used for waste disposal, it should be used solely to dispose of waste associated with cleanup of the Weldon Spring site. No additional waste should be brought to the site for treatment or disposal. *(Transcript pages 28, 29, 43, 44, 53, and 82; comment letters C and D.)*

Response. In response to community concerns such as this one, the DOE has committed that no other DOE waste would be brought to the site for treatment or disposal and intends to firmly abide by that commitment.

Issue 2

Comment. Any on-site disposal facility should essentially meet the substantive siting and design requirements of the state and federal hazardous waste laws and regulations. Such a disposal facility should remain under the control and ownership of DOE. *(Transcript page 29.)*

Response. If a disposal facility were constructed on-site, it would be sited and designed to achieve the substantive siting and design requirements, including equivalent performance standards, identified in applicable state and federal hazardous waste laws and regulations. During the detailed engineering design phase for this facility, the DOE would coordinate with both the state of Missouri and EPA Region VII to ensure that such requirements were appropriately addressed. The disposal facility would remain under the control and ownership of DOE or any successor government agency.

Issue 3

Comment. Protective and permanent waste disposal should be achieved with natural barriers and engineered materials, methods, and designs to the maximum extent possible; reliance on institutional control measures should be kept to a minimum. *(Transcript page 30.)*

Response. The waste resulting from cleanup of the Weldon Spring site would be placed in an engineered containment facility using proven materials, methods, and designs. From the conceptual design for this facility, natural materials including recompacted clay would be used to construct the base because these materials have been shown to be very effective in similar facilities for radioactive and chemically hazardous wastes at other sites. In addition to these natural materials, synthetic materials such as flexible membrane liners would be used for certain components of the disposal facility, including the leachate collection and removal system. This engineered facility would include redundant containment features that would be the primary

means for ensuring long-term protection of the general public and the environment. Although institutional controls would be employed to help ensure protection during remedial action activities, reliance on such measures would be kept to a minimum following waste disposal.

Issue 4

Comment. The DOE should commit to an appropriate long-term monitoring and maintenance program to verify and maintain the performance of the on-site disposal facility. More details should be provided on the proposed long-term monitoring procedures for the disposal area. *(Transcript pages 30 and 36; comment letter H.)*

Response. The DOE would perform long-term monitoring and maintenance of the disposal area if the disposal facility were constructed on-site. The parameters and the frequency with which monitoring and inspection would occur cannot be precisely defined at this stage of the remedial action process because detailed design activities can only be completed after the record of decision for this action has been signed. If the disposal facility were constructed on-site, a long-term monitoring and maintenance plan including parameters and inspection frequency would be developed after specific design information became available. In developing this plan, DOE would consider the hydrologic and hydrogeologic conditions at the chemical plant area, would incorporate input received from the public, and would consult with EPA Region VII and the state of Missouri. It is expected that monitoring and maintenance inspections would occur at least annually. More frequent inspections (e.g., quarterly) would be conducted in the near term (e.g., over the first several years) to assess the performance of the containment system. Additional details on the monitoring and maintenance program to be used at the site will be provided in the mitigation action plan, which will be completed during the detailed design phase of this remedial action. The plan will be available in the information repositories for the project.

Issue 5

Comment. The waste resulting from cleanup of the Weldon Spring site should be transported to and disposed of at the Envirocare facility near Clive, Utah, because the geology at the Weldon Spring site is not suitable to support a disposal facility; the geology in the area is porous, sinkholes are present nearby, and the possibility of an earthquake exists. In addition, disposal at the Envirocare facility could be less costly than estimated in the FS. Ideally, the more highly contaminated material should be vitrified and disposed of at a site that is geologically sound. *(Transcript pages 46, 47, and 52; comment letters F and L.)*

Response. The geology of the location considered for construction of an engineered disposal facility at the chemical plant area has been thoroughly investigated and has been determined to be suitable for such a facility, as discussed in the RI/FS-EIS. Numerous geological studies have been conducted by DOE in consultation with the state of Missouri, and no sinkholes have been identified in the study area. The results of these investigations have been reviewed by the state and EPA Region VII, and all parties agree that the disposal study area of the Weldon Spring site is acceptable for the construction of a facility to contain the waste resulting from site cleanup.

Issues associated with vitrifying the more highly contaminated material and with transporting all or a portion of the site waste to an off-site facility (such as the Envirocare facility near Clive, Utah) for disposal were evaluated in detail in the RI/FS-EIS. The results of these analyses indicated that DOE's preferred alternative for this remedial action (Alternative 6a) — which incorporates source removal, treatment of the more highly contaminated material using a proven technology (chemical stabilization/solidification), and disposal in an on-site engineered facility — would provide the best balance among the final action alternatives with respect to the prescribed evaluation criteria. Cost was not a major factor in this determination, so even if transportation costs or disposal fees were to change somewhat, DOE would still prefer Alternative 6a to those alternatives under which the large volume of waste from the Weldon Spring site would be transported and disposed of at distant sites (Alternative 7b or 7c). Most importantly, DOE's preferred alternative would be protective of human health and the environment and could be implemented in a straightforward manner.

Issue 6

Comment. The remedial action alternative selected for implementation should be protective of human health and the environment. Cleanup procedures, designs, and standards should meet all applicable or relevant and appropriate requirements of state and federal environmental, health, and safety laws and regulations. *(Transcript page 29.)*

Response. The DOE's preferred alternative would be implemented in a safe manner and would provide long-term protection of human health and the environment from contamination at the Weldon Spring site. The cleanup procedures, designs, and standards would meet all applicable or relevant and appropriate requirements except in specific cases where a waiver would be appropriate to site conditions during cleanup. (For example, a waiver of the time limit for storing hazardous waste on-site is appropriate until a disposal facility is available.) The appropriateness of such waivers was discussed in Chapters 6 and 7 of the FS and will be finalized in the record of decision for this action.

Issue 7

Comment. The Francis Howell High School is located about 1 km (0.6 mi) east of the site, but the RI/FS-EIS seems to minimize its closeness. Additionally, most citizens of St. Charles County live closer to the site than the city of St. Charles. Because the air pathway is the most direct means by which members of the general public could be impacted by cleanup activities, it is important that this pathway be analyzed in detail using the best information available. What safeguards will be used to protect workers, the students and staff at the high school, and the community at large during remedial action activities? How can the safety of the general public be guaranteed? *(Transcript pages 38 and 42; comment letters C, I, N, and O.)*

Response. The closeness of the high school to the site is discussed in many sections of the RI/FS-EIS and is prominently identified in many figures. The DOE agrees that the air pathway is of primary concern during the cleanup period. For that reason, impacts that might result from contaminant releases were addressed in greater detail in the assessment of the cleanup period than were those impacts associated with any other pathway. The fact that

individuals live in unincorporated areas closer to the site than the city of St. Charles is also noted in text and presented in figures, and this was one of the main reasons that potential risks were estimated for the nearby population within 5 km (3 mi) of the site center; potential risks were also estimated for nearby residents and individuals at the high school (as discussed in Appendix F of the FS).

A comprehensive assessment of the material that could become airborne because of cleanup activities (including radon gas), the movement of airborne contaminants through the atmosphere to potential receptors nearby, and the types of control measures that could be applied to limit airborne releases are discussed extensively in Appendixes C and F of the FS. These analyses were performed with representative meteorological data for the site. The results were subsequently compared with those estimated with other meteorological data recently obtained by the project office. (Those data consisted of measurements for specific parameters collected from the on-site meteorological station over 10 months during 1992 and 1993 and mixing height data measured from Eureka, Missouri.) This comparison indicated that the results were essentially the same regardless of whether the representative or the slightly modified meteorological data set was used. These results provide additional support for the determination presented in the RI/FS-EIS that remedial action at the Weldon Spring site could be safely performed such that members of the general public would be protected. The results also indicate that DOE could reliably meet its commitment to conduct the cleanup with no measurable impact from site contaminants at the high school. The DOE will continue to consult with school administrators throughout the remedial action process to ensure that they are fully informed of planned activities.

Cleanup activities at the site would be conducted in a manner that minimizes the release of contaminants to the environment, as discussed in the RI/FS-EIS. The safety of the public, including students and staff at Francis Howell High School, would be ensured by maintaining an extensive monitoring program in conjunction with operational contingency plans. These contingency plans would include the staged application of increasingly stringent operational controls in the event that monitoring results identified any release situations that might affect workers or the general public as cleanup progressed. These controls would include such measures as limiting or covering exposed areas and reducing dust and radon releases by applying water sprays. Additional details on the monitoring and operational contingency plans to be applied for this remedial action will be provided in the mitigation action plan.

Issue 8

Comment. The Atomic Energy Act requires that human exposures to radiation be reduced to levels that are as low as reasonably achievable. The Weldon Spring project should be conducted with the design objective that no member of the general public would ever receive more than 25 mrem/yr above background. If further dose reductions are reasonably possible, they should be pursued. *(Transcript page 29.)*

Response. Cleanup activities at the Weldon Spring site would be designed and conducted to ensure that no member of the general public would receive a dose of 25 mrem/yr above background (projected doses estimated from conservative assumptions are well below this

level). Further, the DOE process whereby risks are reduced to levels as low as reasonably achievable (ALARA) would be applied during field activities. (The ALARA process is discussed in Chapter 2 of the FS. The DOE applies this process to reduce exposures and risks as far below protective criteria as technical, economic, and social considerations permit.) The ALARA process was also explicitly incorporated into the development of cleanup criteria for site soil to ensure that future radiation doses would be reduced to levels as far below applicable standards as reasonably achievable.

Following site cleanup, the dose level of 25 mrem/yr would be met for all reasonably foreseeable exposures at the site, except possibly for exposures to indoor radon if someone were to live at certain locations in the future. To put this issue in context, the annual dose from exposure to background levels of radon is estimated to be about 200 mrem/yr, and these naturally occurring levels vary considerably. For this reason, the EPA has separately identified an acceptable radon concentration for indoor air, which is 4 pCi/L. The indoor radon concentrations estimated for those areas of the site at which the incremental dose to a future resident is estimated to be above the suggested 25 mrem/yr level are projected to be below 4 pCi/L (and standard mitigative measures such as ventilation could be readily applied to further reduce radon exposures and related doses).

Issue 9

Comment. Soil cleanup levels should be conservatively developed so that individuals who may have unrestricted access to the site in the future will not be subjected to unacceptable risks. *(Comment letter K.)*

Response. The proposed cleanup levels for contaminants in soil at the Weldon Spring site were developed in accordance with EPA guidance. These levels were conservatively developed by considering a residential scenario, to address the reasonable maximum exposures for a future individual with unrestricted access to the site. Per EPA guidance, the cleanup levels were determined by targeting an incremental risk range of 1 in 1 million (1×10^{-6}) to 1 in 10,000 (1×10^{-4}), with consideration of site-specific conditions. A key site-specific factor is the concentration of natural constituents in local soil, which would be used to backfill on-site areas from which contaminated soil would be excavated during cleanup. That is, background concentrations of certain metals can correspond to estimated risks above EPA's target range.

Therefore, given natural variability, it would be difficult to distinguish an incremental risk at the upper end of the target range associated with residual contamination from the risk associated with natural concentrations, and this distinction would be virtually impossible for the lower end of the target range. Further, replacing the excavated soil with uncontaminated local soil could result in actually increasing the risks at certain areas depending on the specific levels of naturally occurring constituents in the backfill soil. For these reasons, the lower end of EPA's range could not serve as the endpoint for site cleanup criteria. The cleanup levels proposed for the site would be applied to areas released for other use and are expected to be protective of human health and the environment for all reasonably anticipated future uses.

Issue 10

Comment. The DOE should address chemical contamination at the vicinity properties. All contaminated vicinity properties should be cleaned up to allow for completely unrestricted use. *(Transcript pages 29 and 30; comment letter K.)*

Response. The DOE is responsible for properties on the adjacent Army site and in the surrounding state wildlife area that were contaminated as a result of activities conducted by DOE and its predecessor agency at the Weldon Spring site. These are termed vicinity properties and have been identified on the basis of their radioactive contamination; no DOE vicinity property contains only chemical contaminants. The Army is responsible for properties on the Army site that are chemically contaminated by previous Army activities, and cleanup of those areas is currently being addressed by the Army under a separate RI/FS process. The DOE will continue to coordinate with the Army regarding cleanup of the DOE vicinity properties on Army land.

As part of cleanup activities that would be conducted under the proposed remedial action at the chemical plant area, DOE would remove radioactively contaminated soil from those vicinity properties. Excavating soil to remove the radioactive contamination would also result in the removal of any combined chemical contamination from these locations. The DOE would clean up all radioactively contaminated vicinity properties to levels that would allow for unrestricted use. During soil cleanup activities in the Busch Wildlife Area, which are addressed in this RI/FS-EIS, the DOE would also remove contaminated sediment from Lakes 34, 35, and 36 in conjunction with the draining of those lakes by the Missouri Department of Conservation (this draining has been planned as part of the state's routine sedimentation management program for the wildlife area). Under existing conditions at the lakes, the estimated health risks associated with this contaminated sediment are well below the levels identified by the EPA as either of concern or warranting cleanup action. Nevertheless, DOE would conduct this activity to address the possibility that sediment excavated from those lakes might subsequently be used as backfill material in a residential area.

Issue 11

Comment. The site risk assessments seem to focus almost exclusively on human health impacts. These assessments should consider all living organisms so as not to decrease biotic diversity or cause extinction of certain organisms. *(Comment letter N.)*

Response. The site risk assessments did examine potential ecological impacts that could result from the contamination present at the chemical plant area and in affected areas nearby. An entire chapter (Chapter 7) of the BA and several appendixes were devoted to the assessment of ecological impacts that might occur in the absence of cleanup. Potential impacts to ecological resources from cleanup activities were assessed in the FS. These analyses were developed from current characterization data for the site in combination with available scientific information. No obvious adverse ecological impacts have been observed at the site or surrounding areas, except for circumstantial evidence (the paucity of biota) in the raffinate pits. However, adverse ecological impacts might occur if the site were not cleaned up and contaminants remained in

their current state, particularly at the raffinate pits, as discussed in the RI/FS-EIS. Possible impacts to the density and diversity of invertebrates at the site were also discussed. To address the long-term protection of ecological resources at the site, additional studies are under way and others are planned. As they become available, data from these studies will be incorporated into future documents prepared for the project.

Issue 12

Comment. The DOE should commit to follow-on studies of the groundwater contamination and, if necessary, undertake remedial action for groundwater after the sources of contamination are removed. *(Transcript page 30 and comment letter H.)*

Response. The DOE will continue to investigate groundwater at the chemical plant area. The groundwater response action has been separated from the action being proposed at this time, as discussed in the RI/FS-EIS, because the comprehensive data needed to support a final decision for this medium are not yet available. The DOE will prepare a separate set of assessment documents focused specifically on groundwater at the chemical plant area. These documents will be developed in consultation with EPA Region VII and the state of Missouri, and they are expected to be issued to the public within the next several years. Comments received from the state, EPA Region VII, and the public on the proposal made in that future document package will be considered before a decision is made on the final response for groundwater.

Issue 13

Comment. The DOE should accelerate the process addressing contaminated groundwater at the quarry, including the Femme Osage Slough area. The quality of water in the St. Charles County well field is a chief concern for this project. *(Transcript page 53 and comment letter I.)*

Response. The DOE is committed to ensuring that the county drinking water wells are not impacted by contaminants from the site. An extensive monitoring program is in place at the quarry and Femme Osage Slough area to address this issue, and the process for addressing that groundwater contamination has been initiated. Focused characterization of the quarry and Femme Osage Slough area is expected to begin this summer to support final remedial action decisions for that location.

Issue 14

Comment. Much of the cleanup work at the site is being performed by workers who do not reside in St. Charles County or the greater St. Louis metropolitan area. Many local laborers have been trained to perform remedial action work similar to that currently under way at the Weldon Spring site, and local unions provide a labor pool of qualified workers. The economic benefits associated with this project should be distributed to those most affected by the action. *(Transcript pages 40-41, 49-52, 54-62, 67, 77, and 79.)*

Response. The DOE recognizes that a large number of qualified workers are available locally to support cleanup activities such as those being conducted at the Weldon Spring site. Most of the site workers reside in St. Charles County or the greater St. Louis metropolitan area. Of the 256 full-time workers currently on-site in the project office building, all but 5 live within

the St. Louis metropolitan area. Of the 158 craftspersons and laborers currently involved in site work — primarily in field activities to support interim actions (such as decontaminating and dismantling the chemical plant buildings) — 140 live in the area. All site workers are appropriately trained for the cleanup activities with which they are involved. In summary, the great majority of people involved in the on-site cleanup effort are local workers, they are qualified to conduct the work, and the economic benefits associated with this project are being distributed in the area. The employment of qualified local workers would be expected to continue through the remedial action proposed in the RI/FS-EIS.

Issue 15

Comment. The DOE should ensure that the funding for this project is maintained at a high level so the site is cleaned up expeditiously. The potential for future contaminant migration should be minimized. *(Transcript page 53 and comment letters H, I, and N.)*

Response. Maintaining an appropriate level of funding for expeditious cleanup of the Weldon Spring site is a high priority for the project. To date, cleanup activities have not been constrained by the availability of funds. Although the DOE anticipates project support to continue, the amount of funding available to the department is greatly affected by the annual budget established by the U.S. Congress.

The DOE is committed to cleaning up the site in a safe and environmentally sound manner and is moving forward with cleanup activities as quickly as possible. Numerous regulatory review and engineering requirements must be met as part of the cleanup process before field activities can be implemented, and extensive planning and development of detailed operational procedures are also involved. Focused cleanup activities have been expedited to reduce health and safety threats on-site and to limit contaminant migration. These interim actions include the treatment of surface water at both the quarry and chemical plant area, dismantlement of the chemical plant structures, and removal of bulk waste from the quarry — with maintenance of the resultant waste in controlled storage on-site until an appropriate disposal facility is available. The major cleanup activities at the chemical plant area, which include the removal and treatment of sludge from the raffinate pits and disposal of all site waste, are expected to begin within the next few years after the RI/FS-EIS process for the proposed remedial action is completed.

3 WRITTEN COMMENTS AND RESPONSES

Comment letters on the RI/FS-EIS issued in November 1992 were received from various individuals, organizations, and agencies. Copies of these letters are presented in Section 3.1 with DOE's responses. The comment cards submitted to DOE at the public meeting (for which oral responses were provided at the meeting) are reproduced in Section 3.2. Copies of the letters received on the biological assessment (Appendix I of the FS) from the three field offices of the U.S. Department of the Interior, FWS, and DOE's responses are given in Section 3.3. The Washington, D.C., office of the U.S. Department of the Interior sent a letter to the DOE project office on January 27, 1993, requesting a further extension of the comment period (i.e., beyond February 19, 1993). The DOE responded that any comments received after the close of the comment period would be considered to the extent practicable; no comments were subsequently received from that office.

3.1 COMMENT LETTERS ON THE RI/FS-EIS

Comment letters on the RI/FS-EIS were received from the individuals, organizations, and agencies listed in Table 3.1. These letters are arranged according to the date of receipt except for the last entry (Letter P), which was an anonymous letter submitted at the public meeting. A copy of each letter is included in this section, and DOE responses to the individual comments in each letter are presented on succeeding pages. Each comment letter on the RI/FS-EIS has been assigned an identifying alphabetical letter, and specific issues within each letter are identified with a number. For example, the first letter received is Letter A; the first comment identified within Letter A is labeled A-1, and the response to that comment is Response A-1. One individual submitted two comment letters (N). The purpose of the second letter was to clarify comments presented in the first, and it included all of the original comments. To avoid repetition in responding to this individual, both letters are marked to identify the common comments; the first letter has been reproduced without separate responses, and the individual responses that address the comments in both letters are inserted with the corresponding pages of the second letter.

TABLE 3.1 Comment Letters on the RI/FS-EIS

Letter A

December 16, 1992

My name is Ken Gronewald, I am the current President of the St. Charles Countians Against Hazardous Waste Board of Directors.

This is sort of a historic meeting - the last public one on Weldon Spring. I was also at the first one 10 years ago at Francis Howell High School. I live in O'Fallon and worked at the plant site when the Army tried to clean it up in the late 1960s. They wanted to clean up three buildings so they could make agent-orange there. I guess it's lucky for us that they couldn't clean it up or we would have dioxin out there too!

After years of going to all kinds of meetings about what DOE planned to do at Weldon Spring - it feels good to be at this point. Our group has always tried to learn as much as we could so we could understand the problems involved. Over the years we have made suggestions which have been acted on which made us feel like our opinions counted. It wasn't always like that, in the beginning DOE thought they knew it all. They didn't know what to do with us, we probably felt like a thorn in their side.

A-1

All that changed after the last big meeting in 1987 when 1,500 people turned out. Then DOE got new people with better attitudes, a new contractor, and everything changed for the better. They started cleaning up contaminated buildings and other projects that could be done in the short run. Now with all the work they have

Response A-1

The DOE values the input received from the public, especially from those who live close to the site. The DOE appreciates the support expressed in this letter and looks forward to continuing to work with the nearby community in an open and productive manner as the cleanup proceeds.

A-1 (Cont.)

done to produce their reports for this meeting they are ready to roll into high gear and really clean-up the place. I'm glad I got to be involved and I'd like to say it's been good working with you. I hope we can continue.

Kenneth F. Gronwald

[Letter begins on next page.]

Letter B

John Ashcroft
Governor

James R. Moody
Commissioner

State of Missouri
OFFICE OF ADMINISTRATION
Post Office Box 809
Jefferson City
65102

Stan Perovich
Director
Division of General Services

December 22, 1992

Stephen H. McCracken, Project Manager
ATTN: RI/FS-EIS Comments
U.S. Department of Energy
Weldon Spring Site Remedial Action
Project Office
7295 Highway 94 South
St. Charles, Missouri 63304

Dear Mr. McCracken:

Subject: 92120015 - Draft Remedial Investigation/Feasibility Study-Environmental Impact Statement for Remedial Action at the Chemical Plant Area of the Weldon Spring Site

The Missouri Federal Assistance Clearinghouse, in cooperation with state and local agencies interested or possibly affected, has completed the review on the above project application.

None of the agencies involved in the review had comments or recommendations to offer at this time. This concludes the Clearinghouse's review.

B-1 A copy of this letter is to be attached to the application as evidence of compliance with the State Clearinghouse requirements.

Sincerely,

Lois Pohl C.M.

Lois Pohl, Coordinator
Missouri Clearinghouse

LP:cm

cc: East-West Gateway Coordinating Council

Response B-1

A copy of this letter has been placed in the administrative record for this action to provide evidence of compliance with the requirements of the Missouri Federal Assistance Clearinghouse.

Letter C

John Jacobs
45 Cimmarron Dr.
St. Charles MO 63304

WSSRAP
7295 Highway 94 South
St. Charles, MO 63304

Re: Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site.

December 19, 1992

I am just a concerned citizen, the only organization that I represent is my family particularly my children that must attend Francis Howell High School. Let me start off by saying what a fine job of public relations you are doing on this project. You're doing such a fine job that most of the public could not care less what kind of clean up you're doing (as evidenced by the direction that the December 16, 1992 public hearing went).

C-1

My overriding concern about the proposed action of ON-SITE storage, is the FACT that other Midwest sites will try to send their waste to Weldon Spring. The question was repeatedly asked at the public hearing " Will the site be come a magnet for other waste". The best answer given was "our *PROPOSED* (my emphasis) plan is only for Weldon Spring waste". Let me say that proposals, in our government system just open the door for change. I am AGAINST having even one ounce of additional waste added to the Weldon Spring Site. If you don't think other sites will attempt to export their waste here, listen to your own proposal's that call for exporting the waste to Utah or Washington.

C-2

While reading the proposed plan I noticed that the High School is only briefly mentioned and that the largest city is St. Charles of about 50,000. While St. Charles is the Largest city, most of the population lives far closer to the site than the city (they live in areas of the county that are unincorporated). It also appears from all photo's, at the public exposition and informational bulletins that the fact of the High Schools closeness is being masked. Oh yes its mentioned in the 2000 page report, but let me restate that the High School is less than half a mile from the site, it boards the fence line. Let me also make it public record, if my children should develop any conditions that could be caused by toxic waste I will seek restitution from the DOE. My children are in fine health at this time, but my oldest will attend Francis Howell High School next school year.

C-3

I have often heard that this site is LOW RISK. What is low risk, 1 case of cancer, 10,000 cases of leukemia? No one seems to define low exposure, low risk, or low level waste.

C-4

Response C-1

The DOE is fully committed to an open exchange of information regarding activities at the Weldon Spring site. As part of this commitment, the project supports a strong community information program to provide a mechanism for open communication with members of the public. The DOE is doing everything possible to ensure that the Weldon Spring site is cleaned up as expeditiously and safely as possible.

Response C-2

In response to community concerns such as this one, the DOE has committed that no other DOE waste would be brought to the site for disposal and intends to firmly abide by that commitment. The conditions under which the Weldon Spring site would be used to dispose of the waste resulting from site cleanup will be specified in the record of decision for this action, which is expected to be signed by both the EPA and DOE within the next several months.

Response C-3

The possible risks to the students and staff at the Francis Howell High School, as well as to residents near the site, were explicitly addressed in the RI/FS-EIS (see Appendix F of the FS). The results of this assessment indicate that the estimated incremental exposures and risks to hypothetical nearby receptors are so small as to be indistinguishable from those attributable to background sources. The proximity of the high school to the site is discussed in the text of each document and is prominently identified in all figures that illustrate facilities near the site. The DOE is committed to cleaning up the site in a manner that would have no measurable impact from site contaminants at the school. Regarding the nearby residents, the assessment documents specifically note that many individuals live in unincorporated areas near the site. In fact, this was one reason that the possibility of health impacts to the nearby population within 5 km (3 mi) of the center of the site was evaluated. This evaluation indicated that cleanup activities would not result in a threat to human health for any member of the general public. An extensive monitoring program would be implemented during remedial action activities to ensure the safety of the nearby public.

Response C-4

To limit the likelihood of someone developing cancer (i.e., to limit the risk) from possible exposures to contaminants associated with NPL sites (such as the Weldon Spring site), the EPA has identified a target range of 1 in 1 million (1×10^{-6}) to 1 in 10,000 (1×10^{-4}) for the incremental lifetime risk associated with such exposures (EPA 1990). For comparison, the chance that an American will develop cancer from all sources (including natural environmental sources) is about 1 in 3 (American Cancer Society 1992). Therefore, EPA's range is a very small fraction of the background cancer rate in this country. Leukemia is one specific type of cancer. A risk that is within or below the EPA target range can be considered a low risk. A low exposure means that the length of time a person is exposed (e.g., hours per day), number of times a person is exposed (e.g., days per year), and/or the duration over which someone is exposed (e.g., years), in combination with the amount of the contaminant to which the individual is

C-5 About the disposal facility proposed (theres that word again). I was talking to the geologist about the Leachate collection system. I'm not a scientist but it seems to me that as fluids flow through the soil the leachate bed will start to clog up, much like a homes septic drain field. I asked the geologist about that and he said "The leachate collection system is a short term safe guard, short term meaning 50 years". Here all this time the proposals (theres that word again) are saying this is a 1000 year fix, yet portions are only short term.

C-6 My *PROPOSAL* is for the DOE to pay for moving Francis Howell High School to a safe location, then parents won't have to worry about the unforeseen mistake. This would be a relatively inexpensive fix to the school problem, in light of the large price tag of the entire clean-up.

C-7 I am *AGAINST* storing the waste on site, I feel that new waste will be added if the site is used for disposal.

John Jacobs

exposed, is limited such that the risk is typically low. The exposures and risks to various hypothetical receptors who could be exposed to contaminants originating from the Weldon Spring site under current conditions were calculated and discussed in the BA and Appendix E of the FS. These risks are summarized in Section 6.4 of the BA and Section 1.6 of the FS. Potential exposures and risks during and following remedial action activities are addressed in Chapters 2 and 6 of the FS.

The wastes at the Weldon Spring site are low-activity wastes in that they have low concentrations of radionuclides in comparison to some radioactive wastes with many times their activity levels. Estimated concentrations of radionuclides in the various wastes associated with site cleanup are given in Tables F.3 and F.4 in Appendix F of the FS; these concentrations range from less than 1 pCi/g (for soil) to 58,000 pCi/g (for raffinate pit sludge). Low-level radioactive wastes can have much higher concentrations of specific radionuclides — up to 1,000 times higher than those associated with the raffinate pit sludge — and can be sufficiently radioactive to require extensive shielding to limit gamma radiation exposure during handling. The waste at the Weldon Spring site is not of this type.

Response C-5

The primary purpose of the leachate collection system is to remove liquid that accumulates in the cell, e.g., from precipitation while the cell is open to receive waste. This period is projected to last about 5 to 7 years. After the cell was closed and the cover in place, this precipitation would no longer enter the cell. The cover would be designed to limit this infiltration, and the integrity of the cover system would be monitored and maintained. However, the conceptual design of the leachate collection and detection system was extended into the early years of waste containment to address the possibility that a small amount of liquid could be generated during that time by the natural decomposition of the limited amount of organic material in the cell. Thus, a leachate collection system design life of 50 years is expected to well exceed the projected need (it would be unnecessary to design a leachate collection system beyond the time period over which collectable amounts would be produced).

Response C-6

There is no need to move Francis Howell High School. Its location is safe, and DOE is committed to implementing site cleanup in a manner that would not result in any measurable impact from site contaminants at the high school and is meeting this commitment. To date, measurements from state-of-the-art monitors at the high school identify radon concentrations at background levels. During the major cleanup period at the chemical plant area, which is expected to begin within the next two years, an extensive network of monitors at the site in combination with monitors at the high school would provide the means for ensuring that this commitment continues to be met.

Response C-7

In response to community concerns such as this one, the DOE has committed that no other DOE waste would be brought to the site for disposal and intends to firmly abide by that commitment.

Letter D

January 4, 1993

Steve McCracken
Dept. of Energy
Weldon Spring Site Remedial Action Project
7295 Hwy. 94 South
St. Charles, MO. 63304

Dear Mr. McCracken:

This letter is to express our appreciation for your time and information that was presented to the Village Board at our December 7, 1992 regular board meeting.

D-1

The Village Board has ask me to follow-up on the air monitor that you confirmed will be installed to monitor any fallout from the cleanup site at the Village City Limits during the presentation at the December meeting. Also, the Village Board wants to go on record as supporting the final cleanup plans that was discuss at the meeting: to remove, treat, and use an on-site cell for disposal. The only objection would be if any government agency would try to bring additional hazardous waste to this site for treatment or storage.

Please don't hesitate to call if there is any questions.

Sincerely,

Allan Wansing

Allan Wansing, Village Chairman
Village of Weldon Spring Heights
22 Weldon Spring Heights
St. Charles, Mo. 63304

Response D-1

The DOE appreciates the support expressed by the village of Weldon Spring Heights for implementing the preferred alternative as identified in the PP. In response to community concerns such as this one, the DOE has committed that no other DOE waste would be brought to the site and intends to firmly abide by that commitment.

Letter E

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

January 20, 1993

Mr. Stephen H. McCracken
ATTN: RI/FS-EIS Comments
US Dept. of Energy
Weldon Spring Site
7295 Highway 94 S
St Charles MO 63304

Dear Mr. McCracken:

Thank you for the opportunity to comment on the draft environmental impact statement (DEIS) for Remedial Action at the Chemical Plan Area of the Weldon Spring Site. We reviewed the DEIS and have the following comments.

E-1

1. In general, we are concerned that the Weldon Spring remediation is not being examined in the context of the U.S. Department of Energy's (USDOE) entire Environmental Restoration and Waste Management Program. Both the transportation of wastes between and off of DOE sites and the disposal of wastes at other sites should be explored in the EM-Programmatic EIS. Any decisions on shipping Weldon Springs waste off site should be deferred until the EM-PEIS is complete. Until such steps are taken, we view with concern ad-hoc decisions on the movement of wastes to the Hanford Site.

2. With regard to Option 7c, we have the following specific concerns:

E-2

a. The RI/FS-EIS does not examine the Hanford option with sufficient detail to both understand its impacts on human health and the environment or to compare it to the other options.

E-3

b. There is currently no complain disposal facility at the Hanford Site which would be able to accept the proposed waste. To date, DOE has not demonstrated capacity to meet on-site needs. Until these needs are met, this should preclude further consideration of the disposal of Weldon Springs waste at Hanford.

E-4

c. Before off-site wastes are accepted at the Hanford Site, the consequences of the acceptance should be evaluated in the Hanford Remedial Action - EIS and the proposed Hanford Site-Wide EIS.

E-5

d. The RI/FS-EIS should include a study of preparedness and emergency response along the transportation route.

E-6

e. The costs associated with transporting the Weldon Springs waste to Hanford appear to be great compared to the benefit, if any, of disposal at Hanford.

Response E-1

The programmatic EIS for DOE's environmental restoration and waste management program is addressing transportation of wastes between various DOE facilities for subsequent treatment and disposal, among other issues. The preferred alternative identified in the RI/FS-EIS for the chemical plant area of the Weldon Spring site is on-site treatment and disposal of the waste resulting from site cleanup activities — not disposal of this waste at the Hanford site. Cleanup of the Weldon Spring site is an interim action in the context of DOE's programmatic EIS, and the requirements identified in 40 CFR 1506.1(c) for interim actions while a programmatic EIS is in progress have been met (as discussed in the FS and PP). Therefore, this site-specific proposal does not bias the programmatic EIS process, and a decision for the Weldon Spring site need not be delayed until after the programmatic EIS is completed.

Response E-2

The level of analysis associated with disposal of Weldon Spring waste at the Hanford site (and at the alternative disposal location in Utah) is sufficient for its purpose within the context of the multicomponent assessment in the RI/FS-EIS. This purpose is to provide information for a comparative evaluation of alternatives to support an informed decision on DOE's preferred alternative for cleanup of the Weldon Spring site. The evaluation was developed in accordance with both NEPA and CERCLA, as amended.

Response E-3

The unavailability of a disposal facility at the Hanford site for waste from the Weldon Spring site was discussed in several places in the FS. This was one consideration that led to DOE identifying on-site disposal as the preferred option for the Weldon Spring waste.

Response E-4

If DOE decided to dispose of the Weldon Spring waste at the Hanford site, DOE would either prepare an EIS (tiered from the RI/FS-EIS) to analyze environmental impacts of various cell locations and other site-specific factors or would consider such impacts in other EIS documentation under preparation for the Hanford site. However, the preferred alternative involves treatment and disposal of the waste at the Weldon Spring site. The additional administrative requirements noted in this comment associated with off-site disposal of the Weldon Spring waste were discussed in the FS and contributed to the identification of on-site disposal for the preferred alternative.

Response E-5

If DOE decided to dispose of the Weldon Spring waste at the Hanford site, DOE would evaluate the need for additional preparedness and emergency response training along the transportation route and would consult with the affected states (see also Response E-4 regarding the additional impact evaluations that would be performed). However, the preferred alternative involves treatment and disposal of the waste at the Weldon Spring site. The additional administrative requirements and impacts associated with off-site transportation and disposal of the Weldon Spring waste contributed to identifying on-site disposal for the preferred alternative.

E-7 | 3. In addition, the Washington public has repeatedly expressed to our Program their opposition to the importation of additional mixed and hazardous wastes to the Hanford Site.

If you have any questions, please call Mr. Geoff Tallent with the Nuclear and Mixed Waste Management Program at (206) 459-6228.

Sincerely,

M Vernice Santee

M. Vernice Santee
Environmental Review Section

MVS:
92-7501

cc: Geoff Tallent, Nuc Waste

Response E-6

The high cost compared to the benefit, if any, associated with transporting Weldon Spring waste to the Hanford site for disposal was a factor contributing to DOE's preference for on-site disposal, as discussed in the FS.

Response E-7

The views of the Washington public are acknowledged. The administrative difficulties associated with disposal of the Weldon Spring waste at the Hanford site contributed to the identification of on-site disposal for the preferred alternative.

Letter F

January 20, 1993

Department of Energy
WSSRAP
7295 Highway 94 South
St. Charles, MO 63304

Dear Sirs:

The following is my commentary on the proposed final storage for the WSSRAP wastes.

F-1 I believe the above ground on site storage with chemical stabilization and solidification, or Alternative 6A, to be a secondary and inferior choice to that of vitrification and disposal at the Clive, Utah site, or Alternative 7B.

F-2 Although I am generally pleased with the progress which has occurred at the WSSRAP site to this time, it is my nature to prevent problems, rather than to fix them. I feel the choice of solidification and onsite storage of wastes will present another required cleanup in St. Charles County, sometime in the future, anywhere from 100 to 200 years from now. Granted, that cleanup should be easier than this one, perhaps. If disposal cell failure does occur at the WSSRAP site, it most likely would be a result of the integral loss of the double bottom liner, due to the karst geology, or from the tons of new weight on top of it, or from an earthquake, or from the appearance of a new sinkhole to join the many others in the area.

F-3 I am concerned that the proposed solidification process increases the volume of the wastes by 32%. I am pleased that the vitrification process decreases the volume of the wastes by 68% and takes only 4 years to do. Vitrification costs more, but you get more for your money, because the final product is much safer to store.

F-4 The porous karst geology at the WSSRAP site presents concerns on the preferred alternative, which could be addressed by vitrification and removal of the wastes to Clive, Utah. The permitting required in Utah for the WSSRAP wastes could be pursued during those four years while the vitrification process at WSSRAP was occurring.

Ideally, the WSSRAP site should be permanently relieved of its million year contaminants and returned to the Earth, without a 42 acres tombstone as a memorial to mistakes of the past.

F-5 St. Charles County does not need a million cubic yards of toxic wastes permanently stored next to a high school, 1½ miles from residences, on an area of underlying karst porous geology and nearby sinkholes, by a chemical solidification process which mixes concrete with the contaminants.

F-6 St. Charles County should be entitled to the best available technology which I perceive to be vitrification and removal to Clive, Utah. The WSSRAP site was never meant to store radioactive wastes in the first place, neither 50 years ago, today or 100 years from now. Utah was meant to do that. The WSSRAP site

Response F-1

The preference expressed for Alternative 7b is noted.

Response F-2

Disposal of waste such as that resulting from cleanup of the Weldon Spring site involves well-established technologies that have been effectively implemented at a number of locations across the country (including about 20 with similar waste types). These technologies would be applied to the construction and maintenance of an on-site disposal facility for the Weldon Spring waste that would protect human health and the environment for hundreds to thousands of years.

Many geological, geotechnical, and hydrogeological studies have been conducted at the proposed disposal location to evaluate the suitability of the overburden as a foundation material and the suitability of the bedrock with respect to catastrophic collapse potential. These studies have been conducted in consultation with geologists and engineers from the state of Missouri, and the state has determined that the proposed disposal area is suitable for the construction of an engineered cell. Test results indicate that the overburden would provide adequate weight-bearing capacity and a sound foundation for a disposal facility.

Relative to the issue of karst in the context of disposal cell integrity, the term applies to topographic regions characterized by losing streams, springs, and sinkholes. These features can occur in varying degrees that reflect the stage of karst development for a particular area. The upper portion of the bedrock beneath the proposed disposal location at the chemical plant area is characterized as immature in terms of karst development. This site is located within a larger region that contains springs and losing streams; however, sinkholes are not common in the immediate vicinity of the site, and the nearest sinkhole is more than 1.6 km (1 mi) away (as discussed in the FS). The limestone weathering that has occurred at the chemical plant is much less developed than at off-site areas, in part because the site is situated on topographic and groundwater highs. Water-level measurements on and around the site reveal a well-developed groundwater divide, suggesting that the groundwater flow system is characterized by diffuse flow with only minor components of discrete (fracture) flow.

Karst conditions within several miles of the chemical plant area vary because of overburden differences and the susceptibility of the shallow bedrock to dissolution. For example, the Kimmswick Limestone of the Weldon Spring quarry area is fundamentally different from the Burlington-Keokuk Limestone beneath the chemical plant area. Examination of the Kimmswick Limestone in outcrops north of the Missouri River has identified solution features that range from enlarged bedding planes and vertical fractures to small caves. One reason for the presence of such features in the Kimmswick Limestone may be the lack of appreciable soil cover in that area (south of the commonly accepted limit of continental glaciation). By contrast, the overburden in the study area for the proposed disposal cell ranges from at least 4.6 to 9.1 m (15 to 30 ft) thick. The Burlington-Keokuk Limestone has also been examined at outcrops north of the Missouri River, and fundamentally different characteristics were observed. The Burlington-Keokuk Limestone generally appears massive (an engineering term would be

"competent"), with a thin weathered zone near the surface. Vertical fractures are rare and do not appear to be affected by solution influences. These data indicate the unit has engineering qualities that make it suitable as a foundation for a disposal cell.

Subsurface data collected for the Burlington-Keokuk at the chemical plant area also indicate suitable engineering characteristics. Most bedrock studies conducted at the site have focused specifically on determining whether solution features or large voids are present that could increase the potential for catastrophic collapse and affect the integrity of an on-site disposal cell. For example, hydraulic conductivity has been determined from slug and pump tests, core data have been collected from angle and vertical borings, and numerous water-level measurements have been taken. These studies have not identified any active groundwater conduits or closed depressions in the bedrock beneath the proposed disposal location. The results of preliminary numerical modeling for groundwater flow beneath the site also indicate that such features are not present at the proposed cell location. The Missouri Department of Natural Resources has reviewed the results of these studies and concluded that no significant potential for catastrophic collapse exists in the area proposed for on-site disposal (as discussed in Section 3.2.6 of the FS). In addition, the presence of an engineered disposal cell with a cover that limits infiltration and a recompacted clay layer below the waste that limits percolation would minimize any future development of karst features beneath the cell.

Relative to potential impacts to the cell integrity from earthquakes, a review of local conditions suggests that soil beneath the proposed cell area is not susceptible to liquefaction or earthquake-induced settling, as discussed in the FS. Further review would be conducted as part of detailed design activities, and the cell would be designed to withstand earthquakes that might occur over at least the next 200 to 1,000 years.

Response F-3

Cost was not a major factor in selecting chemical stabilization/solidification over vitrification as the treatment component of the preferred alternative. Chemical stabilization/ solidification using a mixture of cement and fly ash is a standard waste treatment technology that can be readily implemented at the scale required for the site. In contrast, the vitrification process (which would reduce the total disposal volume by 24%) is an innovative technology for waste treatment and has not been demonstrated on the necessary scale. It is expected that system development would take several years, with delays likely due to the innovative nature of vitrification for the required waste treatment application. In addition to the time required to demonstrate that effective treatment would be reliably achieved upon scale-up, it would require two vitrification units operating 24 hours per day year-round to maintain the treatment schedule of one chemical stabilization/solidification unit operating 8 hours per day for 9 months of the year. Despite the likelihood of implementation difficulties for vitrification, this process is being carried forward into the conceptual design phase of this project as a contingency remedy to provide an alternative response if needed.

Response F-4

The geology beneath the Weldon Spring site has been extensively studied, and the Missouri Department of Natural Resources has concluded that no significant potential for catastrophic collapse exists in the area proposed for on-site disposal (see Response F-2). Several concerns associated with vitrification (some of which are indicated in Response F-3) make it a less attractive treatment technology for site waste than chemical stabilization/solidification. The permitting process for the Utah site is outside the control of DOE.

Response F-5

Well-established technologies would be applied to the treatment of Weldon Spring waste and the construction and maintenance of an on-site disposal facility that would protect human health and the environment — including the high school and nearby residents. The DOE has committed to conducting the cleanup and maintaining the site in a manner that would result in no measurable impact from site contaminants at the high school and is meeting this commitment. During the major cleanup period at the chemical plant area, which is expected to begin within the next two years, an extensive network of monitors at the site in combination with monitors at the high school would provide the means for ensuring that this commitment continues to be met. The site geology has been extensively studied and is considered suitable for the construction of a disposal cell to contain the waste that is currently present at various locations across the site (see Responses F-2 and F-3).

Response F-6

As discussed in the FS, several concerns regarding vitrification make it less attractive than the preferred chemical treatment method for site waste. One of these concerns relates to the fact that vitrification has not been demonstrated as a reliable and effective technology for waste such as that present at the Weldon Spring site. In contrast, chemical stabilization/solidification with fly ash and cement is a well-established technology for waste treatment (see Response F-3). Nevertheless, although vitrification does not provide as good a balance among the prescribed evaluation criteria as the preferred chemical treatment method, this technology is being retained as a contingency remedy because it could offer certain specific advantages (such as volume reduction) and could provide a general benefit relative to the national effort to develop innovative treatment technologies.

Many adverse impacts would be associated with implementing Alternative 7b (on-site vitrification of the highly contaminated site waste and disposal of all waste in Utah), including impacts associated with transporting waste from the Weldon Spring site to Utah over thousands of miles and many years. (The impacts identified for Alternative 7b are discussed at length in the FS.) Therefore, Alternative 7b is not considered the best overall option for cleanup of the Weldon Spring site.

On the basis of numerous studies, the location proposed for on-site disposal has been determined to be suitable (see Response F-2). The preferred alternative — which involves the

happened due to the frantic war effort in 1940. It was a hurried mistake in location, which we finally have an opportunity to correct at this time. The WSSRAP site geology, the High School, the River, the Busch Wildlife area, and the nearby homes, as well as the One million people living in the Metro area, are all reasons to recognize and acknowledge when choosing where to permanently store these wastes. To endorse the onsite storage of these wastes, or Alternative 6A, would be to endorse a less than adequate, inferior and least costly method of permanent storage for these wastes.

F-6 (Cont.)

Why should the wastes be stored in Utah? Because it is a better site, dedicated to exactly such an identified purpose such as the WSSRAP wastes. The Clive, Utah site is 25 miles from the nearest home, and it is drier. Utah is already largely contaminated from nuclear bomb testing in the Fifties. The Clive, Utah site is 28 miles away from the nearest body of water and is a commercial disposal facility, licenced by the state of Utah for naturally occurring radioactive materials. It is 81 miles west of Salt Lake City, Utah.

F-7

It took 45 years for the WSSRAP site to develop in St. Charles County. If we can spend half of that time, or 22 years cleaning it up, and permanently remove from the County the contaminants which we never asked for in the first place, then we will have done it right after all.

The choice of vitrification and Utah storage would support President-elect Clinton's expected environmental agenda, which is to create a stronger national environmental infrastructure, by forming new jobs. We can set a precedent here at WSSRAP by doing this at a critical time, at the beginning of his Presidency. The Nation is watching us, and DOE has already set precedents here in St. Charles County by their extraordinarily positive responses to citizens' concerns.

F-8

In that respect, I will conclude with a heartfelt thankyou to the Department of Energy and especially to Mr. Steve McCracken, who represents the "fresh thinking" of a branch of government which has inherited far too many cleanup sites such as WSSRAP.

Respectfully,

Mary A. Halliday

Mary A. Halliday
St. Charles Countians Against Hazardous Wastes

removal of waste from various contaminated areas of the site for consolidation in an on-site disposal cell — could be implemented in a manner that would not adversely affect the nearby community or the environment. Extensive engineering controls would be applied to minimize any impacts, and monitoring systems would be in place to ensure that the commitment to protecting the public is met. Alternative 6a was selected as the preferred alternative for the Weldon Spring site on the basis of the comparative evaluations presented in the FS, and EPA Region VII and the state of Missouri (Shorr 1993) concur with this selection.

Response F-7

The Envirocare facility in Utah is indeed more isolated, has a drier climate, and is farther from the nearest surface water body than the Weldon Spring site. However, as discussed in the FS, these were not critical factors contributing to the negative impacts associated with Alternative 7b (see also Response F-6). Use of the Envirocare site for disposal would involve loading waste from the Weldon Spring site onto transport vehicles for shipment to Utah. Transporting this large volume of waste over considerable distances for many years would be a difficult task and would result in adverse health effects, including those from transportation accidents. Many administrative difficulties would also be involved in moving this large volume of radioactive material through several states and numerous communities. In contrast, the preferred alternative — which involves on-site disposal — could be implemented without the impacts associated with the required double handling of waste or the administrative difficulties associated with its transportation. The preferred alternative would be implemented in a safe manner, and the disposal cell would be designed and maintained in a manner that would minimize any impacts to the public or the environment (including surface water). (As a note, Utah has received radioactive fallout, as have all states, but the state is not largely contaminated. Fallout was not a factor in siting the Envirocare facility in Utah.)

Response F-8

The preferred alternative (chemical treatment and engineered containment of the waste at the Weldon Spring site) is also considered a positive environmental solution because it would promote a protective, environmentally sound, and cost-effective cleanup action. This action would be contained within the area already affected by the site and would not extend impacts over additional states.

Letter G

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

January 26, 1993

Mr. Stephen H. McCracken
Project Manager
U.S. Department of Energy
Weldon Spring Site Remedial
Action Project Office
7295 Highway 94 South
St. Charles, Missouri 63304

Attention: RI/FS-EIS Comments

Dear Mr. McCracken:

RE: Review of RI/FS-EIS for the Remedial Action at the Chemical Plant Area of the Weldon Spring Site, November, 1992 (DOE/EIS-0185D)

G-1

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act, we have reviewed the above-referenced document. Based on our review, we rate the document LO-1 (Lack of Objections; Adequate Information). We also concur with your preferred alternaitve, 6a. We have no comments to offer at this time.

Please send us a copy of the final RI/FS-EIS and Record of Decision when they are completed.

Sincerely,

Gene Gunn

Gene Gunn, Chief
Environmental Review
and Coordination Section

Response G-1

The rating of the RI/FS-EIS and concurrence with the preferred alternative are appreciated. A copy of the final RI/FS-EIS and the record of decision will be provided upon completion.

Letter H

OZARK UNDERGROUND LABORATORY

Rt. 1 Box 62 • Protem, Missouri 65733 • (417) 785-4289

February 11, 1993

Mr. Stephen H. McCracken, Project Manager
U.S. Dept. of Energy
Weldon Spring Site Remedial Action Project Office
7295 Highway 94 South
St. Charles, MO 63304

RE: Comments on Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site.

Dear Mr. McCracken:

I have been retained by St. Charles Countians Against Hazardous Waste to review hydrological issues in the following documents:
1) "Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site".
2) "Baseline Assessment for the Chemical Plant Area of the Weldon Spring Site".
3) "Feasibility Study for Remedial Action at the Chemical Plant Area of the Weldon Spring Site". 2 volumes.
4) "Remedial Investigation for the Chemical Plant Area of the Weldon Spring Site". 2 volumes.

Characterization of groundwater and surface water hydrology in the area is necessary to provide a rational basis for considering and evaluating possible remedial actions and for planning such remediation. With these purposes in mind, it is my professional opinion that, in general, the above documents provide both an adequate and an acceptably accurate characterization of surface and groundwater conditions in the area described. However, there is one notable exception which I will discuss in the following paragraphs.

H-1

Groundwater tracing studies at and around the site were conducted by the Missouri Division of Geology and Land Survey (DGLS). Well conceived and well conducted groundwater tracing studies are essential for site characterization in soluble rock landscapes. Unfortunately, the DGLS tracing program was critically flawed by a number of factors. These factors included:
1) Inadequate field investigation to identify all springs which should have been sampled prior to the start of tracing work.

Response H-1

The Missouri Division of Geology and Land Survey has conducted many difficult studies at and around the Weldon Spring site, and the results of these studies have provided much useful information for characterizing the complex hydrologic and hydrogeologic conditions in the area. These and other studies were used to develop the site characterization presentation in the RI/FS-EIS, and the collective results led to the acceptable characterization of the site that was acknowledged in this comment. The investigation mentioned in this comment was one of those numerous studies, and the results of that investigation as well as the state's discussion of possible explanations for the results (which are noted in the comment) are being incorporated into the development of additional studies for the site area (see Responses H-2 and H-5). The DOE appreciates the comment regarding the characterization of surface water and groundwater conditions in the chemical plant area.

2) Inadequate background sampling in an area where dyes from previous groundwater tracing work might still be present.
3) Apparent absence of a statistically established quantitative detection limit for each of the tracer dyes.
4) Apparent absence of any statistically established method for separating fluorescein dye from other fluorescence materials based upon peak emission wavelengths.
5) Apparent absence of other sampling and analysis controls which are important in producing good quality data with reasonable credibility.
6) Apparent absence of normal QA/QC procedures in sample analysis work (such as routine analysis of sample blanks and duplicate samples).
None of the above-listed factors would have existed in a well conceived and well conducted groundwater tracing study which utilized the equipment available to DGLS.

H-1 (Cont.)

Because of the flaws in the DGLS investigation identified above, it is possible that tracer dyes injected by DGLS were recovered at various sampling stations in addition to those identified in the documents under review. DGLS reports state that tracer dyes were recovered at points not identified as positive dye trace recovery sites. DGLS may be correct that these dye recoveries resulted from extraneous sources of fluorescein dye and/or contaminated activated charcoal and/or from inadvertent contamination of samples by DGLS personnel. However, the flaws in the study make it possible that groundwater flow to springs in the region is much more extensive than what is concluded in the reports.

It is clear that a karst aquifer underlies areas which essentially surround the Weldon Spring Chemical Plant area. A key question is whether or not a karst aquifer also underlies the Chemical Plant area. The common current definition of a karst aquifer is that it is an aquifer located in a soluble rock unit in which appreciable amounts of water move through dissolutionally modified openings. The definition of "appreciable" is a function of the issue; at this site we must be concerned with the migration of hazardous and radioactive wastes. Solutional openings which provide preferential flow routes present a much greater opportunity for subsurface waste migration than is provided by diffuse flow. At the Weldon Spring Chemical Plant, "appreciable" should be viewed as even a very small percentage of total flow. Because of the flaws in the DGLS work we must assume that the Weldon Spring Chemical Plant area is underlain by a karst aquifer. Even if the DGLS groundwater tracing work had been of professional

H-2

Response H-2

Per the definition provided in the comment, the site may be considered to be underlain by a karst aquifer as a "worst case scenario." The current conceptual model of the site hydrogeology includes areas of preferred flow where thick sequences of partially saturated residuum exist in linear bedrock depressions. This model acknowledges the possibility identified in the comment of incipient karst terrane conditions at the site area. The model will continue to be refined as part of the focused assessment of site groundwater over the next several years.

quality and had found no rapid flow from the site to off-site springs, assuming that the site is underlain by a karst aquifer would still be a logical and prudent "worst case scenario".

The Department of Energy's view of groundwater movement on and off the site is essentially as stated on page 7-3 of the Remedial Investigation. This is as follows:

> **"Groundwater movement in the limestone aquifer below the site is believed to occur predominantly by diffuse flow along horizontal bedding planes and, to a lesser extent, through vertical fractures. In general, hydraulic conductivity decreases with depth from the top of the water table. As the intensity of bedrock weathering and fracturing decreases with depth, groundwater flow paths are more widely spaced, and the influence of vertical fractures is reduced. Groundwater flow off site may occur by diffuse-flow as well as through free-flow conduits on both sides of the groundwater divide. Discharge points for the conduits are perennial springs such as Burgermeister Spring and two unnamed springs in the southeast drainage."**

H-2 (Cont.)

I agree with DOE's conclusion that groundwater movement in the limestone aquifer below the site probably occurs predominantly by diffuse flow. However, to use the DOE terminology, groundwater flow <u>on-site</u> may occur through free-flow conduits as well as by diffuse-flow.

H-3

It is my professional opinion that DOE has conducted adequate hydrologic and hydrogeologic work at the site to fulfill the needs of the various documents under review. With this in mind, the next question is the extent to which the nature of the groundwater system limits or restricts the five evaluated remedial action options.

H-4

If we assume that a karst aquifer underlies the site and that groundwater flow may occur within it through free-flow conduits as well as by diffuse-flow, then the No Action Alternative is clearly unacceptable. In such a groundwater system, even short delays in cleanup (or alternatives which extend the cleanup period) may have consequences which offset any benefits which vitrification might have over chemical treatment and stabilization, or which off-site disposal may have over on-site disposal.

Response H-3

The DOE appreciates the comment regarding the adequacy of the hydrologic and hydrogeologic characterization work at the site for purposes of the RI/FS-EIS.

Response H-4

The DOE agrees that a delay in implementing site cleanup in accordance with the preferred alternative (which involves chemical stabilization/solidification and on-site disposal) could result in consequences that would offset any benefits associated with the alternative treatment or disposal options. The DOE is committed to cleaning up the Weldon Spring site safely and completing the cleanup as quickly as possible to limit any future impacts, including further impacts to groundwater.

H-5 I would never have recommended this site for on-site disposal of the wastes in question if such wastes did not already exist at the site. However, the wastes do exist at the site, they are abundant and poorly contained, and these conditions have prevailed for many years. The overburden which exists in the area and overlies the karst aquifer has clearly been of critical importance in limiting the migration of contaminants. On-site disposal would make critical use of this overburden. It should be recognized that any on-site disposal would require groundwater monitoring strategies appropriate for a karst aquifer; such monitoring would be more expensive to install and to operate than would monitoring at a non-karst aquifer site.

H-6

H-7 It is my view that all of the five identified options except the no action alternative are viable from a surface and groundwater perspective.

Sincerely,

Thomas Aley

Thomas Aley, PHG 179*
Director, Ozark Underground Laboratory

* Professional Hydrogeologist, certified by American Institute of Hydrology

Response H-5

The DOE recognizes the benefit of the site overburden that is noted in the comment, and the conceptual cell design includes compacted naturally occurring material from the site. Removing the sources of contamination, chemically treating the more highly contaminated material, and disposing of all waste associated with site cleanup in an engineered containment cell would greatly reduce the potential for future releases to the nearby environment.

Response H-6

An extensive monitoring program would be developed for an on-site disposal facility, and this program would consider the hydrologic and hydrogeologic conditions at the chemical plant area. As part of this program, wells and springs would be monitored with consideration of preferential subsurface flow paths. Although it would be more expensive to install and operate a groundwater monitoring system in a karst aquifer setting (as defined in this comment) compared with a non-karst aquifer site, this additional cost would be a small component of the overall cost for implementing any one of the four action alternatives. Additional details on the monitoring system that would be employed will be provided in the mitigation action plan, which will be completed during the detailed design phase of this remedial action.

Response H-7

The DOE agrees that site cleanup should not be delayed and appreciates the support for action.

Letter 1

FRANCIS HOWELL SCHOOL DISTRICT
4545 Central School Rd. • St. Charles, MO 63304 • (314) 441-0088
FAX 314-939-8423

Dr. John R. Oldani
Superintendent

Dr. Daniel T. Brown
Associate Superintendent

February 12, 1993

Stephen H. McCracken
Project Manager
U.S. Department of Energy
7295 Highway 94 South
St. Charles, MO 63304

RE: Comments on the Draft Proposed Plan for Treatment and Final Disposal of Waste at the Weldon Spring Site.

Mr. McCracken

I write at the behest of the Board of Education of the Francis Howell School District following a presentation/review of the referenced plan by Mr. Donald J. McQueen of Shannon & Wilson Inc.

I submit the following list of recommendations as a school district response to the referenced plan.

I-1 a. The rate of clean up should be accelerated.

I-2 b. The critical elements of the plan should be conducted during non-school hours; that is, prior to and after normal school hours, on weekends and during school breaks.

I-3 c. The process addressing ground water contamination in the Femme Osage Slough should be accelerated.

We appreciate your consideration of the recommendations and commend you for the creation of a proposed plan which appears to significantly minimize hazards.

Sincerely

Daniel T. Brown
Associate Superintendent

DTB/ts

c: Dr. Oldani

Response I-1

The DOE is committed to cleaning up the site in a safe and environmentally sound manner and is moving forward with cleanup activities as quickly as possible. Numerous regulatory review and engineering requirements must be met as part of the cleanup process before field activities can be implemented, and extensive planning and development of detailed operational procedures are also involved. Focused cleanup activities have been expedited to reduce health and safety threats on-site and to limit contaminant migration. These interim actions include the treatment of water at the quarry and chemical plant area, dismantlement of site structures, and removal of bulk waste from the quarry — with maintenance of the resultant waste in controlled storage on-site until an appropriate disposal facility is available. The major cleanup activities at the chemical plant area, which include the removal and treatment of sludge from the raffinate pits and disposal of all site waste, are expected to begin within the next few years after the RI/FS-EIS process for the proposed remedial action is completed.

Response I-2

The DOE appreciates the involvement of the school board in this project and will continue to work with the Francis Howell School District to minimize potential impacts to the high school. The DOE will work with the school district to identify critical elements of the cleanup plan, such as scheduling of activities, and will develop appropriate mitigative measures. With regard to controlling potential releases, DOE has committed to conducting the cleanup in a manner that would not result in any measurable impact from site contaminants at the high school. (See also the response to General Issue 7.) The DOE will continue to work with the school and district administrators to ensure that these parties are fully informed of planned activities.

Response I-3

The environmental compliance process for addressing contamination in the quarry area has been initiated. Focused characterization of that area, including the Femme Osage Slough, is expected to begin this summer to support final remedial action decisions.

Letter J

Federal Emergency Management Agency

Washington, D.C. 20472

FEB 16 1993

Stephen H. McCracken, Project Manager
ATTN: RI/FS-EIS Comments
U.S. Department of Energy
Weldon Spring Site Remedial Action Project Office
7295 Highway 94 South
St. Charles, Missouri 63304

Dear Mr. McCracken:

In review of the Department of Energy's *Draft Remedial Investigation/Feasibility Study-Environmental Impact Statement (RI/FS-EIS) for Remedial Action at the Chemical Plant Area of the Weldon Spring Site*, November 1992 (DOE/EIS-0185D), we provide the following comments.

J-1 It has been our intention to analyze the RI/FS-EIS as it complies with various applicable laws, mainly the National Environmental Policy Act, which addresses major federal actions that may significantly affect the quality of the human environment, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. The RI/FS-EIS satisfactorily addresses the emergency preparedness requirements within CERCLA which are, among others, to focus the remedial actions on the releases which may pose a threat to human health, to apply the more stringent state standards and the assurance that these are met, and to allow for public participation in this process.

J-2 Overall, the on-going removal and interim remedial actions appear to be adequate and suitable in protecting the surrounding community, responding to potential worker health and safety concerns, and mitigating environmental hazards.

We commend your efforts in this process, and thank you for allowing us the opportunity to review this invaluable information.

Sincerely,

D. Anne Martin
Chief
Hazardous Materials Division

Response J-1

The DOE appreciates the supportive statements by the Federal Emergency Management Agency, including the comment that the RI/FS-EIS satisfactorily addresses the emergency preparedness requirements of CERCLA.

Response J-2

The positive comment regarding ongoing removal and interim remedial actions is also appreciated.

Letter K

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry
Atlanta GA 30333

FEB 17 1993

Mr. Stephen H. McCracken
U.S. Department of Energy
Weldon Spring Site
Remedial Action Project Office
7295 Highway 94 South
St. Charles, Missouri 63304

Dear Mr. McCracken:

The Agency for Toxic Substances and Disease Registry has been asked to provide written comments to you concerning the public health aspects of the "Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site". This document proposes remedial actions for contaminated materials and soil cleanup standards, and identifies a disposal decision for wastes generated during remediation. This letter will address the adequacy of the proposed soil cleanup standards and the potential for human exposures to those waste materials.

K-1 The public health concerns of the proposed remedial actions are specifically addressed in an ATSDR Health Consultation, which is currently in internal review. This letter is to insure that ATSDR comments are received during the public comment period for the proposed plan. The Health Consultation will also be forwarded to you as soon as possible.

K-2 ATSDR has several concerns with the proposed plan. First, the off-site (or vicinity) properties, which are radiologically contaminated, have not been evaluated for non-radiological contaminants. Although cleanup of radiological contaminants at these sites may remove/remediate non-radiological contamination, these are the sites for which there is current exposure potential and DOE will not retain access restrictions. Additionally, several of the off-site areas may have been subject to prior contamination by Ordnance Works operations, which presents the potential for significant remedial worker exposure and safety hazards. ATSDR recommends, that in the off-site areas, non-radiologic soil contaminant screening be conducted and that site remediation be coordinated with ongoing Ordnance Works site characterization.

K-3 The second concern is the proposed cleanup standards (ALARA Goals). The ALARA Goals for arsenic, chromium VI, dinitrobenzene, nitrobenzene, trinitrobenzene, and trinitrotoluene exceed health-based comparison values for ingestion exposures for pica children (assumed soil ingestion rate of 5,000 mg/day). The ALARA Goals for dinitrobenzene, nitrobenzene, and trinitrobenzene are also greater than

Response K-1

The DOE will review the Health Consultation from the Agency for Toxic Substances and Disease Registry upon receipt.

Response K-2

The DOE is responsible for properties on the adjacent Army site and in the surrounding state wildlife area that were contaminated as a result of past activities conducted by DOE and its predecessor agency at the Weldon Spring site. These vicinity properties have been identified on the basis of their radioactive contamination; no DOE vicinity property contains only chemical contaminants. The radioactively contaminated soil would be removed from these properties under the proposed remedial action, so any chemical contamination that may be present would be removed at the same time. The DOE would clean up these vicinity properties to levels that would allow for unrestricted use. Measures taken by the remedial action workers during those activities to protect against radiological exposures would also protect against exposures to any chemical contaminants that may be present; i.e., the protective clothing, gloves, and masks that would be worn would prevent exposure to contaminants through inhalation, ingestion, or dermal contact. The Army is responsible for properties on the Army site that are chemically contaminated by previous Army activities. Thus, the Army is addressing the screening for nonradioactively contaminated areas and cleanup of those areas as part of a separate RI/FS process for the Army site. The DOE will continue to coordinate with the Army regarding cleanup of the contaminated DOE vicinity properties on the Army site.

K-3 (Cont.) comparison values for non-pica children (assumed soil ingestion of 200 mg/day). Arsenic, PAHs [benzo(a)pyrene], and PCBs (Aroclor 1248, 1254, and 1260) are known or suspected carcinogens and the proposed ALARA Goals are greater than appropriate comparison values.

K-4 Calculation of the comparison values assumes chronic exposure to the contaminated soil. Currently, there are no chronic exposures to Chemical Plant Site soils for the public because site access is resticted. However, the cleanup goals were derived assuming unlimited public access. Under the scenario of residential occupation of the contaminated area, the proposed non-radiologic cleanup goals would not be protective of human health.

K-5 Thirdly, the proposed plan has not demonstrated that future potential doses due to radioactive materials at the site will be within the recommendations of the International Commission on Radiation Protection (ICRP Publication 60). Calculation of radiation dose includes the accumulation of radioactive materials within the body throughout one's expected life (i.e. 70 years). The proposed plan does not detail how or if that was completed.

K-6 Using the Baseline Assessment for the Chemical Plant Area of the Weldon Spring Site (BHA) as an indicator, the BHA included calculations for doses over an individuals working-life-span of 50 years for either 10 year or 30 year exposure scenarios. Those scenarios do not include dose estimates for the pica-child nor are they representative of the public's expected life-span. To determine whether the ALARA Goals for the radioactive soils are protective of public health, exposure scenarios should account for pica-child, child, and adult activities. The doses from those scenarios should be evaluated for the expected life-span of an individual, 70 years, as specified by the ICRP.

K-7 Accidental or intermittent exposure to soils remediated to ALARA Goals should not be of public health concern if safety procedures and site access restrictions, as outlined in the "Feasibility Study for Remedial Action at the Chemical Plant Area of the Weldon Spring Site," are maintained.

Respectfully yours,

Sally L. Shaver
Chief
Federal Programs Branch
Division of Health
Assessment and Consultation

Response K-3

The soil cleanup levels proposed for the Weldon Spring site were developed on the basis of the reasonable maximum exposure scenario for a resident. The EPA has established standard guidance for assessing risks from soil ingestion, which indicates that the incidence of pica behavior in the normal population is low (as discussed in Section E.4.1.2 of the FS). In addition, the EPA has identified 200 mg/d as the upper bound value to assess soil ingestion for children aged 1 through 6 (EPA 1991a). This information was incorporated into the development of cleanup criteria for the Weldon Spring site, in accordance with EPA guidance.

The scientific data and the methods used to develop these cleanup levels are discussed in detail in the FS (see Chapter 2 and Appendix E), with supporting information in the BA. The cleanup levels proposed for the various chemicals in site soil, including those identified in this comment, have been determined to be protective without access restrictions for a resident. That is, exposures to soil containing residual contamination at the levels proposed for the site are estimated to result in incremental risks to a hypothetical resident that meet the target range of 1×10^{-6} to 1×10^{-4} established by the EPA for NPL sites (see Response C-4). As a note, in guidance developed to address the application of risk estimates to site cleanup decisions, the EPA states that (1) remedial action is not typically warranted unless risks exceed the upper end of the target range, i.e., 1×10^{-4}; and (2) action may not be warranted even when risks exceed the range, depending on site-specific conditions (EPA 1991b). (This is also discussed in Chapter 2 of the FS.) Conditions in the area of the Weldon Spring site relative to the levels of natural constituents in uncontaminated soil were important to the development of site cleanup criteria, as explained in Chapter 2 of the FS and summarized below.

It appears that the comparison values referred to in the remainder of the comment may correspond to the low end of the target range (1×10^{-6}). The EPA considers this level an initial "point of departure" to be targeted, with cleanup criteria to be developed appropriate for the specific conditions at a given site. For the Weldon Spring site, the variability in background concentrations of naturally occurring metals in local soil make it virtually impossible to discern incremental levels that correspond to 1×10^{-6}. (The concentrations of these metals in local soil are well within the ranges reported for agricultural soil across the state of Missouri.) As an example, the concentrations of arsenic in local soil correspond to risk estimates that approach and exceed the upper end of the target range. Therefore, it would be difficult to distinguish an incremental risk at the low end (and in certain cases even the upper end) of EPA's target range associated with arsenic contamination from the risk associated with a naturally occurring level, given the relatively high risk inherent to arsenic and its background variability. Backfilling on-site areas from which contaminated soil would be excavated during cleanup with uncontaminated local soil could have the effect of actually increasing the risk at a "remediated" area of the site above that associated with the area if it were not excavated. For these reasons, the lower end of EPA's range could not serve as the endpoint for site cleanup criteria.

Response K-4

The nonradiological cleanup levels were developed for the site in accordance with EPA's established process incorporating site-specific conditions, as explained in Response K-3. These levels are considered protective for residential use of the site without access restrictions.

Response K-5

The radiation doses presented in the RI/FS-EIS are 50-year committed effective dose equivalents, and they were estimated using procedures and dosimetry models developed by the International Commission on Radiological Protection (ICRP), as discussed in the BA. These doses account for the radiation effects that could occur during the 50 years following intake of radioactive materials. This approach for calculating radiation doses is consistent with current EPA risk assessment guidance (as discussed in the BA).

The ICRP recently recommended changes to its procedures for calculating radiation doses in Publication 60 (ICRP 1990). The 50-year committed dose concept was retained for adult exposures, but for children the ICRP recommended that the integrating period should extend from the age of intake to 70 years. The recommendations in ICRP Publication 60 have not been adopted by the federal government.

Nevertheless, to evaluate the significance of this recommended change on the risk estimates presented in the RI/FS-EIS, doses calculated using age-specific dose conversion factors were compared with those calculated using 50-year committed dose conversion factors for the radionuclides present at the Weldon Spring site. This comparison indicated that committed doses estimated from age-specific factors were generally within a factor of 2 of those obtained using the method presented in the RI/FS-EIS for the residential scenario. (The exposure duration used in these assessments was 30 years, which is the value recommended by the EPA for evaluating residential exposures at a given residence.) Thus, the impact of using age-specific factors on the risk estimates for the Weldon Spring site, conservatively assuming that the receptor was an infant at the onset of exposure, would be relatively small.

In addition, DOE's ALARA process was explicitly incorporated into the development of soil cleanup criteria for the site to ensure that any future risks associated with residual radionuclides in soil would be reduced to levels as low as could reasonably be achieved. This process would also be applied during field cleanup activities so the actual concentrations of radionuclides remaining in soil would likely be much lower than the cleanup criteria. (See response to General Issue 8.) Hence, the use of age-specific dose conversion factors would not change the conclusions presented in the RI/FS-EIS.

Response K-6

Although the ICRP recommends the use of age-specific dose conversion factors and an integrating period from the age of intake to 70 years, these recommendations have not been adopted by the federal government. In any case, from a comparative evaluation for the radionuclides present at the Weldon Spring site, the effect of these recommendations on the site risk estimates would be small (see Response K-5). The risk estimates for the residential scenario at the site represent the probability of cancer incidence over a lifetime that could result from an exposure over 30 years, which is the duration identified in EPA guidance for a reasonable but conservative representation of time spent in a given residence. Regarding pica behavior, see Response K-3.

Response K-7

The cleanup levels developed for the site are expected to provide long-term protection of human health and the environment without access restrictions. Remediating soil to those levels would result in incremental risks within or below EPA's target range for an individual who might live on-site in the future. This topic is discussed in considerable detail in the FS (see also Response K-3).

Letter L

ENVIROCARE OF UTAH, INC.
THE SAFE ALTERNATIVE

February 18, 1993

U.S. Department of Energy
Weldon Spring Site Remedial Action Project
Attn: Steve McCracken
7295 Highway 9400 South
St. Charles, MO 63303

Re: RI/FS-EIS Document: DOE/EIS-0185D

Dear Mr. McCracken:

Envirocare is providing the following information in response to the public comment opportunity for the Remedial Investigation/ Feasibility Study for the Weldon Springs project. Envirocare of Utah, Inc. is pleased to be considered as one of the off-site alternatives for the Weldon Spring project. We have reviewed the above-mentioned document and would like to comment on some specific issues relating to the Envirocare alternative.

First and foremost, our estimates show that the actual cost of disposal at Envirocare would be considerably lower than the estimate presented in the report for the following reasons:

L-1

1. Because of our anticipated license with the NRC, treatment may not be required prior to disposal at Envirocare. This could greatly reduce the cost of the Envirocare option and may also reduce the amount of volume that would need to be shipped.

L-2

2. NRC and Envirocare have mutually agreed that the date of issuance for the 11e.(2) by-product disposal license will be the third quarter of 1993. Therefore, the Envirocare option should be available within 6 months. This may greatly reduce inflation costs associated with other options.

L-3

3. Bulk waste shipments are more economical than containerized waste shipments. Therefore, the transportation costs would be significantly lower.

L-4

4. The unit price for disposal at the Envirocare site has been reduced since our previous quote was based on the overall anticipated volumes of 11e.(2) by-product to be disposed of at Envirocare.

215 So. STATE STREET • SUITE 1160 • SALT LAKE CITY, UTAH 84111 • TELEPHONE (801) 532-1330

Response L-1

Cost was not the major factor that led to DOE's selection of on-site disposal as the preferred option for the Weldon Spring waste. Disposing of this waste at the Envirocare facility would require that site workers double handle the material to load it for transport and would also involve a considerable number of haul trips over thousands of miles — whether by rail or truck — which would increase administrative difficulties and the likelihood of accidents and injuries for workers and members of the general public. Certain waste would be treated before being transported because of worker protection issues and regulatory restrictions, regardless of conditions at the Envirocare facility per the anticipated license with the U.S. Nuclear Regulatory Commission (NRC). This treatment would reduce the waste volume, as discussed in Chapters 4 through 7 of the FS, so the estimates presented in the FS have already accounted for the suggested savings and volume reduction.

Response L-2

For the analyses in the RI/FS-EIS, it was assumed that the Envirocare facility would receive the NRC license such that it would be available to receive waste from the Weldon Spring site. No inflation costs were added to the Envirocare disposal option relative to the timing of that license. In any case, inflation cost was not a distinguishing factor between the final alternatives and had no bearing on the selection of the preferred alternative for the Weldon Spring waste.

Response L-3

As discussed in Appendix F of the FS, the Weldon Spring waste would be containerized before being trucked to a nearby railroad siding and then transferred to rail cars for transport to the Envirocare facility because this would be necessary for intermodal waste transport. This approach was determined to be the most protective and cost-effective means of transporting the material of primary concern for the site, i.e., the raffinate pit sludge, in accordance with stringent safety requirements. Because of its contaminant characteristics, this considerable amount of waste would require packaging in strong, tight containers before being shipped. Further, the health and safety of workers and the public would be of highest priority during the extended transportation campaign that would be required, and bulk shipment could increase the likelihood of exposures of the general public (e.g., from accidents). For these reasons, the cost of transporting the Weldon Spring waste to the Envirocare facility would not be expected to be significantly lower than estimated in the FS.

Response L-4

The unit price for disposal at the Envirocare site was not a significant factor in DOE's selection of on-site disposal as the preferred option for the Weldon Spring waste. (See Response L-1.)

ENVIROCARE

L-5

5. Based on quotes received by Envirocare, the truck option may be more economical than the rail option. This is contingent on the fact that the transfer station would not be necessary if the truck option were to be used.

Other questions which would help Envirocare better understand the nature of the project as it pertains to the Envirocare option include:

L-6

1. Some places in the document suggest that the Envirocare option would not include treatment and yet these costs seem to be included in the overall cost. Is treatment expected for the Envirocare option?

L-7

2. What is the basis for the statement that "impacts to groundwater could be comparable" between the Envirocare option and the onsite option? Have any groundwater models been run for the two different options?

L-8

3. Has a comparison been done using the Envirocare and the onsite option concerning the potential health and environment impacts if cell failure occurs?

L-9

4. Does the onsite proposal meet all of the requirements of 40 CFR 192, 40 CFR 264, subpart G, 10 CFR 40, Appendix A and 10 CFR 20?

L-10

5. What is the reason for stating on page 46 under the Envirocare alternative that "If the waste were exposed....wind dispersal of untreated material would be higher than Alternative 7a". Long term plans at Envirocare include covering the waste.

L-11

6. Have any models been run to support the statement on page 46 under the Envirocare alternative that states, "potential groundwater contamination could be similar" to onsite disposal? What is the permeability of the overburdens assumed to be for the onsite option and the Envirocare option?

L-12

7. Have the synthetic liners suggested for onsite disposal been accepted as providing the necessary long term protection required (200 to 1000 years)?

L-13

8. What is the basis for stating that possibility of cell failure is similar for onsite and offsite options? What is the basis for stating that the effects of cell failure would be similar?

Response L-5

Although costs may be lower for truck transport than for rail transport, other considerations were more important in selecting a transportation method for the waste. Health and safety risks to the public and to transportation workers would be greater for transportation by truck. Another consideration is the regulatory requirement for strong, tight containers for a considerable amount of the waste, which can be transported more economically by rail. Also, the administrative requirements associated with the extended, multistate transportation campaign would be greater for truck transport than for rail transport because of the greater involvement of the individual states in regulating highway transportation. (See Response L-3.)

Response L-6

As discussed in Chapters 4 through 7 of the FS, certain waste would require treatment before transport to the Envirocare facility, and the cost of that treatment was included in the overall cost of the disposal options. No assumptions were made in the document for any further treatment that the Envirocare facility may wish to implement as part of the disposal process.

Response L-7

Both the basis for the statement excerpted in the comment and the screening-level model that was applied for the comparative evaluation of final disposal options were discussed at length in Appendix D of the FS. As explained in the FS, the estimated contaminant breakthrough times following hypothetical cell failure and the related potential for subsequent exposure (assumed for each option) would be similar for the Weldon Spring and Envirocare sites because of their similar phreatic zone properties.

Response L-8

Yes, potential health and environmental impacts that could result from cell failure were compared for the Weldon Spring and Envirocare (and Hanford) disposal options. This evaluation was conducted with information for the Envirocare site (presented in the RI addendum [DOE 1992e]) and was presented in Chapter 6 of the FS and summarized in Table 7.1 of the FS (which was also presented as Table 6 in the PP).

Response L-9

The on-site disposal cell would meet all the applicable requirements from the citations identified in this comment, and more (including additional subparts of 40 CFR 264), as presented in Appendix G of the FS and summarized in Section 6.2.2 of the PP.

Response L-10

Long-term plans for all three final disposal options would include covering the waste. As explained in the text that accompanied this statement (which is excerpted from Table 6 of the PP), a hypothetical scenario of cell failure at some time in the future, e.g., after 200 to 1,000 years and absent corrective measures, was evaluated for each disposal option to bound potential long-term impacts on a comparative basis.

ENVIROCARE

L-14

Envirocare has considerable information concerning our South Clive site that may be helpful in comparing our site to the onsite option. Envirocare would like to have the opportunity to discuss these comments in the near future. We feel it is especially important to discuss with you the reduction in costs associated with the Envirocare option. Please contact me or Al Rafati at (801) 532-1330 for further information.

Sincerely,

Charles A. Judd

Charles A. Judd
Executive Vice President

Response L-11

Yes, screening-level models were run for the comparative analysis of the on-site and Envirocare disposal options, as discussed at length in the FS (see Response L-7). The assumptions for the overburden at the two sites are presented in Appendix D (see Sections D.4.1 and D.4.2); the harmonic mean saturated hydraulic conductivities assumed for the composite overburden material at the Weldon Spring site and the Envirocare site were 1.0×10^{-7} and 4.3×10^{-7} cm/s (2.8×10^{-4} and 1.2×10^{-3} ft/d), respectively.

Response L-12

Synthetic liners were one of several containment systems identified in the conceptual design of the on-site cell, as discussed in Chapter 5 of the FS. Synthetic liners have been developed because of recent technological advances in material science, so they have not yet been available for 200 to 1,000 years to test the expectations of long-term performance established by laboratory tests and other studies. However, naturally occurring material such as clay-rich soil has been available for centuries, and its containment performance is well established. The on-site cell would consist of redundant containment features that include multiple synthetic liners in combination with a compacted clay liner beneath the cell to limit potential leaching and clay-rich soil in the cover (combined with slope) to limit infiltration into the waste.

Response L-13

The bases for these statements were given in the discussions in the FS from which they were extracted. All three sites evaluated as final disposal options for the Weldon Spring waste would be expected to maintain control of the disposal cell for the long term, and the likelihood of losing this control would be similarly low for each. Nevertheless, to comparatively evaluate potential impacts over the extended long term, the same hypothetical cell-failure scenario was evaluated for each case. Screening-level calculations were made to estimate impacts to air quality and groundwater (as discussed in Appendixes C and D of the FS), and impacts to other resources were evaluated on the basis of available environmental, land use, and demographic data (e.g., regarding the presence of threatened and endangered species and the locations and numbers of residents). Those analyses provided the basis for the statement regarding similarity of effects, as discussed in the FS. (See also Responses L-7, L-10, and L-11.)

Response L-14

The health and safety of workers and the public was the primary factor in identifying on-site disposal as the preferred option for the Weldon Spring waste. Also considered were the administrative difficulties associated with the extended transportation campaign that would be required under the Envirocare option. Cost was not a significant factor, and a cost reduction in the disposal component of the Envirocare option would not alter this determination.

Letter M

Page 1 of 3

Feb. 19, 1993

Stephen H. McCracken, Project Manager
U.S. Dept. of Energy
Weldon Spring Site Remedial Action Project
7295 Hwy 94 South
St. Charles, Mo. 63304

ATTN: RI/FS-EIS Comments on the Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site

Mr. McCracken,

My name is GEORGE A. FARHNER. I live at 892 California Trail St. Charles Mo. 63304 I'm a member of St. Charles Countians Against Hazardous Waste as Board Director. My other duties include Volunteer Service as project manager for a Technical Assistance Grant administered by the Environmental Protection Agency Region VII

M-1 I have three Technical Advisors to submit written comment on behalf of SCCAHW at this time. They are as follows:

Page 2 of 3

Feb. 19, 1993

1. Land: underground aspects
Tom Aley, Ozark Underground Laboratories
Rt. 1 Box 61 Protem, Mo. 65733

2. Biological: uptake aspects
Rao Ayyagari (Biology professor, Lindenwood College)
16084 Meadow Oak Dr.
Chesterfield, Mo. 63017

3. Air monitoring: offsite aspects
Bill M. Vaughn, Environmental Solutions
8147 Delmar Blvd. St. Louis, Mo. 63130

M-1 (Cont.)

Each of these advisors will be mailing to you their review of Dept. of Energy documents on the Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site. Their summaries will include flaws in logic, methodology, formulas or design structure. Plus their personal comments, questions and concerns regarding the plan.

Please enter these as part of the Administrative Record for the Responsiveness summary RI/FS-EIS.

Page 3 of 3

Feb. 19, 1993

M-1 (Cont.)

Their reviewers should be considered and evaluated for merit in helping solve this serious waste problem. It is my firm belief that the more people you have working on a problem the less margin for error there is! Thank you.

Sincerely,

George A. Farhner
892 California Trail
St. Charles, Mo.
63304

Phone: (314) 928-7358

Response M-1

The DOE appreciates the involvement of the St. Charles Countians Against Hazardous Waste in this project and the comments on the RI/FS-EIS received from the three technical reviewers. These comments (in letters H, N, and O) and DOE's responses are provided separately in this document. The DOE will continue to work with this organization and other members of the general public to ensure that this cleanup project is implemented in a safe and environmentally sound manner.

Letter N
Received at the end of the formal comment period

Stephen H. McCracken, Project Manager
U. S. Department of Energy
Weldon Spring Site Remedial Action Project Office
7925 Highway 94 South
St. Charles, Missouri 63304

Dear Mr. McCracken,

The time has come, it seems, when I can refocus on the goal of realistically evaluating the proposed actions for the Weldon Spring site. I do not refer to the real realistic evaluation because it surely is based on the actual hazard than risk analysis.

Recent reports on television and in news papers indicate, people are dying from exposures to toxic chemicals, nuclear power plant disasters, drunken drivers and incompetent health care. If one avoids these hazards and with little help from replacing the overused and tired organs and tissues, dying seems like a happening of the past centuries. All that needs to be done is to reduce life to zero risk. This will require first the full understanding of risk analysis as carried out by experts.

The comparitive listing of various risks (as provided in the RI/FS-EIS) makes it evident that I have to give up being a policeman with a 2×10^{-4} annual risk of death (AR), driving motor vehicles (2×10^{-4} AR), and being a "frequent flying" professor (5×10^{-5} AR). I was, to say the least, stunned to find that by switching from city water (6×10^{-7} AR) to what the Environmental Protection Agency considers contaminated water at the Raffinate pits, I could actually lower my risk by a factor of 500. It was also distinctly unnerving to find out that the potassium in my body, which contains a radioactive isotope, gave me 4-500 times the radiation level of that of the air around the Chemical plant area, and 100 times that from being a hiker in the Weldon Spring wild life area. Should we, I wondered, abandon superfund and find a substitute for potassium in the body? Astonishingly, corn contains aflatoxin at appreciable levels as does peanut butter and, for me, giving up these two delicacies is not going to be an easy trade-off for mere immortality. Apparently, plants learned through evolutionary time that chemical warfare is an extremely effective way to fight off fungi, insects, and animal predators. Unfortunately, these species have the same type of genetic code as I do, so that whatever I eat, I am consuming mutagens and carcinogens rated everywhere as hazardous to my health.

N-1

Clearly, to get to zero risk I must give up walking up and down stairs, not play physical sports, or live in a metropolitan area with a population higher than 100,000, and innumerable other temptations. I am willing to sit in a rocking chair with a lead roof over my head and be fed amino acids intravenously in order to live forever.

Still, a scientist does not necessarily see risk in the same way as the public does. The public regards deaths caused by mysterious and invisible technology (such as nuclear power plant failure or the threat from high voltage or electromagnetic fields) or the

simultaneous deaths of a large number of people (air plane crashes) as being far worse than those from well-known causes (from cancers directly related to smoking) or the same number of deaths occuring in multiple locations (as in automobile accidents). Therefore, I had no choice than to evaluate the proposed actions based on exhaustive scientific data contained in the RI/FS-EIS documents because excessive worry about the inherent value of the risk analysis can cause peptic ulcers and lead to my death from "natural causes".

N-1 (Cont.)

Thus, although my commitment to the goal of immortality is unswerving, I am not positive that a zero risk society is yet in the immediate future. Given that as it may be, I am very comfortable that this report is based on the best available methodology and copmrehensive in its considerations. I also believe that the preferred alternative 6a of the Department of Energy was the result of very careful evaluation of cost-effectiveness, longevity of the cell's containment of hazardous material, and prudent management parctices. I fully concur with this alternative and list few minor comments in the next few pages.

N-2

On a personal note, I am extremely pleased with the gradual maturity of the project management and special improvements made in the scientific aspects of the project. I look forward to a successful remediation of the Weldon Spring Chemical plant area and the Quarry in the immediate future.

Sincerely,

L Rao Ayyagari

(L. Rao Ayyagari)
Professor of Biology
Lindenwood College
209 S. Kingshighway
St. Charles, MO 63301

Baseline Assessment: DOE/OR/21548-091

5-40

N-3 What are the total amounts of radioactivity in the entire contaminated area? There must be a way of determinung these quantities for each radioactive isotope.

5-41

N-4 The health effects associated with exposure to lead must be quantified in view of the sensitive effects on fetus and young children.

Tables D.3 & D.5 and I-39 of feasibility study

N-5 It seems odd to compare the contaminant concentration as acceptable risks based on EPA data. This is done by comparing with limits set by yourself and justifying the exposures acceptable at a later time.

Feasibility Study: DOE/Or/21548-148. VOL. 1

S-4 para. 1

N-6 Waivers are unacceptable during the remedial action period in view of higher exposures to Radon gas and its known effects on health.

para. 3 and p 6-41

The chemical treatment is a standard .....

N-7 I don't believe that this is a standard technology for heterogenous contamints, especially for radiactive material. See p. 3-35 under treatment.

S-3 para. 3

N-8 Review period should be decreased to every year to increase the public confidence of the safety of the project.

3-38

Treatment (biological)

N-9 Bioleaching methodology is available which concentrates Uranium. Why was this not considered?

Remedial Investigation: DOE/OR/21548-074

ES-3 and ES-7

N-10 Sodium sulfite and nitrate were found in high concentrations in the water.
Are these removed in the ion-exchange type of water purification plants?

5-126

N-11 The data provided on bio-uptake studies is from 1987-1990.

Do these data reflect all the studies carried out to date on biouptake?

Proposed Plan: DOE/OR?21548-160

N-12 p. 4 para. 2
Additional documentation is forthcoming.
When can we expect this?

N-13 p. 17 4.1.1
How many people use the surrounding wild life areas per year.
Should this not be considered in risk analysis?

N-14 p. 22 4.2 para. 2
Why only human health assessment?
Should include all the living species, so as not to decrease the diversity or cause extinction.

N-15 p. 35 para. 4
What about the release of gases from the mulch pile?
Radon may be released to the air.

N-16 p. 41 5.5 para. 2
Why would the cost of transporting the material over a longer distance be cheaper than to Utah?

N-17 p. 34. 5.2
Truck transport should be limited to the off-school hours to decrease the accidental exposure of contaminated material to students.

Some general comments:

N-18 Is there going to be a cover over the material in the TSA to minimize the release of Radon gas? If so, how do you decide the thickness of this protective layer?

N-19 Contingency plans for natural and/or human acidents and errors seemed to be non-existant. These are vital to the safety of the workers as well as the public.

N-20 Expression of Risks: Just as a comparison of risks is an aid in understanding them, so is a careful selection of the methods of expression. It is hard to comprehend the hazard quotients and index used in the preparation of the documents of this study. It is important to realize that risks appear to be very different when expressed in different ways (A. Taversky and D. Kahneman. SCIENCE.,

N-20 (Cont.)

211,453 (1981)). One example of this can be seen if we consider the cancer risk to those persons exposed to radionucleides ater the Chrenobyl disaster. Acoording to the Soviets, the 2400 persons between 3 and 15 kilometers from the plant, but excluding the town of Pripyat, recieved and are expected to reciece 1.05 million man-rems total integraed dose, or about 44 rems average. Even if we asume a linear dose-response relation, with 8000 man-rems per cancer, the risk may be expressed in different ways. Dividing 1.05 million man-rems by 8000 gives 131 cancers expected in the lifetimes of that population. This is larger than, and for some people more alarming than, 31 people within the power plant itself who died within 60 days of acute radiation sickness combined with burns. Dividing the 131 again by the approximately 5000 cancer deaths expected from other causes, the accident caused "only" a 2.6% increase in cancer. This seems small compared to the 30% of cancers attributable to cigareete smoking. The difference is even more striking if we consider the 75 million pepole in Byelorussia and the Ukraine who recieved, and will recieve, 29 million man-rems over their lifetimes. On the linear dose-response relation this leads to 3500 "extra cancers", surely a large numbrn for one accident. But dividing by the 15 million cancers expected in the population leads to an "insignifacant" increase of 0.0047%. Of course, none of the methods of expressing the risk can be considered "right" in an absolute sense. Indeed it is my beleif that a full understanding of the risk involves expressing it in as many ways as possible.

Letter N
Received on March 19, 1993

Stephen H. McCracken, Project Manager
U. S. Department of Energy
Weldon Spring Site Remedial Action Project Office
7925 Highway 94 South
St. Charles, Missouri 63304

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N-1

Clearly, to get to zero risk I must give up walking up and down stairs, not play physical sports, or live in a metropolitan area with a population higher than 100,000, and innumerable other temptations. I am willing to sit in a rocking chair with a Lead roof over my head and be fed amino acids intravenously in order to live forever.

Still, a scientist does not necessarily see risk in the same way as the public does. The public regards deaths caused by mysterious and invisible technology (such as nuclear power plant failure or the threat from high voltage or electromagnetic fields) or the

simultaneous deaths of a large number of people (air plane crashes) as being far worse than those from well-known causes (from cancers directly related to smoking) or the same number of deaths occuring in multiple locations (as in automobile accidents). Therefore, I had no choice than to evaluate the proposed actions based on exhaustive scientific data contained in the RI/FS-EIS documents because excessive worry about the inherent value of the risk analysis can cause peptic ulcers and lead to my death from "natural causes".

N-1 (Cont.)

Thus, although my commitment to the goal of immortality is unswerving, I am not positive that a zero risk society is yet in the immediate future. Given that as it may be, I am very comfortable that this report is based on the best available methodology and comprehensive in its considerations. I also believe that the preferred alternative 6a of the Department of Energy was the result of a very careful evaluation of cost-effectiveness, longevity of the cell's containment of hazardous material, and prudent management practices. I fully concur with this alternative and list few minor comments in the next few pages.

N-2

On a personal note, I am extremely pleased with the gradual maturity of the project-management and special improvements made in the scientific aspects of the project. I look forward to a successful remediation of the Weldon Spring Chemical Plant Area and the Quarry in the immediate future.

Sincerely,

L Rao Ayyagari

(L. Rao Ayyagari)
Professor of Biology
Lindenwood College
209 S. Kingshighway
St. Charles, MO 63301

Response N-1

As described in this comment, all human beings are subjected to a myriad of hazards on a daily basis. Your discussion of these hazards is appreciated, as it helps provide some perspective for the risk results presented in the RI/FS-EIS. The chance that any individual in the United States will develop cancer in the course of a lifetime from all possible sources is about 1 in 3 (American Cancer Society 1992), and the likelihood of getting cancer from natural background radiation is about 1 in 100 (EPA 1989). This latter risk is comparable to the risks noted in this comment from everyday activities, such as driving a motor vehicle — which is indicated as having an annual risk of fatality of 2×10^{-4}. (Assuming a 50-year duration for this activity, this corresponds to a lifetime risk of 1 in 100.)

As a note, the risk estimated for an individual occasionally ingesting water from the raffinate pits at the Weldon Spring site was developed from different assumptions for the ingestion rate, exposure frequency, and exposure duration than would be used to estimate risks associated with the regular ingestion of water from a city drinking water supply. In the baseline risk assessment for the site, an individual was assumed to ingest a small amount of water (200 mL, or about 1 cup) per visit from the raffinate pits during a limited number of visits (50 for a hypothetical trespasser and 600 for a hypothetical recreational visitor). To estimate risks from daily exposures to a drinking water supply, the standard EPA assumptions of 2 L/day, 350 days per year, for 30 years would be used. These different assumptions would result in a difference of 2 to 3 orders of magnitude between the risks estimated for scooping water from a contaminated pond during limited (unauthorized) visits to a contaminated site and the risk associated with regularly ingesting water from a city drinking water supply.

Your acknowledgment of the careful evaluation and comprehensive considerations presented in the RI/FS-EIS is appreciated, as is your concurrence with the preferred alternative.

Response N-2

The DOE appreciates your support of the project and the useful comments and suggestions provided over the years. The DOE is committed to expeditiously cleaning up the Weldon Spring site in a safe and environmentally sound manner.

Baseline Assessment: DOE/OR/21548-091
5-40

Concern: In, general, sitewide contaminants are at or near background concentrations. Local background concentrations of radionucleides in the .....

N-3 Question: What are the total amounts of radioactivity in the entire contaminated area? There must be a way of determing these quantities for each radioactive isotope in soil, water, and air.

Rationale: These values can be better related to established levels and risk factors may then be evaluated more realistically.

5-41

Concern: The health effects associated with exposure to lead could not be quantitatively assessed because of the unavailability of toxicity values or models appropriate for tho receptors evaluated in this BA. However, levels exceeding general EPA guidelines for lead concentrations in soil for residential settings have been measured at only a few on-site locations. The fetus and oyung children are especially sensitive to the effects of lead, which includes premature birth.....

N-4 Question: Why was this not quantitatively assessed and data obtained on more sites? Even if minimal exposures are recieved by the receptors during the clean-up period it is an important factor in alleviating the fears of the general public.

Rationale: The health effects associated with exposure to lead must be quantified in view of the sensitive effects on fetus and young children, especially since the effects are well documented in scientific journals and news papers.
This is also indicative of the practice used in this entire study. Scarcirty of data is often treated very lightly with general statements, and justified as posing minimal risk. This approach should be avoided adnd every attempt should be made to obtain more data.

Tables D.3 & D.5 and I-39 of feasibility study

Concern: Limits of various inorganic and organic contaminants.

N-5 Question: How can comparisons of data be made to limits set by yourself as safe levels?

Rationale: It seems odd to compare the contaminant concentration as acceptable risks based on EPA data. This is done by comparing with limits set by yourself and justifying the exposures acceptable at a later time.

Response N-3

The total quantities of the primary radionuclides in all contaminated materials at the Weldon Spring site are estimated as follows:

Radionuclide	Activity (Curies)
Actinium-227	75
Lead-210	110
Protactinium-231	96
Radium-226	89
Radium-228	41
Thorium-230	3,300
Thorium-232	1.2
Uranium-235	6.6
Uranium-238	170

These estimates were determined on the basis of current information, as reported in the RI/FS-EIS. Although radon gas is being continuously released from the site, it is regenerated from radium isotopes at essentially the same rate. Hence, the total quantity of radon-220 and radon-222 can be estimated directly from the total amounts of radium-228 and radium-226 at the site, which are about 41 and 89 Ci, respectively.

Response N-4

Exposure to lead was quantitatively assessed for the Weldon Spring site, as identified in the discussion from which this statement was excerpted. The text on page 5-41 reads as follows:

> The health effects associated with exposure to lead could not be quantitatively assessed because of the unavailability of toxicity values or models appropriate for the receptors evaluated in this BA. (Site-specific exposure to lead is modeled for the residential scenario presented in the rebaseline assessment of the FS [DOE 1992a].) However, levels exceeding general EPA guidelines for lead concentrations in soil for residential settings have been measured at only a few on-site locations. The fetus and young children are especially sensitive to the effects of lead, which include premature birth, ...

For some reason, the excerpt in the comment did not retain the second sentence in which this cross-reference was made, which answers the question raised in the comment. In any case, considerable effort was made throughout the BA and FS to provide cross-references to supporting discussions in order to address the concern identified in the comment. The scarcity of data was not treated lightly in this study; in fact, the entire section preceding the summary of the risk characterization in the BA (from which the excerpt was taken) is devoted to a discussion of the uncertainties associated with the data and the effects those uncertainties have on the results (Section 5.6). The issue of lead relative to the unavailability of standard EPA toxicity values but availability of the EPA model for estimating potential health effects to

children was explicitly addressed in that discussion. The quantitative assessment of potential health effects resulting from exposures to lead was presented in detail in the FS, as noted by the multiple references in the BA.

For example, the portion of the toxicity assessment devoted to the chemical health effects from lead (Section 4.4.2.9) discusses the unavailability of toxicity values but availability of the EPA model and also references the subsequent risk discussion (Section 5.1.2.2) in which it is explained that the model was developed "to assess residential exposures for the most sensitive subpopulation, children aged 0 through 6; therefore, it is not directly applicable to the receptors evaluated in this BA. However, children were considered in evaluating the residential scenario for the rebaseline assessment (Appendix E of the FS), and the model was applied for that analysis. For these reasons, exposures to lead have not been quantified in this baseline assessment." As discussed throughout the BA, the receptors evaluated for site conditions in the absence of further cleanup actions were adolescents and adults because children aged 0 through 6 would not be expected to inhabit the site under existing conditions.

Every attempt was made to obtain all pertinent data and to present a comprehensive evaluation in this study to ensure that the best information was used to assess potential risks associated with the site. This effort was acknowledged in the earlier comment (N-1), in which the exhaustive scientific data and best available methodology used in the RI/FS-EIS documents were noted.

Response N-5

Tables D.3 and D.5 do not set limits of inorganic or organic contaminants, do not discuss safe levels, and have no bearing on the risk estimates that were compared with the "acceptable risks" identified by the EPA for NPL sites. These two tables summarize results of the screening-level leaching calculations from a hypothetical disposal cell failure at the Envirocare and Hanford facilities in the extended long term. Rather than concentrations, the tables present projections for lateral flow through the phreatic zone as a percent of the initial concentrations for three representative retardation cases. Similarly, Table I.39 does not set such limits, discuss safe levels, or have any bearing on the risk estimates per EPA's target range. This table presents the results of leaching studies that were conducted in bench-scale tests of chemically treated raffinate pit sludge and quarry soil; the leachate concentrations against which the test results were compared are the regulatory requirements established by the EPA to determine whether a waste is a characteristic hazardous waste.

[Letter continues on next page.]

Feasibility Study: DOE/Or/21548-148. VOL. 1

S-4 para. 1
Concern: Applicable environmental requirements would be attained by each action alternative, with few waivers during the cleanup period, and the protectiveness and effectiveness of the overall cleanup response would be comparable.

N-6 Question: I do not understand the meaning of the words "applicable" and "waivers". Why would one not use the same standards for each alternative?

Rationale: All comparisons must be made without any bias towards the preferred alternative. Waivers are unacceptable during the remedial action period in view of higher exposures to Radon gas and its known effects on health.

S-4 para. 3 and p 6-41
Concern: The chemical treatment is a standard tehnology that has been proven at a number of other contaminated sites, and it could be implemented with resources that are readily available.

N-7 Question: This technology was used in the remediation of mostly non-radioactive chemical material. What happens to the radionucleides during chemical stabilization?

Rationale: I don't believe that this is a standard technology for heterogenous contamints, especially for radioactive material. See p. 3-35 of Feasability Study under treatment.

S-5 para. 3
Concern: Instituitional controls such as access restrictions would be maintained at the disposal area, and the effectiveness of the remedy would be reviewed every 5 years.

N-8 Question: In view of present experience of not paying attention to posted warning of hazards by the public at the present site and other contaminate sites throughout the country why was not a shorter period of review not proposed?

Rationale: Since the remedial action's general goal is to the expose the public to the most possible minimal hazard, the review period should be decreased to every year to increase the public's confidence of the safety of the project.

3-38 Table 3.9
Concern: Treatment (biological)

N-9 Qustion: Bioleaching methodology is available in scientific literature about concentrating Uranium by bacteria. Why was this technology not considered?
Rationale: May be the combination of this available methodology and the chemical stabilization would have been a batter choice.

Response N-6

"Applicable" refers to a requirement that specifically applies to the circumstances at a site. For example, if a site were considering an action to demolish and dispose of a building that contained asbestos, the EPA requirements for wetting and sealing asbestos-containing material from demolition operations in labeled, leak-tight containers for disposal would be applicable to that action. (A lengthy discussion of the applicability of various requirements to the proposed action at the Weldon Spring site is presented in Appendix G of the FS.)

In most cases, the same standards are used for each alternative; however, when some alternatives involve an activity that others do not, the standards pertaining strictly to that activity are limited to those alternatives of which it is a part. For example, the vitrification alternatives for the Weldon Spring site would involve emissions from the stack of a thermal treatment unit that could be considered sufficiently similar to an industrial furnace (e.g., the vitrification facility could be considered a melting furnace) for which federal regulations have been promulgated that could be pertinent to emission controls. In contrast, those regulations would not be pertinent to the chemical stabilization/solidification alternatives because that facility would not be considered sufficiently similar to the regulated unit.

Waivers would only be applied in limited cases during the remedial action period, and they would be identified in compliance with the requirements established by the EPA (which are listed in Section G.1 of the FS). No waivers would be applied for any actions that could potentially result in harm to workers, members of the general public, or biota.

It may be necessary to apply some waivers during the cleanup period because it may not be possible to meet certain standards and still implement the action. For example, the radon-222 flux from the radium-contaminated quarry soil in storage at the temporary storage area (TSA) will be reduced to low levels by use of a cover such as a flexible-membrane liner or tarp, as part of the interim action for the quarry bulk waste. (A similar cover would be placed over erodible material at the material staging area [MSA] for debris associated with building dismantlement.) That cover would have to be removed in order to retrieve this waste for subsequent treatment and disposal under the action currently proposed. This activity might result in a temporary increase in the radon concentration at the fence separating the chemical plant area from the adjoining Army property. Such an increase might exceed the state of Missouri standard for radon-222 in uncontrolled areas, which is 1 pCi/L above background as a quarterly average. (Although access to the Army property is controlled by the Army, this control is not based on the presence of radioactive contamination, for which the state standard was defined.) Therefore, a waiver of the state standard at this location could be appropriate for a limited time during the cleanup period. No waivers would be applied after the cleanup action was completed, nor would any be applied that would compromise the protection of human health or the environment.

Response N-7

A considerable amount of information is available regarding the appropriateness of the chemical treatment technology for heterogeneous contaminants. This technology represents a very common method for treating wastes contaminated with metals, which represents a class of contaminants that includes radionuclides and is especially appropriate for the radioactively contaminated material found at the Weldon Spring site. The discussion on page 6-41 of the FS explains (with references) that this technology has been widely demonstrated in waste treatment applications, is considered by the EPA to be a proven remedial treatment method, and was approved for use at 62 NPL sites as of 1991. During chemical stabilization, the radionuclides are incorporated into a solid, cementitious matrix and immobilized to limit potential mobility. The information referenced from page 3-35 does not discuss this chemical treatment technology. Rather, it discusses two different technologies — leaching/contact extraction and a specific type of chemical addition for detoxification — for which additional explanation is presented in the text of Chapter 3 from which this information was summarized (see Section 3.2.4.1), as well as in Appendix B, as noted in the text that accompanies this table.

Response N-8

The five-year review period discussed in the referenced paragraph is the time period for which the effectiveness of the remedy at NPL sites is to be reviewed when waste remains on-site, as established by the EPA in the National Oil and Hazardous Substances Pollution Contingency Plan (EPA 1990). The DOE would conduct more frequent inspections of specific parameters, e.g., on a quarterly to annual basis, to ensure the integrity and continued protectiveness of the disposal cell.

Response N-9

Biological treatment with bacteria to address uranium contamination was considered in the FS, as discussed in the text of Chapter 3 (Section 3.2.4.3) from which the referenced table was summarized (as noted in the introduction to this table). For the reasons discussed in Chapter 3, biological treatment was determined to be a much poorer method for addressing the contaminated material at the Weldon Spring site than those retained in the alternatives developed for site cleanup. These reasons included the limited applicability of this treatment method for the varied site waste; the presence of inhibitory contaminants (such as metals) in the site waste; the difficulty in maintaining appropriate temperature, pH, and oxygen conditions for the system; and the generation of an additional volume of contaminated material (microbial mass) that would require disposal.

[Letter continues on next page.]

Remedial Investigation: DOE/OR/21548-074

ES-3 and ES-7
Concern: The major component in the wastewater was selite sodium sulfite used in the purification of trinitrotoluene (TNT).

N-10

Question: Sodium sulfite and nitrate were found in high concentrations in the water. Are these removed in the ion-exchange type of water purification plants used at this site?

Rationale: Ion exchanger-type of water purification generally is used for the removal of metals. Does it also remove nitrates and sulfites. If not removed, these may eventually get reduced and become potentially hazardous to the public using the treated water.

5-126

Concern: The data provided on bio-uptake studies is from 1987-1990.

N-11

Question: Do these data reflect all the studies carried out to date on biouptake?

Rationale: I am aware of atleast one project on small rodents carried out by the Dept. of Biology at Lindenwood college. I believe those results are not included. Are there other studies which have to be included which we are not aware of? In a critical study of this nature, every available data should be included in the evaluation of the risk to the public.

Proposed Plan: DOE/OR?21548-160

p. 4 para. 2
Concern: Separate documentation has been completed for cleanup action at the Quarry, and additional documentation is forthcoming.

N-12

Question: When can we expect this?

Rationale: I am a little confused about the time sequence of the cleanup. In the overall evaluation of the hazard at the site the Quarry site waste was included , yet the data and related studies are not included in these documents. Why are they being included in a separate document?

p. 17 4.1.1
Concern: The public uses the surrounding wildlife area for hiking, hunting, and fishing.

N-13

Question: How many total number of people use the surrounding wild life area per year?
Rationale: The effects of before and after the cleanup can be better appreciated by the general public if increased safety and less risk can be documented. This is important for risk analysis. See general comments below.

Response N-10

Sodium sulfite (sellite) was a major component of wastewater generated at the chemical plant during TNT production activities conducted by the Army in the 1940s. However, sodium sulfite has not been identified in water currently at the site. This is as expected because the sulfite would have oxidized to sulfate over time as a result of natural environmental processes. In contrast, nitrate is a key component of water in the raffinate pits, which were constructed to contain the wastes from subsequent uranium processing activities at the chemical plant conducted by DOE's predecessor agency in the 1950s and 1960s.

Nitrate and sulfate can both be removed from water by an ion exchange system, and the treatment plants at both the chemical plant area and the quarry include such a system. The removal efficiency for nitrate using ion exchange can be 75 to 95% (Patterson 1985), as discussed in the engineering evaluation/cost analysis report issued to the public in 1990 for the interim action to treat water from the raffinate pits (see Section 1.5.1 of the FS). However, nitrate and sulfate are contaminants of concern for the treatment plant at the chemical plant area, and these anions will be removed during an earlier stage of treatment by vapor recompression/distillation process. This process involves purification of a waste stream by vaporizing and recondensing its aqueous fraction in a partial vacuum, leaving behind a concentrated residue. Removal efficiencies of 90 to 98% have been demonstrated for nitrates using this technology (Patterson 1985), as discussed in the 1990 engineering evaluation/cost analysis report.

Response N-11

The RI contains biouptake data through 1991, with some limited additional data that became available in 1992. As part of DOE's ongoing environmental monitoring program, fish were sampled in 1992 to further evaluate biouptake and support plans for future monitoring. A small mammal biouptake study was also conducted in 1992 to complement the 1987 mammal study. Deer and other animals are occasionally included in biouptake analyses as they become available from accidental deaths (such as road kills) or hunter donations. Data became available in 1992 for agricultural samples from DOE's recently expanded environmental monitoring program. The results of these studies have been presented in the annual site environmental reports. This report summarizes the results of the environmental monitoring activities for the project for each calendar year.

The DOE agrees that all available data should be considered in the project assessments and appreciates your information regarding an additional study that could prove useful to these analyses. Biouptake results from studies such as these that are obtained in the future will be presented in other project documents, including the annual site environmental reports. To address the long-term protection of ecological resources at the site, additional studies are under way and others are planned. As they become available, data from these studies will be incorporated into the future documents prepared for the project.

Response N-12

As described in Section 1.5 of the FS, cleanup of the Weldon Spring site comprises several integrated components. One of these components is management of the bulk waste currently located in the quarry. A focused RI/FS, written to incorporate NEPA values appropriate for an EA, was issued in March 1990 to evaluate management alternatives for this bulk waste. The alternative selected pursuant to this RI/FS process, which included public review and comment, was to excavate the bulk waste from the quarry and transport it to the chemical plant area of the Weldon Spring site for short-term storage, pending the disposal decision that would be determined from the current RI/FS-EIS.

Meaningful decisions on the need to perform additional remediation of the contamination remaining in groundwater, soil, and bedrock in the quarry area can only be made after the bulk waste has been removed from the quarry. These additional follow-on actions for the quarry are being addressed in the quarry residuals operable unit of the project. The DOE expects to issue the work plan and associated sampling plans for this operable unit to the public in early 1994. Key results from characterization activities will be shared with the public as they become available,.e.g., through quarterly environmental reports. The focused RI/FS for the quarry residuals operable unit (which will also incorporate NEPA values) is currently scheduled to be issued for public comment in 1998, and the record of decision is targeted for 1999.

Response N-13

The Busch and Weldon Spring wildlife areas are estimated to receive 1.2 million visitors each year, as identified in Chapter 1 (Section 1.3.2.7) of the FS and Chapter 3 (Section 3.1.2) of the BA. The DOE agrees that safety is a key component of risk prevention, and standard engineering controls would be applied during the cleanup period to ensure that the health of visitors in the surrounding wildlife areas would not be impacted by site activities.

[Letter continues on next page.]

p. 22 4.2 para. 2
Comments: No adverse ecological impacts are associated.....
on the basis of the human health assessment.

N-14

Question? Why only human health assessment?

Rationale: Should include all the living species, so as not to decrease the biotic diversity or cause extinction.

p. 35 para. 4
Concern: Treatment would be used as.....
e.g., by chipping and composting wooden debris.

N-15

Question: What about the release of gases from the mulch pile?

Rationale: Compost piles do release various geases. Radon may be released to the air. Has this been taken into account?

p. 41 5.5 para. 2
Concern: The total cost of implementing Alternative 7c is estimated to be $304 million.

N-16

Question: Why would the cost of transporting the material over a longer distance be cheaper than to Utah?

p. 34. 5.2
Concern: Standard construction equipment.....
across the site, and vicinity properties.

Question: Inspite of repeated requests of better appreciation of the generaql fear of exposing the Francis Howell school children to especially air- borne contaminants during the cleanup, no precautions to alleviate this fear are presented in this study.

N-17

Rationale: Truck transport should be limited to the off-school hours to decrease the accidental exposure of contaminated material to students.

Some general comments:

Is there going to be a cover over the material in the TSA to minimize the release of Radon gas? If so, how do you decide on the thickness of this protective layer?

N-18

Contingency plans for natural and/or human acidents and errors seemed to be non-existent. These are vital to the safety of the workers as well as the public.

N-19

Response N-14

The risk assessments conducted for the Weldon Spring site included consideration of all living species, from deer to invertebrates and aquatic to terrestrial vegetation. These assessments examined potential ecological impacts that could result from the contamination present at the chemical plant and in affected areas nearby. An entire chapter (Chapter 7) of the BA and several appendixes were devoted to the assessment of baseline ecological impacts that might occur in the absence of cleanup. Potential impacts to ecological resources from cleanup activities were assessed in the FS. These analyses were developed from current characterization data for the site in combination with available scientific information. No obvious adverse ecological impacts have been observed at the site or surrounding areas, except for circumstantial evidence (the paucity of biota) in the raffinate pits. However, adverse ecological impacts might occur if the site were not cleaned up and contaminants remained in their current state, particularly at the raffinate pits, as discussed in the FS and subsequently summarized in the PP. Possible impacts to the density and diversity of invertebrates at the site were also discussed.

The sentence partially excerpted in the comment is taken from the brief summary of the extensive baseline ecological assessment given in the PP, which follows a similar summary of the human health assessment. The full sentence reads as follows:

> No adverse ecological impacts are associated with either the radionuclides or chemicals in soil at the cleanup levels developed for the site on the basis of the human health assessment (Section 4.4).

It is clear from the complete statement that this relates to the potential ecological impacts associated with final site conditions. Potential ecological impacts associated with the site were an important consideration in the development of cleanup levels for the site.

Response N-15

Yes, the release of radon gas from all proposed site activities was taken into account; the approach used to estimate these releases is discussed in Appendix F of the FS (Section F.4.1.2). The mulch pile would not be expected to be a significant source of radon emissions from the site because vegetation sampling has not identified any substantial radium contamination. If this pile were found to be releasing significant amounts of radon gas, mitigative measures such as keeping the pile wet would be applied to minimize any such releases.

Response N-16

The total cost estimated for implementing Alternative 7c ($304 million) is less than the cost estimated for implementing Alternative 7b ($351 million) largely because of the relatively higher cost to dispose of waste at a commercial facility compared with another DOE facility. The cost for transporting the waste to the Hanford facility near Richland, Washington, is estimated to be about $16 million more than for transporting the waste to the Envirocare facility near Clive, Utah, as described in the FS. However, this difference would be more than offset by the lower

cost estimated for disposing of waste within the DOE complex. From preliminary information, the disposal cost for the Hanford facility was estimated to be about $88 million less than for the Envirocare facility. Hence, the combined cost for waste transportation and disposal for Alternative 7b was estimated to be about $72 million more than for Alternative 7c, as discussed in the FS. Supporting information on the bases for these cost estimates is provided in Chapter 6 of the FS from which the PP was summarized. As explained on the referenced page 41 of the PP,

> A detailed cost analysis would be performed to develop a firm price for disposal at the Hanford site if this were a component of the remedy selected for the Weldon Spring site.

This explanation was made for both Alternatives 7b and 7c in the more detailed discussion in the FS (see Sections 6.4.7 and 6.5.7).

Response N-17

The DOE is very conscious of the school's proximity and intends to abide by its commitment to conduct site cleanup in a manner that would result in no measurable impact from site contaminants at the high school. The full statement excerpted from page 34 reads as follows:

> Standard construction equipment and procedures would be used to remove contaminated sludge and soil from the raffinate pits; sediment from ponds and lakes; solid material (including structural material and debris, process equipment, rock, vegetation, and soil) from the MSA and TSA; underground pipes; and soil from dump areas, scattered locations across the site, and vicinity properties.

As explained in the sentence immediately following,

> Good engineering practices and other mitigative measures would be applied to minimize potential releases; for example, the size of the area being disturbed would be minimized and erodible material would be misted with water during excavation and transportation.

Thus, DOE would apply numerous engineering controls to minimize releases to ensure that its commitment for no measurable impact at the high school would be met. The DOE will continue to coordinate with the Francis Howell High School District on implementing this project so that all reasonable requests can be incorporated into project plans. No contaminated material would be transported past the high school under the preferred alternative. Such material would be transported past the school if Alternative 7b or 7c were selected. If either of these alternatives were selected, DOE would implement redundant protective measures to decrease the potential for accidental exposure of students to contaminated material and would attempt to transport that material past the high school outside of the busy school hours.

Response N-18

A cover is expected to be placed over the radium-contaminated soil that is being brought to the TSA from the quarry for short-term storage pending the availability of a disposal facility. Radon gas can be easily controlled by water or a cover, and the amount of water or thickness of the cover can be readily determined from the results of numerous laboratory tests and field measurements that have been conducted to address this issue. For example, a moisture content of about 20% has been shown to effectively reduce radon release from uranium mill tailings to background levels, as has a cover thickness of 0.15 cm (0.06 in.).

Response N-19

The DOE agrees that contingency plans are important to the safety of workers and the public, and numerous plans are in place for the project. Regular practice drills are held to implement plans that address accidents, fires, and other possible events that could affect the health and safety of workers or the public. A summary of the major monitoring and mitigative measures that would be used during remedial action activities is given in Section 6.6 of the FS.

N-20

Expression of Risks: Just as a comparison of risks is an aid in understanding them, so is a careful selection of the methods of expression. It is hard to comprehend the hazard quotients and index used in the preparation of the documents of this study. It is important to realize that risks appear to be very different when expressed in different ways (A. Taversky and D. Kahneman. SCIENCE., 211,453 (1981)). One example of this can be seen if we consider the cancer risk to those persons exposed to radionucleides ater the Chrenobyl disaster. Acoording to the Soviets, the 2400 persons between 3 and 15 kilometers from the plant, but excluding the town of Pripyat, recieved and are expected to reciece 1.05 million man-rems total integraed dose, or about 44 rems average. Even if we asume a linear dose-response relation, with 8000 man-rems per cancer, the risk may be expressed in different ways. Dividing 1.05 million man-rems by 8000 gives 131 cancers expected in the lifetimes of that population. This is larger than, and for some people more alarming than, 31 people within the power plant itself who died within 60 days of acute radiation sickness combined with burns. Dividing the 131 again by the approximately 5000 cancer deaths expected from other causes, the accident caused "only" a 2.6% increase in cancer. This seems small compared to the 30% of cancers attributable to cigareete smoking. The difference is even more striking if we consider the 75 million pepole in Byelorussia and the Ukraine who recieved, and will recieve, 29 million man-rems over their lifetimes. On the linear dose-response relation this leads to 3500 "extra cancers", surely a large numbrn for one accident. But dividing by the 15 million cancers expected in the population leads to an "insignifacant" increase of 0.0047%. Of course, none of the methods of expressing the risk can be considered "right" in an absolute sense. Indeed it is my beleif that a full understanding of the risk involves expressing it in as many ways as possible.

Response N-20

The DOE agrees that risk assessment is a difficult subject to present and understand. The risk assessments in the RI/FS-EIS were developed in accordance with the standard EPA process for NPL sites, and every attempt was made to simplify the discussions as much as possible by explaining the process and presenting results in various ways, including in context with background risks for similar exposures. Your interesting discussion correctly identifies some of the difficulties associated with a risk presentation. For example, the risk results in the BA and FS were compared with the target range identified by the EPA for incremental risks to an individual from exposures associated with an NPL site (i.e., 1×10^{-6} to 1×10^{-4}) because presenting them only as percent increases above a background rate could have led to confusion. Similarly, the apparent downplaying by some people of the deaths to workers inside the Chernobyl plant could be extrapolated to the potential for short-term risks from accidents and injuries associated with worker activities or off-site waste transportation, and these risks are a very real component of human health protection for cleanup sites. The DOE appreciates your past interest in and helpful contributions to the risk assessments for this project.

Letter O

William M. Vaughan
839 Berick Drive
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19 February 1993

Stephen H. McCracken, Project Manager
Weldon Spring Site Remedial Action Project
7295 Highway 94 South
St. Charles, MO 63304

Re: Comments and Questions regarding the BA, RI and FS documents developed for the WSSRAP

Dear Mr. McCracken:

I have been asked by St. Charles Countians Against Hazardous Waste (SCCAHW) to provide an air quality review of the following documents prepared for the Chemical Plant Area involved in the Weldon Spring Site Remedial Action Project (WSSRAP):

Baseline Assessment (BA)
Remedial Investigation (RI)
Feasibility Study (FS)

This review was undertaken as part of the Technical Assistance Grant (TAG) that has been awarded to SCCAHW.

My particular professional expertise is in air quality monitoring with specific experience over the years (since 1974 as an air quality consultant) in air monitoring program design and management, perimeter air monitoring at Superfund cleanup sites, various air transport and transformation studies for EPA, and a listed participant in EPA's Radon Measurement Proficiency (RMP) Program both as an individual and as president of a corporation that is both a primary and secondary RMP Laboratory. I am also registered in Illinois for radon detection services with the Illinois Department of Nuclear Safety's Radon program (#RNI91006).

O-1 It is from this perspective and background that the above documents were reviewed for their consistency with good professional practice regarding air quality issues and the

Response O-1

Good professional practice regarding air quality issues was followed in conducting the analyses in the RI/FS-EIS, and the document underwent extensive peer review before publication. Every effort was made to fully discuss the rationale and methodology used to address all relevant engineering and environmental issues and to provide a consistent evaluation of potential air quality impacts. Minimizing such impacts during site cleanup activities is very important to the DOE, as stated in the RI/FS-EIS. For this reason, the air pathway was evaluated in considerable detail in these assessment documents, to support the cleanup decision and provide useful information for future design activities.

The point cannot be overemphasized that the RI/FS-EIS is a decision-making assessment document and not an engineering design document. Its purpose is to address a variety of issues, providing a comparative evaluation of alternatives from which the preferred alternative for site cleanup can be selected. Of necessity, this evaluation is conducted at a broad level to address all topics. Further, only conceptual engineering information is to be evaluated at this stage of the remedial action process. In accordance with the prescribed process, detailed engineering cannot be completed until after the remedy is selected pursuant to review and comment on the proposed action by the public. Thus, the level of detail solicited in several comments presented in this letter cannot be provided at this time. That information will be made available after the final remedy is selected (i.e., after the record of decision for this action), after which specific engineering plans can be developed.

O-1 (Cont.)

impact of air quality on the surrounding public access areas. I will group my comments by document and section as appropriate. There are some interconnected issues that are best raised as topics of concern which are addressed in several sections of one or more documents. Those focused comments are grouped without regard to sequence in any one document.

I trust that these comments will focus your attention on various air quality issues that do not appear to be consistently, thoroughly or properly addressed in these documents.

=== === === === === === === ===

GENERAL COMMENTS:

O-2

- These documents do not, in general, address air quality issues with anywhere near the detail and attention developed for the water and soil on-site despite several comments that radon gas is a serious health concern.

O-3

- In particular these documents do not recognize and reflect the fact that the most direct radon exposure route for the general public will be during remediation activities. Yet long term health issues addressing 30 year exposure to trespassers and recreational visitors receive most of the attention in the BA, RI and FS health assessments.

O-4

- There is a puzzling lack of use, and almost an ignoring, of on-site meteorological data gathered since the spring of 1990. Such information would be most helpful in evaluating current site conditions and, more importantly, in developing an emergency response plan. Such a plan should be based on real time modeling with current meteorological data to assist in decision-making.

BASELINE ASSESSMENT:

O-5

In 5.2.3 the "sitewide air exposure" estimate rationale is developed. The sources of the radiological risk are specifically focused on radon-222 and its short-lived decay products. Specific sources mentioned include 1) "radium-226 in surface soil" and 2) "contaminants generated from soil at the southern end of the site."

Response O-2

Air quality associated with cleanup activities was addressed in greater detail than any other environmental medium at the site because the DOE considers the air pathway a primary means by which members of the general public might be affected during the cleanup period, as discussed in the FS. An entire appendix (Appendix C) was dedicated to assessing air quality impacts, and the assessment of off-site health impacts from airborne releases was the topic of a second appendix (Appendix F of the FS).

The DOE considers the potential for radon releases and exposures an important issue to be addressed for cleanup activities, and for that reason the radon assessment of the action period for the RI/FS-EIS was extensive. The approach used to estimate radon releases during the cleanup period is discussed in Appendix F of the FS (Section F.4.1.2). All potential sources of radon gas were evaluated for each final remedial action alternative, and the results of the related risk assessment are presented in Appendix F. The DOE has committed to cleaning up the site in a manner that would have no measurable impact from site contaminants at Francis Howell High School, and the high school was considered a primary receptor location for the health assessment presented in Appendix F. Hence, these issues are thoroughly addressed in the RI/FS-EIS.

Response O-3

The documents explicitly discuss the fact that the most direct radon exposure route for the general public would be during remediation activities. Considerable discussion of this issue was presented in Appendix F, and a separate technical memorandum was prepared to provide additional detailed information for the analysis (Avci et al. 1992); this further presentation was incorporated by reference and summarized in Appendix F and Chapters 6 and 7 of the FS, and it is available in the administrative record for this action.

As a note, radon released from the site during cleanup activities would be dispersed in the atmosphere such that the resulting concentrations at off-site receptors would be several orders of magnitude lower than naturally occurring levels of this gas. The primary radon concern at the site is associated with more direct exposures, e.g., from trespassing in the former process buildings remaining at the chemical plant area. Of similar concern would be exposures to localized soil areas containing elevated radium concentrations, e.g., from trespassing across the site. These and other scenarios were discussed in considerable detail in the RI/FS-EIS, and they were evaluated to ensure that radon risks were thoroughly assessed as part of the decision-making process for remedial action at the Weldon Spring site.

Response O-4

Site-specific meteorological data were collected at the chemical plant from 1983 through 1985. These data were evaluated for representativeness in accordance with EPA requirements (as discussed in Section C.2.1 of the FS), and the data from 1985 were used for the air quality analyses presented in the FS. The collection of meteorological data at the site resumed in 1990, following the installation of a new meteorological station on-site. This station was installed so

it would be available to assess site conditions during the fieldwork phase of the upcoming remedial action. Data were initially collected from this station as part of a start-up effort to ensure the system would be fully operational when the cleanup period began; because these data were not collected for the pre-action assessment process, they were not fully validated until May 1992 (primarily because of delays in completing the instrument calibration process). Thus, only the data collected since May 1992 are considered appropriate for use in an air quality analysis. (Validated data are currently available for the project through February 1993.) The EPA considers temporal and spatial representativeness key factors in determining the appropriateness of a data set for such use. Because the more recent data do not constitute an adequate compilation of meteorological information for a full year, these data were not used for the evaluations in the FS. In contrast, the data collected on-site from 1985 do constitute a spatially and temporally representative data set, as explained in Section C.2.1 of the FS. Therefore, these data are fully appropriate for the site-specific analyses.

In response to this comment, the on-site data for wind speed and wind direction from 1985 were compared with those collected since May 1992 to the extent possible, i.e., for those seasons during which sufficient data were available (Figure 3.1). This comparison indicates strong similarities between both the wind speeds and wind directions from these data sets. Therefore, the results of the site-specific analyses using incoming data would be essentially the same as those presented in the FS. These types of analyses will continue to be conducted to ensure that meteorological conditions during the cleanup period are known, especially relative to their potential effect on the airborne transport of material released by the cleanup activities. The emergency response plans developed for the cleanup period will consider the on-site meteorological data. It is DOE's firm commitment to protect human health and the environment during the site cleanup, and these continued efforts will support that commitment.

Response O-5

The comment appears to confuse the current remedial action with a previous action for the project. Elevated concentrations of radon have been measured at the quarry because certain waste that was disposed of in the quarry many years ago contains elevated concentrations of radium-226. The fact that the quarry is located in a depression that traps the radon emanating from the quarry also contributes to the elevated concentrations measured at certain portions of the quarry perimeter. The waste in the quarry and the radon emissions noted in the comment were addressed in a separate RI/FS issued to the public in 1990. The scope of the remedial action that is currently proposed is discussed at some length in Chapter 1 of the FS; this text includes a discussion of the previous assessment for the bulk (solid) waste at the quarry. This FS also explains that upon excavation of the bulk waste under a previous cleanup decision for the project, it is to be placed in controlled storage at the TSA of the chemical plant area. Therefore, the starting point for the evaluation of quarry waste in the RI/FS-EIS is its storage at the TSA, as explained in these documents. The radon that could be generated from this quarry waste during the cleanup period was included in the risk assessment for both on-site and off-site receptors. This analysis is presented in Appendix F of the FS.

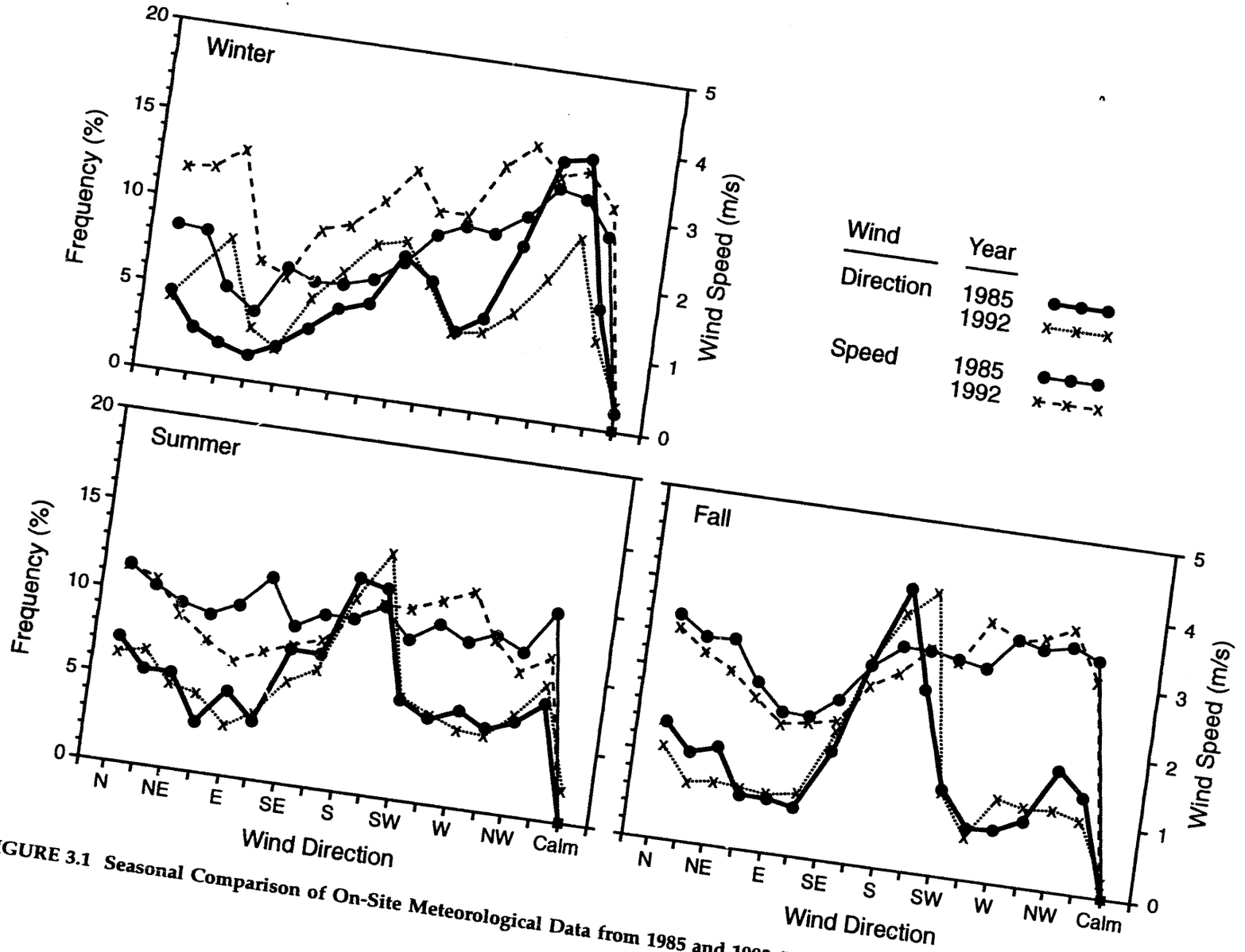

FIGURE 3.1 Seasonal Comparison of On-Site Meteorological Data from 1985 and 1992 (Response O-4)

O-5 (Cont.)

QUESTION BA-1: Why are the on-going radon emissions from the quarry ignored despite some of the highest ambient radon levels being measured in the vicinity of the quarry? [I am referring to the third quarter data from locations 1001 and 1002 during the third quarter of 1988, the only data available to me at this writing outside RI Table 5.6.]

O-6

In 5.2.3.1 results of the "location-specific analysis indicates that the maximum risks from inhalation are $2x10^{-2}$ for the worker, $4x10^{-5}$ for the trespasser, and $2x10^{-3}$ for the recreational visitor. Inhalation of radon-222 decay products accounts for more than 99% of the risks."

COMMENT: EPA risk levels of $1x10^{-6}$ (i.e. one-in-a million) are considered a rough guideline for acceptable cancer risk. These levels are appreciably higher despite being based on unrealistic exposure estimates.

O-7

QUESTION BA-2: Why were the off-site occupants of the Francis Howell High School (FHHS) not evaluated as a more seriously exposed population than the "recreational visitor" here and in FS Appendix E?

The reason for the above concern is the inconsistency between the "recreational visitor" potential exposure (from 6.2.2 his exposure is based on 20 visits per year of 4 hours each or 80 person-hours exposure per year over 30 years) and the current, actual FHHS population's exposure (approximately 2,000 people per day for 6 hours/day during 36 weeks per year or 2,160,000 person-hours exposure per year.) The FHHS population is located closer to the site than 2 of the 3 Busch Wildlife Lakes which would be visited by the recreational visitor in the future AFTER remediation has been completed while FHHS will be present DURING much of the remediation activity that will be generating elevated radon-222 emission. With this vast exposure difference AND the already high risks computed for the "recreational visitor," Question BA-2 deserves an answer, explanation and parallel risk calculations to support a response!!

O-8

In 5.6.2.1 the comment is made that "because measured values needed to assess the inhalation pathway at the site were not available, airborne contaminant concentrations were modeled to estimate exposure point concentrations." Later in the same paragraph there is the statement that "inhalation contributes insignificantly to health effects estimated for the site except

Response O-6

As discussed in the RI/FS-EIS, the EPA considers the level of 1×10^{-6} a "point of departure" for evaluating risks associated with NPL sites, and the target range identified for "acceptable" incremental cancer risks for these sites is 1×10^{-6} to 1×10^{-4} (EPA 1990). The purpose of the unrealistically high exposure assumptions in the BA was to ensure that all possible hazards associated with no cleanup action are identified and incorporated into the site cleanup decisions. The referenced text discusses the location-specific analysis conducted for the site to assess the possible impacts to individuals who might repeatedly visit one particular area of the site, which could be a "hot spot." This same discussion explains that the risk calculations intentionally applied conservative assumptions, notably those for radon-222 exposures.

Response O-7

The comment appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS — i.e., the no-action (baseline) analysis and the cleanup period analysis. Existing site conditions were evaluated for the no-action assessment, as discussed at length in the BA and FS. The results of DOE's extensive air monitoring program for the site show that local air quality is not being impacted under current conditions, and the air pathway does not contribute to any off-site impacts. Monitoring results at the high school have consistently shown that the concentrations of airborne particulates and radon gas are at background levels, as discussed in Chapter 2 of the BA. Thus, Francis Howell High School is not impacted by site releases under current conditions. The only means by which high school individuals could be impacted by site contaminants under current conditions is by direct access to the various source areas on-site (e.g., by trespassing). The basis for the approach used to assess baseline risks at the site is described in considerable detail in Chapter 3 of the BA. Air quality impacts that could result from cleanup activities were evaluated in considerable detail in the FS, and the high school was considered a primary receptor location for that evaluation. As explained in the RI/FS-EIS, local air quality would only be impacted during that cleanup period, not during the no-action conditions. A complete reading of the documents should alleviate any apparent confusion.

Response O-8

See Responses O-2, O-3, and O-7. The comment is extracted from the discussion of uncertainty in the assessment process, which explains that conservative assumptions were intentionally applied to the assessment of radon exposures. By this means, the radon risk estimates would provide information to support remedial design planning after the remedy is selected, to ensure that appropriate measures would be taken during the fieldwork phase of cleanup and to assist in future land use planning. The on-site data were indeed used in the sitewide analysis, as explained in the BA; additional radon concentrations were modeled for hundreds of individual locations across the site to provide further information for the upcoming decisions on site cleanup and the subsequent release of land for unrestricted use.

for radon (emphasis added). In the FS where the no-action alternative is evaluated and the "Protection of the Public" is addressed in FS 6.1.3.2 (FS page 6-5), the carcinogenic and radiological "risks would be due primarily to external gamma radiation (and) inhalation of radon..." This conclusion is reached even though the FHHS population and person-years of potential exposure was not weighted as heavily as I think appropriate.

O-8 (Cont.)

COMMENT: Radon is again emphasized as important in the health effects for the site, yet its actual modeling and evaluation are not clearly addressed here. See related comments below.

QUESTION BA-3: Why weren't the actual on-site radon air quality data (that have been gathered since at least 1987) used instead of modeling?

O-9

QUESTION BA-4: In the third paragraph on page 5-33 please explain the statement that "..the related uncertainty (in the exposure point calculations for the highly contaminated buildings) does not affect the outcome of this assessment because interim action decisions have already been made for these structures"? Explain, why interim decisions should affect assessment calculations if done properly with realistic assumptions?

O-10

In 5.6.2.3 where exposure pathways are discussed, no mention is made of inhalation exposure for radon despite comments in 5.2.3.1 mentioned above that radon decay products are 99% of the calculated risk. Then under Toxicity assessment that concept is reinforced with the comment (pg 5-37 second para.) that "radioactive contaminants are generally the primary contributors to health effects estimated for the site."

COMMENT: These statements about concern for risks due to radon and radioactive contaminants are in sharp contrast to the lack of detailed evaluation of impact on existing populations near the site, see question BA-2 for example.

O-11

In 5.6.4 the risk characterization is specifically mentioned as focusing on the "standardized individual" for worker protection, an adult male. The next sentence at the bottom of page 5-38 starts out "although children are more susceptible to radiation exposure."

Response O-9

The decision to dismantle the chemical plant buildings has already been made under an earlier action for the project, as discussed in Chapter 1 of the BA (and FS). Documentation developed to support that decision was issued to the public in 1991. Therefore, the main purpose of the baseline risk assessment — which is to identify hazards for which cleanup decisions need to be made — is a moot point for those buildings. For this reason, screening-level calculations were appropriate for the building component of this assessment (as explained in the BA). This assessment was conducted properly by applying data for the most contaminated buildings to conservatively represent all buildings.

Response O-10

The uncertainties associated with the assessment process are discussed according to the individual components of a baseline risk assessment in Section 5.6. The exposure pathways are discussed in Section 5.6.2.3, and there is little uncertainty regarding the potential for radon exposure from inhalation. Hence, the text appropriate for the discussion is presented in this section. The comment regarding the off-site populations appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS (see Response O-7).

Response O-11

The comment appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS (see Response O-7). Age-specific considerations were incorporated into the risk analyses for the appropriate scenarios (i.e., the residential scenario, for which children are considered), which are presented in Appendix E of the FS, and doses were estimated appropriately for the high school students, as presented in Appendix F of the FS. The entire sentence should be retained when making comments to avoid incorrect interpretations, as is the case in this question about the students. That question is answered in the portion of the sentence that was not retained with the excerpt. The full sentence reads as follows:

> Although children are more susceptible to radiation exposure, i.e., the radiation doses are larger for children than adults for the same intake of radioactive substances, such effects are significant only for young children (see Cristy et al. [1986] and ICRP [1989]).

That is, the effect would not be significant for adolescents attending the high school. Additional information on the age-specific effects of radiation exposure is provided in Responses K-5 and K-6.

O-11 (Cont.)

QUESTION BA-5: With such a large population of children (albeit not "young") in the FHHS just to the east of the site, how can you justify omitting consideration of their dose? (See following discussion as well in developing your answer.)

O-12

In 5.7 (page 5-42) the significance of radon-222 is reiterated as "the total risk is dominated by inhalation of radon-222 decay products derived from radium contaminated soil." Then the potential health effects were estimated for "adjacent off-site areas."

COMMENT: Despite these strong statements, there is absolutely no discussion of the radon being emitted from the quarry surface and/or the release of radon as the quarry sludge is handled and brought to the site.

O-13

QUESTION BA-6: Since "adjacent off-site areas" were evaluated for impact, why did you not address the FHHS for these BA health effect estimates?

REMEDIAL INVESTIGATION:

O-14

In 2.2.3 there is the statement that an emergency preparedness plan (EPP) has been prepared.

COMMENT: There is no indication here that the EPP utilizes the real time meteorological data from the site meteorological tower much less the use of 15-minute average meteorological conditions, as called for by DOE guidance ["Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance," DOE/EH-0173T (Jan. 1991)], rather than the hour average data discussed in the FS. One can only hope that despite the downplaying of the air transport route, the EPP makes a serious effort at proper planning and implementation.

O-15

In 3.6.2 there is the statement that "a site-specific meteorological study at the Weldon Spring site as part of the RI/FS has not been undertaken..." Yet in 4.2.2 while there is the statement that "no long term (meteorological) data are available," at the beginning of the paragraph, another statement at the end of the paragraph stated that "a meteorological station was established at the site in early 1990." If this is true, then the other claims that there are no long term or current meteoro-

Response O-12

The comment appears to confuse the current remedial action with a previous action for the project (see Response O-5). The waste in the quarry and the radon emissions associated with bringing it to the chemical plant area were addressed in a separate RI/FS issued to the public in 1990. The scope of the current remedial action is discussed at some length in Chapter 1 of the FS; the text includes a discussion of the previous assessment for the bulk (solid) waste at the quarry. This text also explains that the starting point for the evaluation of quarry waste in the RI/FS-EIS is its storage at the TSA. The radon that could be generated from this quarry waste during the cleanup period was included in the risk assessment for the current remedial action. That detailed assessment is provided in Appendix F of the FS, as referenced in the summary discussions presented in Chapters 6 and 7 of the FS. (This issue is further discussed in Response O-44.)

Response O-13

The comment appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS (see Response O-7). Existing site conditions were evaluated for the no-action assessment, as discussed at length in the BA and FS. The results of DOE's extensive air monitoring program for the site show that local air quality is not being impacted under current conditions, and the air pathway does not contribute to any off-site impacts. Monitoring results at the high school have consistently shown that the concentrations of airborne particulates and radon gas are at background levels, as discussed in the BA. Thus, Francis Howell High School is not impacted by site contaminants under current conditions. Air quality impacts that could result from cleanup activities were evaluated in considerable detail in the FS, and the high school was considered a primary receptor location for that evaluation. A complete reading of the documents should alleviate any apparent confusion. As explained in the RI/FS-EIS, air quality would only be impacted during the cleanup period, not during the no-action conditions.

Response O-14

The emergency preparedness plan for the project addresses responses to potential emergency scenarios, including those involving airborne releases (such as a fire). Included in this plan are the actions that would be taken and the notification process that would be followed in the event of an emergency at the site. The air quality analyses in the FS will be considered together with the data being collected from the on-site meteorological station to help refine these plans. It is DOE's firm commitment to conduct site cleanup in a protective manner, and all available information will be applied to support that commitment.

Response O-15

Data that are properly "quality assured" only recently became available from the new meteorological station at the site. This station was installed in 1990 so that it would be fully operational to support the fieldwork phase of site remediation. The station is expected to provide information for evaluating any potential impacts as a result of remediation activities at the site, both chronic and short term (see Response O-4).

logical data are not accurate.

Data from early 1990 through 1992 would approach, if not exceed, the data gathered during parts of 1983 and 1984 along with all of 1985. The guidance of DOE/EH-0173T urges use of at least one year of on-site data for modeling and predictive work. Obviously a Meteorological tower installed and sited for site conditions in the 1990s would be more applicable than a tower installed in the mid 1980s near the raffinate pits (section 3.6.1).

O-15 (Cont.)

Properly QAed (quality assured) data from the current tower should be available for use by now. It is my experience from other Superfund cleanup sites that fully QAed data for a full year are available within a couple of weeks of the end of the year, if it has been professionally operated and checked during the year.

QUESTION RI-1: What is the purpose of the meteorological tower that has been operating on-site since the spring of 1990 and to what use have its data been put?

O-16

QUESTION RI-2: Why is the comment made in 4.2.1 that meteorological "data collected from locations closer to the site, such as Spirit of St. Louis Airport, Labadie Power Plant and the Busch Wildlife Area will be included in the site documents when they become available" when there is on-site data? Aren't two of those data bases (Spirit and Busch) already in the public domain and readily available?

In 4.2.1.5 there is a discussion of tornadoes in the vicinity. Mention is made that in the "most recent 40-year period of records for the St. Louis area, there have been only four tornadoes that produced extensive damage and loss of life." The reference is dated 1979, hence these figures must pertain to 1 period like 1935-1975.

O-17

QUESTION RI-3: Why hasn't anyone asked the local meteorologists in the St. Louis-St. Charles area about the reports of several tornadoes in the St. Charles area in recent years? Why have you ignored the 1991 damage in St. Charles County due to either "straight line wind," a "downburst" or, perhaps, a small tornado or the fact that localized damage at one site is just as significant as "extensive damage and loss of life"?

Response O-16

The data from the listed off-site locations are available, but appropriate on-site data have only recently become available from the new meteorological station. (See Responses O-4 and O-15.)

Response O-17

Tornado data for the site area are updated in the FS (see Section 1.3.2.5). As part of ongoing support for the remedial action evaluated in the RI/FS-EIS, the potential impact of a tornado strike at the site has been evaluated, and a response plan has been developed as part of emergency preparedness planning for the project. The primary threat associated with a tornado would result from flying debris, not contaminant exposures. The evaluation of exposures to contaminants that could be dispersed by a tornado indicated that the risk would be lower than EPA's target range of 1×10^{-6} to 1×10^{-4} for the incremental risk to an individual from an NPL site. (This risk range is further discussed in Responses C-4 and O-6.)

The comments in 4.2.1.6 on air quality deal exclusively with regulatory issues and criteria pollutants, NOT primary concerns for this site.

O-18 QUESTION RI-4: Why does your discussion of air quality ignore a discussion of the on-site radon measurements (radon being the most significant air quality factor on the site if the above comments from the BA can be believed) and their location, pattern and implications?

The majority of the comments in 4.2.2 regarding Site-Specific Climate are quite irrelevant since they ignore the on-site data discussed above. The statement in 4.2.2.5 that the "only on-site climatological monitoring is limited to precipitation" is untrue in light of almost three years of on-site meteorological measurements (see above) including precipitation!

O-19 QUESTION RI-5: What reason does DOE's PMC have for continually downplaying and ignoring the on-site meteorological data as is so evident by statements such as the quote from 4.2.2.5?

COMMENT: Frankly the credibility of these documents is weakened by such glaring omissions that expose the limited awareness of on-site professionals for available data that could assist their efforts. It surely seems the staff was operating in a vacuum that recognizes little site meteorological or air quality data past the mid-1980s!

In 5.6 there is discussion of the air monitoring (as distinguished from air quality above that appears to deal with criteria pollutants only and not site-specific pollutants of concern). Despite all the other descriptive sections on the
O-20 atmosphere that try to describe multi-year average trends, only one year of air monitoring data is summarized.

QUESTION RI-5a: With data extending from 1987 through 1992, why is only one year, 1989, presented?

O-21 QUESTION RI-5b: The implication is that in late 1992 there is not yet a compilation of valid, QAed data more recent than 1989, "the most current year." What has delayed the validation of at least 1990 and 1991 data??

O-22 QUESTION RI-5c: Why are we not given the full data set for evaluation of trends, etc.?

Response O-18

Contaminants of concern, such as radon and airborne radioactive particulates, have been and are currently being measured at the chemical plant area, and the results are presented in annual site environmental monitoring reports. These measurements indicate that radon and radioactive particulate concentrations are at background levels; i.e., there are currently no impacts to local air quality. This information is also presented in the BA, and potential air quality impacts associated with the cleanup period are presented in the FS.

Response O-19

Appropriate data only recently became available from the new on-site meteorological station (see Responses O-4 and O-15).

Response O-20

The monitoring results from DOE's annual air sampling program are presented in the site environmental monitoring reports. The 1989 data were presented because they are representative of those for the previous and following years.

Response O-21

The air monitoring data for 1990 and 1991 are presented in the annual site environmental monitoring reports. The recent on-site meteorological data were collected for a separate objective (see Response O-15).

Response O-22

These data are provided in the annual site environmental monitoring reports, and trends are discussed in those reports. The data presented in the RI are representative of those trends.

O-23

COMMENT: It is interesting to note that the DOE guideline for radon-222 in the ambient air is at 3 pCi/L (above background of 0.1-0.2 pCi/L) while EPA's current Citizen Guide for Radon urges that homeowners consider remediating levels in the 2-4 pCi/L range. It is also interesting to note that in the outside air near the quarry in 1989 (RD-1003 in the first quarter) and 1988 (RD-1001 in the third quarter) exceeded the 4.0 pCi/L levels with readings of 4.7 and 5.6 pCi/L respectively. Yet little to no mention is made of the quarry and its radon in figuring risks, etc. in the BA, RI or the FS.

O-24

COMMENT: It should be made clear to the public that the discussion of the asbestos monitoring by PCM (phase contrast microscopy) in 5.6 is more than a little exaggerated. The PCM does not have the capability to analyse air samples to see "fibers having a size and shape which are characteristic of asbestos!" PCM can only do that for bulk samples as is clearly stated in the next sentence - "The method does not distinguish asbestos fibers from other airborne fibers..." TEM (transmission electron microscopy) IS an unambiguous means of identifying asbestos fibers in the air. YET only 12 such samples were collected during 1988 and 1989. Thank goodness they were collected at the FHHS so that the largest nearby receptor population received some monitoring attention.

O-25

Section 6 addresses fate and transport of contaminants. 6.1.1 deals with air. It is only one paragraph long!! **DESPITE THE MANY REFERENCES IN OTHER PARTS OF THE BA, RI and FS NOTED IN THIS RESPONSE TO THE SERIOUS IMPACT OF RADON GAS (even to the extent that it is responsible for 99% of the risks in one analysis), RADON IS NEVER MENTIONED!!**

O-26

"Release mechanisms" for air contaminants that are mentioned include "generation of fugitive dust, disturbance of friable asbestos and, to a lesser extent, volatilization of contaminants."

Then the summary statement is made that "air transport is currently (emphasis added) not a significant exposure pathway."

QUESTION RI-6a: What is the release mechanism that accounts for the high radon levels near the quarry where there was no human activity?

O-27

QUESTION RI-6b: How will the release mechanisms change during site activities where water and sludge will be

Response O-23

The comment appears to confuse the current remedial action with a previous action for the project (see Response O-12). The waste in the quarry and the associated radon emissions were addressed in a separate RI/FS issued to the public in 1990. The impacts associated with radon that could be generated from this waste (following storage at the TSA) were assessed for the current remedial action. That detailed assessment is provided in Appendix F of the FS and is referenced in the summary discussions presented in Chapters 6 and 7 of the FS.

Response O-24

This distinction between phase contrast microscopy and transmission electron microscopy for asbestos analyses was discussed in the RI/FS-EIS (see Section 2.4.4.2 of the BA). For the project's asbestos analyses, all fibers identified by phase contrast microscopy are conservatively assumed to be asbestos, even though other types of fibers are probably present. In addition, the filters with the highest fiber counts by the phase contrast microscopy method are analyzed by transmission electron microscopy to distinguish asbestos fibers from other airborne fibers. Therefore, the results of the asbestos analyses for the site are conservative.

Response O-25

The comment appears to confuse baseline site conditions, which are described in the RI, with conditions that may exist under the cleanup period, which are assessed in the FS. The site does not impact local air quality under current conditions; radon that could be released during the cleanup period was evaluated in detail in the FS. (See Response O-13; this issue is further discussed in response to subsequent similar comments, e.g., see Responses O-42 and O-54.)

Response O-26

The comment appears to confuse the current remedial action with a previous action for the project (see Response O-12). The release mechanism that resulted in elevated radon concentrations at the quarry perimeter is simply radon emanation from the material within the quarry that contains elevated concentrations of radium-226.

Response O-27

The comment appears to confuse the current remedial action with a previous action for the project (see Response O-12). During activities conducted pursuant to the previous decision for the quarry, the release mechanism for radon will change as a result of mechanical disturbance of the contaminated material. This disturbance will release radon previously trapped in the interstitial pore spaces of the bulk waste. Various engineering controls are being applied during the quarry fieldwork, many of which were discussed in the documents issued in 1990 for that action. If Alternative 7a were selected for the current remedial action, vitrification could indeed result in additional volatilization of contaminants (such as certain metals), as discussed in Chapter 5 of the FS. If a vitrification facility were constructed on-site, it would be equipped with an extensive off-gas treatment system. That system would be developed and optimized during the detailed design phase of the forthcoming remedial action.

O-27 (Cont.)

disturbed at the quarry? And, if option 7a is selected, will vitrification make even non-volatile compounds volatile?

COMMENT: I realize that the RI is limited but those limitations need to be more clearly reinforced so that a statement that may pertain accurately to the quiescent site ("air transport is ... not a significant exposure pathway") is not readily picked up as characteristic of the active site!!

O-28

COMMENT: There is a considerable gap in thought processes evident in the one paragraph dismissal of the air route. The air transport route is THE most rapid means of potential exposure for any nearby residents. Air contaminants move quickly from source to receptor in a matter of minutes - not days, months or years as with many of the soil, water and biological transport routes. It is a gross public disservice to dismiss the air route so glibly! The air route is recognized by DOE guidance documents (DOE/EH-0173T) as one of the main reasons for an emergency preparedness plan, so much so that the guidance urges 15-minute average, real time wind information to guide management response decisions. NO OTHER MEDIUM WARRANTS THAT LEVEL OF TIMELY ATTENTION! Yet here it is dismissed in one small paragraph.

FEASIBILITY STUDY:

O-29

While the FS purports to deal in more detail with site cleanup activities and their impact, it still has a strong tendency to dismiss the impact of radon and the general exposure by the air pathway. The following comments and questions will focus attention on some of the more glaring topics and discussion.

O-30

Table 1.4 (pg 1-41) is an excellent example of ignoring the air route and the general public. It supposedly addresses off-site "exposure scenarios" under Human Health Assessment (Section 1.6.1) as part of a summary of Site Risks. Yet somehow the air pathway disappears even though the "maintenance worker" and "resident" and others from the on-site scenarios only a couple hundred meters away all have inhalation exposure from the air route.

Response O-28

The comment appears to confuse the baseline site conditions, which are described in the RI, with conditions that may exist during the remedial action period, which are assessed in the FS (see Response O-7). Monitoring results show that local air quality is not impacted by the site under current conditions, as discussed in the BA. Radon that could be released during the proposed action was evaluated in considerable detail in the FS (see Appendixes C and F). A complete reading of the documents should alleviate any confusion.

Response O-29

By no means does the FS dismiss the impact of radon and general exposures by the air pathway. These issues were key components of the extensive analyses presented in this document and in supporting reports that were summarized and incorporated by reference. A considerable amount of text (about 200 pages) was devoted to the discussions of air quality, air exposures, and radon.

Response O-30

The comment appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS, i.e., the no-action (baseline) analysis and the cleanup period analysis (see Response O-7). Existing site conditions were evaluated for the baseline risk assessment, as discussed at length in the BA and FS. Table 1.4 presents a summary of that assessment, as stated in the accompanying text. The results of DOE's extensive air monitoring program for the site show that local air quality is not being impacted under current conditions, and the air pathway does not contribute to any off-site impacts. Monitoring results at the high school have consistently shown that the concentrations of airborne particulates and radon gas are at background levels, as discussed in Chapter 2 of the BA. Thus, the general public is not being impacted by site releases under current conditions. The only means by which the general public could be impacted by site contaminants is by direct access to the various source areas on-site (e.g., by trespassing). This information is included in the discussion of the approach used to assess baseline risks at the site, which is presented in detail in Chapter 3 of the BA.

The air pathway is considered the most important pathway during the remedial action period, as stated in the FS. For this reason, impacts associated with airborne releases were evaluated in considerable detail (see Appendixes C and F of the FS). The high school and nearby residents were considered primary receptor locations for the air pathway evaluation. As explained in several sections of the RI/FS-EIS, local air quality would only be impacted during that cleanup period, not during the no-action conditions. A complete reading of the documents should alleviate any apparent confusion.

O-31 QUESTION FS-1a: Why has your analysis eliminated the air pathway from the off site exposure consideration?

O-32 QUESTION FS-1b: Please justify the attention to exposures of recreational visitors and sportsmen when their exposure is 80 and 28 person-hours per year when the FHHS off-site population has a potential of 2,160,000 person hours per year of exposure? (See earlier question BA-2 for context and assumptions leading to this estimate.) It should be noted that the FHHS population is closer to the site than two of the lakes (34 and 35) consistently cited for exposure calculations!

O-33 I wonder about the completeness of your calculations when Table 2.1 that addresses areas and volumes of contaminated media is so inconsistent in dealing with the quarry. For example, it appears that there will be no sludge or sediment from the quarry. It also appeared that there will be no structural material from the quarry despite the knowledge that building debris and equipment are part of the subsurface collection of items under the water. Yet the only quarry quantity mentioned in this table is vegetation while page 2-1 lists "sediment and sludge ... from the quarry area" as "source areas and contaminated media of concern." Later on page 2-3 air is listed as a medium but only as related to "soil contamination," not water and sludge disturbance. There seems to be inconsistent addressing of potential sources terms for future calculations of impact and risk!

O-34 COMMENT: While page 2-1 clearly states that there are quarry materials "of concern," under 5.2.1.9 (page 5-7) where option 6a is being discussed, the impact of these materials is dismissed by the statement "... the specific decision for what residual material might be removed and to what level is outside the scope of this FS.." I'm confused.

O-35 QUESTION FS-2a: With the omission of handling significant material and debris at the quarry, there could well be an underestimate of the release of radon from such handling. How would a realistic consideration of the handling of a more complete range of quarry material affect the computation of radon and other radioactive releases both at the quarry and at the TSA? AND what are the subsequent computed human health risk impacts - keeping in mind the FHHS population exposure?

Response O-31

The comment appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS, i.e., the baseline assessment and the remedial action period assessment. Monitoring results show that the site does not impact local air quality under current conditions, and Table 1.4 presents a summary of the assessment associated with those conditions. For the remedial action period assessment, the air pathway was considered the primary concern (as stated in the FS) and was evaluated in considerable detail; off-site exposure considerations were a major emphasis of that analysis (see Response O-30).

Response O-32

The comment appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS (see Responses O-30 and O-31). The recreational visitor and sportsman were evaluated to assess exposures at off-site areas contaminated by past site releases; the rationale for evaluating these receptors was explained in detail in Chapter 3 of the BA. The high school has not been contaminated by site releases. However, airborne releases are the main concern for the general public during the upcoming cleanup period, as discussed in the FS. Thus, potential impacts to off-site receptors via the air pathway were evaluated extensively for the remedial action period assessment, and the high school was included in that evaluation.

Response O-33

The calculations in the FS are complete; the comment appears to confuse the current remedial action with a previous action for the project. The waste in the quarry and the radon emissions noted in the comment were previously addressed in a separate RI/FS issued to the public in 1990, as discussed in Chapter 1 of the FS. The discussions in the FS identify the quarry waste as the material at the TSA (see Response O-12). Table 2.1 does include structural material from the quarry. Airborne releases associated with the quarry waste were fully incorporated into the RI/FS-EIS analyses, and a complete reading should alleviate any apparent confusion.

Response O-34

The scope of this action relative to other actions for the project is discussed in detail in Chapter 1 of the FS, and a review of that discussion should alleviate the confusion noted in the comment. The specific decision on what residuals may be further removed from the quarry area after the bulk wastes are excavated cannot be made until after that excavation is completed (which is not expected before 1994). Thus, it is outside the scope of this RI/FS-EIS but will be considered in subsequent environmental compliance documentation (see Response N-12).

Response O-35

Handling of the significant material and debris from the quarry was not omitted from the analyses in the FS. The discussions in the FS identify the quarry waste as the material at the TSA (see Response O-33). Releases associated with this and all other contaminated material being addressed by this remedial action were evaluated with conservative assumptions, and these analyses are discussed in considerable detail in Appendixes C and F of the FS.

O-36

QUESTION FS-2b: How are we supposed to be able to evaluate the impact of various options if they are stated as materials of concern one place (with the clear implication that their impact will be computed in some later section of the FS) but then omitted from the scope of this work just when their impact is of most interest? (It is not sufficient to state that such computations are uncertain - sure they are but at least a range of possibilities and impacts can be evaluated on a "what if" basis for public and "expert" review.

Table 2.2 purports to deal with the site cleanup criteria. Yet there is only obscure and circular reasoning given for the air medium.

O-37

COMMENT: Table 2.2 says that cleanup "criteria for air would be related to those for soil, raffinate pits, and buildings." It is not at all clear how air and soil are related since one is a solid and one a gas. The circular reasoning that "interim action" addressed certain aspects and sludge would be "addressed as indicated above," misses the point that <u>air contaminants, especially radon, will be released by site activities</u>. Hence stringent engineering controls are needed to deal with something generated during cleanup rather than something that is physically contaminated in place.

The radon "standards" are quickly presented in 2.2.1.3 (pg 2-10) with the glib statement that "the measured concentrations at the site perimeter currently meet these standards."

O-38

COMMENT: This statement seems to imply that all is well. But, again, the glibness belies the fact that radon will be generated during cleanup activities as waters, sludges, and soils are disturbed, transported and handled.

QUESTION FS-3: Why have you ignored the radon source term from so many potential sources (see FS-2 as well)? AND when will revised and more complete projections and estimates be carried out including a more realistic array of sources and receptors?

O-39

Under 2.4 there is a discussion of Cleanup Criteria for Site Soil, which according to Table 2.2 is also supposed to be related to air criteria. In 2.4.1.3 there is (on page 2-24) a discussion of "incremental risk following site cleanup." Some of these risks are still well-above the usual EPA risk factors

Response O-36

As explained in the three previous responses, all of the contaminated materials associated with cleanup of the Weldon Spring site have been considered in the comprehensive evaluations in the RI/FS-EIS. A complete reading of the documents should alleviate any apparent confusion.

Response O-37

The documents clearly state that contaminants such as radon gas would be released during site cleanup activities. The explanation for including air with the discussion of soil cleanup criteria was presented in the introductory text for Table 2.2. ("Standards and guidelines are also available for radon in air; because this contaminant is generated from radium in soil at the site, related standards are included in the following discussion.") The issue is further discussed in subsequent text within this section. It is important to distinguish between cleanup criteria, i.e., the residual amount of contamination in various media after cleanup, and airborne emissions associated with remedial action activities. The emissions that could result from cleanup activities and the engineering controls that would be applied to limit airborne releases are addressed in considerable detail elsewhere in the FS (in Appendix C in particular).

Response O-38

The discussion in Section 2.2.1.3 of the FS is a straightforward presentation of the radon standards that could apply during site cleanup activities, which are summarized from the more extensive presentation in Appendix G, as referenced. The information on current radon measurements is not a glib statement but simply a representation of actual monitoring data for the site. The releases that would be generated during cleanup activities were comprehensively evaluated in the FS (see Appendixes C and F).

Response O-39

Section 2.4 of the FS specifically addresses soil cleanup criteria; the risks estimated for the cleanup period are provided separately in the appropriate sections (see Appendix F and Chapters 6 and 7). Those sections include a discussion of the potential risks from exposures to radioactive contaminants such as radon released during site cleanup. A complete reading of the documents should alleviate any apparent confusion.

O-39 (Cont.) of $1x10^{-6}$. Nevertheless I see no "incremental risk" for radiological exposures to radioactive species such as radon during the site cleanup.

O-40 COMMENT: At this point it seems relevant to mention that under the 6 Detailed Consideration of Alternatives, EPA criteria call for protecting the public from risks "in the short term" as well as the long term. Attention to that criterion is sometimes confused when it seems so many phrases dismiss risk without quantifying it!

O-41 QUESTION FS-4: In light of the ability to produce "incremental risk" calculations for post cleanup conditions, and in light of comments like that on page 4-31 (..."increased air emissions might pose a concern relative to air quality ..." from the vitrification operations) why are there no clearly communicated results of these risk calculations for radon and organics?

The air quality associated with dust generated by on-site activities received plenty of attention in 5.2.1.10 (off-site borrow soil) and 5.2.1.11 (mitigation and monitoring). Here the conventional dust monitors are mentioned as well as "state-of-the-art radon monitors." (These are apparently described in a joint MKF-JEG "environmental Monitoring Plan" that was not available to me at the time of this review.)

O-42 COMMENT: Here is another example of the inconsistencies throughout these documents regarding the air route and radon. It is at one point referred to as a serious risk yet hardly mentioned as having potential sources from which health risks can be computed. YET it is of enough concern that "state-of-the-art radon monitors" are planned to document site conditions. It would be nice if a more consistent, serious treatment of radon, its risks and health assessment was evident in these documents!

O-43 LO AND BEHOLD more inconsistency - on page 5-11 after dismissing some of the quarry materials (see above) as being out of the scope of this FS, there is a brief discussion of the "... potential contaminant releases (especially radon) from the site." [So I guess radon is there after all.] There is also mention of "dust suppressants" to be used on the "quarry material susceptible to airborne emissions."

O-44 QUESTION FS-5: What calculations of gaseous releases from quarry materials were carried out in the risk assessments

Response O-40

The final alternatives were evaluated in detail in the FS according to the evaluation criteria identified by the EPA, including short-term effectiveness. Protecting the public during the cleanup period is a major emphasis of the proposed action, and far from being dismissed, risks during the cleanup period were quantified in considerable detail. The analyses and results are presented at length in Appendix F and are summarized with numerous cross-references in Chapters 6 and 7 of the FS.

Response O-41

The vitrification technology is discussed in Section 5.3.2 of the FS, and the fate of various contaminants including radon and organic compounds is included in this discussion (see Table 5.3). The estimated emission rates associated with applying this technology are presented in Table 5.4. Risks were estimated in considerable detail for each final alternative, including the vitrification alternatives, and those assessments are presented in Appendix F; key results are summarized in the risk-related sections of Chapters 6 and 7.

Response O-42

The documents are consistent with regard to the air route and radon. The comment appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS, i.e., the no-action baseline analysis and the cleanup period analysis. A complete reading of the documents should alleviate this apparent confusion. Existing site conditions were evaluated for the no-action assessment, as described at length in the BA and FS. The results of DOE's extensive air monitoring program indicated that air quality is not being impacted by the site under current conditions, as discussed in the BA, and the air pathway does not contribute to any off-site impacts. For example, the state-of-the-art radon monitors at the high school have consistently shown that concentrations of airborne particulates and radon gas are at background levels, as discussed in the BA. Thus, Francis Howell High School is not impacted by site releases under current conditions. The only means by which high school individuals could be impacted by site contaminants is by direct access to the various source areas on-site (e.g., by trespassing). The basis for the approach used to assess risks at the site is described in considerable detail in Chapter 3 of the BA.

The DOE considers the potential for radon releases and exposures an important issue to be addressed for cleanup activities, and for that reason the radon assessment of the action period for the RI/FS-EIS was extensive. The approach used to estimate radon releases during the cleanup period is discussed in Appendix F of the FS (Section F.4.1.2). All potential sources of radon gas were evaluated for each final remedial action alternative, and the results of the related risk assessment are presented in Appendix F. The DOE has committed to cleaning up the site in a manner that would have no measurable impact from site contaminants at Francis Howell High School, and the high school was considered a primary receptor location for the health assessment presented in Appendix F. In summary, as explained in considerable detail in the RI/FS-EIS, air quality would only be impacted during the cleanup period, not during the no-action conditions.

Response O-43

The comment appears to confuse the scope of the proposed action with prior and future actions for the project, as was noted in a previous response (see Response O-34). The remedial action evaluated in the RI/FS-EIS addresses the cleanup of contaminated material at the chemical plant area of the Weldon Spring site, and a full section of Chapter 1 of the FS was devoted to a discussion of the scope of this action (which included considerable discussion of previous and future response actions for the project). Under an earlier remedial action, it was determined that bulk waste would be excavated from the quarry and placed in controlled storage at the chemical plant area (at the specially constructed TSA). It is this material that contains elevated concentrations of radium, which are a source of radon emissions that would be controlled by wetting (which is also a dust suppressant) or covering.

Response O-44

The quarry bulk waste was assumed to be covered by a tarp or flexible membrane liner while in controlled storage at the TSA. Such a cover would greatly reduce particulate releases as well as radon gas emissions. Radon gas emissions were assumed to be reduced by a factor of 20 by such a cover, while particulate emissions were assumed to be essentially 0. Measured values indicate that such covers may be much more effective for radon suppression than assumed in this assessment; factors as high as 80 have been reported.

Uncovering the quarry bulk waste for treatment during the proposed remedial action would result in the release of radon and particulates. It was assumed that water sprays would be used to reduce particulate releases by 50%; this control efficiency is based on EPA guidance for air quality assessments. No credit was taken in the FS analyses for controlling the radon gas that could be released during such activities. The amount of radon that would have migrated from the waste particulates into the surrounding void spaces is termed the emanating power; a value of 20% was used for the emanating power of the stored quarry waste in this assessment on the basis of data for uranium mill tailings. It was assumed that all of the radon gas in the interstitial pore spaces would be released when the quarry waste was uncovered and retrieved for treatment. These are conservative assumptions, and a number of control measures would be applied to further reduce both particulate releases and radon gas emissions; thus, the actual impacts during the cleanup would probably be much lower that those presented in the FS.

[Letter continues on next page.]

O-44 (Cont.)

related to these operations? How effective were the suppressants assumed to be for their designed function of dealing with particles? What assumptions were made with regard to their parallel impact on suppressing radon release? What were the experimental/field trial data used to support these assumptions and calculations?

O-45

In the discussion of Treatment (5.3.2) under the vitrification option (7a) the very simple statement is made, "Emissions from the vitrification process would be treated before being released to the atmosphere." The final output would also be passed through a HEPA filter. That is indeed impressive considering the flow restriction imposed on exhaust gases by such a filter and the impact of potentially high water vapor content from prior gas and vapor treatment/scrubber steps. Despite these reassuring words Table 5.5 (page 5-35) indicates that appreciable emissions will occur, including almost 1 Curie of radon a day!

O-46

QUESTION FS-6: Considering the fact that the vitrification facility is indicated on maps as bing near the FHHS side of the site, what radon risk calculations were developed for that population of 2,160,000 person hours per year? If the full population of FHHS was not used in the risk computations in the appendices, why not?

O-47

QUESTION FS-7: I did not notice any mention of continuous stack testing capabilities to assist in the management and control of the emissions from the vitrification facility. What emissions measurements are planned for the facility? How will they be tied into the emergency preparedness plan? and What real time modeling will guide the real time assessment of impact to be tied in with the perimeter monitoring to assure public safety?

O-48

[Some of the health effects issues become confused in the FS due to the many referrals to Appendices C, E and F. There will be comments and questions raised below with regard to technical aspects of those appendices.]

O-49

We again encounter conflicting statements as section 6 tries to evaluate the "No Action Alternative." In 6.1.3.2 (as noted earlier in the BA section), under Protection of the Public, with no action the "on-site receptors" (those 80 person-hours per year populations as opposed to the nearby 2,160,000 person-hours per year at FHHS) would have risks greater than 1 in a million ($1x10^{-6}$). "these (on-going) risks (with no action taken) would be due primarily to external gamma radiation (and) inhalation of

Response O-45

Emissions from the vitrification process would be treated before release, and the final output would be passed through a high-efficiency-particulate-air (HEPA) filter if a vitrification system were selected as part of the final remedy. To provide a conservative analysis for the FS, it was assumed that any radon generated within the process system would be released without control. Because the intent of this assessment document was to support decisions and focus subsequent design activities, this approach permits a bounding-case analysis relative to radon releases from the vitrification stack — which is an important issue for the project. The results can then be used to determine the magnitude of the related impact and the reductions that could be achieved by applying standard controls (such as collection on activated charcoal). If a vitrification system were constructed at the site, it would include a number of such controls for which no credit was taken in the RI/FS-EIS analyses.

Response O-46

The vitrification facility is not indicated as being near the Francis Howell High School side of the site; the comment appears to confuse the vitrification facility with the volume reduction facility. The risk calculations in the RI/FS-EIS were performed in accordance with EPA guidance for assessing NPL sites, which requires risks to be estimated for individuals who could be exposed to site contaminants. From the results of this assessment, which are presented in Appendix F of the FS, the potential risk to an individual student at the high school from radon released during all cleanup activities associated with the vitrification alternatives was estimated to be 5×10^{-8}. (The estimate for the chemical treatment alternative was 3×10^{-8}.) These estimates are well below the risk range of 1×10^{-6} to 1×10^{-4} targeted by the EPA for the incremental risk to an individual from an NPL site. Also, no credit was taken for the radon controls that would be included in the vitrification system if that treatment method were a component of the selected remedy.

To derive a risk estimate for a specific population, the risk estimated for an individual in that population is simply multiplied by the total number of individuals it contains. For the 1,600 high school students, this translates to an estimated population risk of 7×10^{-5} for the vitrification alternatives and 5×10^{-5} for the chemical treatment alternative. For comparison, similarly extrapolating EPA's target range to a population of 1,600 results in a target collective risk range for the student population of 2×10^{-3} to 2×10^{-1}. Again, the potential collective risk would be well below the target range. Further, the potential incremental risk to an individual student or population at the high school from site activities would be immeasurably low compared with the natural background risk associated with radon, which is estimated to be about 8×10^{-3} for an individual or about 13 for a population of 1,600.

Response O-47

As discussed in the FS, the vitrification facility would include a real-time monitoring system. If this treatment technology is selected as part of the remedy for the Weldon Spring site, the effluent from the vitrification facility would be monitored at various locations in the off-gas treatment system to ensure that the various components of the system were functioning

properly. As further discussed in the FS, if the off-gas treatment system were to fail, the vitrification system would be shut down for repair. A complete reading of the FS should alleviate any apparent confusion regarding this issue. The effluent monitoring system would be integrated into the emergency preparedness plan to ensure a timely response. (As a note, it is very difficult to postulate a set of circumstances that would require an emergency response given the very low risks calculated for off-site receptors in the RI/FS-EIS on the basis of reasonable but conservative assumptions.) The procedures that would be used to control emissions from the treatment facility and monitor the site perimeter can only be specified after the remedy for site cleanup is selected, as documented in the record of decision, and subsequent detailed engineering plans are then able to be completed in accordance with the remedial decision-making and design process for NPL sites.

Response O-48

A number of the detailed technical evaluations in the FS were provided in appendixes (Volume II), and key results were summarized in the main text (Volume I) with numerous cross-references to the appendixes. Because of the large number of analyses required for various topics addressed in the assessment, this type of presentation was necessary for readers to be able to discern the distinguishing differences among the final alternatives while at the same time presenting detailed information for the analyses of key issues. A complete reading of the documents should alleviate any apparent confusion.

Response O-49

The comment appears to confuse the two distinct risk analyses that were discussed at length in the RI/FS-EIS — i.e., the no-action (baseline) analysis and the cleanup period analysis. The discussion does not contain conflicting statements, and there is no inconsistency in the text; a complete reading of the documents should alleviate any apparent confusion. Existing site conditions were evaluated for the no-action assessment, as described at length in the BA and FS. No text is "hidden" in the detailed baseline analyses in the BA or Appendix E of the FS; these discussions are key components of the RI/FS-EIS and are extensively cross-referenced throughout the documents.

As discussed in the BA, the results of the extensive air monitoring program for the site (i.e., "real world conditions") show that local air quality is not being impacted under current conditions, and the air pathway does not contribute to any off-site impacts. For example, monitoring results at the high school have consistently shown that the concentrations of airborne particulates and radon gas are at background levels, as discussed in the BA. Thus, Francis Howell High School is not impacted by site releases under current conditions. The only means by which high school individuals could be impacted by site contaminants is by direct access to the various source areas on-site (e.g., by trespassing). The basis for the approach used to assess baseline risks at the site is described in considerable detail in Chapter 3 of the BA. Air quality impacts that could result from cleanup activities were evaluated in considerable detail in the FS. For this evaluation, the high school was considered a primary receptor location. As explained in the RI/FS-EIS, air quality would be impacted only during the cleanup period, not during the no-action conditions.

[Letter continues on next page.]

radon ..." THEN on the very next page (6-6) under Air Quality, there is the statement that "the site does not impact air quality (Section 3.2.2.1 of the BA) and the air pathway does not contribute to off-site health impacts."

O-49 (Cont.)

COMMENT: The glaring inconsistency between these two statements that discuss the impact on populations separated only by hundreds of meters is hidden in Appendix E and the BA. I contend (as related to my FHHS population exposure issues raised before) that **THERE APPEARS TO BE NO AIR QUALITY IMPACT OFF SITE BECAUSE SUCH IMPACT WAS NEVER REALISTICALLY EVALUATED.** When 80 person-hours per year populations are evaluated and 2,160,000 person-hours per year populations are ignored, there is much less off-site impact, probably none!

BUT while the models say no impact under current data input and assumptions, other input and assumptions that are closer to real world conditions just might indicate an impact.

FS APPENDIX C. AIR QUALITY MODELING AND ANALYSIS

O-50

While the first paragraph of this Appendix recognizes that "the air pathway is considered the principal route by which the general public could be exposed to site contaminants during ... remediation action activities ...," the next paragraph mentions that the results of this modeling effort are "used in the health assessment of Appendix F which addresses the potential human exposures to particulates." Radon is not mentioned as being of concern for this modeling effort despite clear statements of concern in other parts of these documents as noted above.

O-51

The comment is made under methodology (page C-5) that "uncontrolled emission rates were calculated from emission factors" found in the EPA's chief guidance document for releases, AP-42. Yet EPA in AP-42 does not address radon emission rates from various activities, so I guess the modeling effort of Appendix C using a well-known EPA model, ISC-ST (Industrial Source Complex - Short Term), that is optimum for gaseous dispersion predictions, was indeed used for particulate modeling and not radon.

O-52

Because "the ISC model is limited in its effectiveness for considering the effects of uneven terrain" (page C-6) they had to justify its use here by stating that they were modeling only

Response O-50

As explained in Appendix C of the FS, "air quality" addresses the six criteria pollutants for which air quality standards have been established — i.e., sulfur oxides, carbon monoxide, ozone, nitrogen dioxide, lead, and particles with an aerodynamic mean diameter of 10 μm or less (see Section C.1.3). Radon is indeed a contaminant of concern at the site, and as acknowledged in the comment, clear statements of this concern are noted in many discussions within the FS. To address this concern, an extensive modeling effort was undertaken to estimate the health effects associated with potential radon releases from the site during the cleanup period. The results of this modeling effort are discussed in the FS and summarized in Appendix F (as noted in the comment).

Response O-51

The dispersion of radon gas from the site was modeled with CAP-88, as discussed in the FS; a summary of the procedures used to estimate radon releases is given in Appendix F, Section F.4.1.2 (see also Response O-38). As noted in this comment, the Industrial Source Complex, Short Term (ISCST) model was not used to model radon gas dispersion, and the reason for this is straightforward. The ISCST computer code does not include an algorithm for estimating the ingrowth of radon decay products, which are the major hazard associated with radon exposures. The CAP-88 computer code, which was specifically developed by the EPA for evaluating compliance with the Clean Air Act, does contain such an algorithm. Furthermore, CAP-88 is one of the few codes approved by the EPA for estimating impacts associated with radon release and dispersion. For these important reasons, CAP-88 is an appropriate code for the required analysis and was therefore used to estimate potential impacts associated with radon in the FS.

Response O-52

This comment incorrectly represents the discussion in the FS. The ISC model was developed on the basis of field data collected from simple (flat) terrain, and its limitation only applies to the evaluation of uneven terrain (e.g., when the elevation of a receptor is higher than that of the release source being modeled), as explained in the full discussion referenced from Appendix C (page C-6). As further discussed, it was assumed that the terrain at the chemical plant area was simple on the basis of actual conditions for local topography and vegetation; it is important to note that this is also a conservative assumption for the chemical plant area because the elevations of the potential receptors are equal to and lower than those of the source emissions associated with cleanup activities. Therefore, the ISC model is an appropriate and conservative model for the site-specific analysis, as explained in the FS.

O-52 (Cont.) "nonbouyant fugitive dust" hence the only impact area is quite local and the limitation "does not impact the analysis."

COMMENT: Perhaps preselecting a limited model explains why no far-ranging impacts are modeled, especially when one considers the omission of radon from the species modeled here. [I should take care to mention that radon was indeed modeled, apparently by using CAP88 (based on a 1979 EPA dispersion model known as AIRDOS-EPA (EPA 520/1-79-009). That model is much less widely used than the more refined models like ISC for gaseous dispersion and is apparently more of a "straight line model" than one that can incorporate a wide variety of meteorological and terrain considerations. Hence it is unclear that it would be the best model for the existing site terrain that should include the area from the quarry as well as the chemical plant.]

O-53

QUESTION AC-1: There is an extensive discussion of ISC assumptions for ISC-ST modeling input for the local fugitive dust modeling (C1.1 and 1.2) but no similar discussion for the radon modeling that could have far more impact off site. What were the assumptions used in developing and implementing the CAP88 modeling effort, particularly the consideration of terrain, joint frequency distributions of winds and stability, source strengths for various radon-release activities, etc. in running the radon dispersion models?

O-54

QUESTION AC-2a: The ISC-ST modeling effort used the on-site meteorological data from 1985. It is a shame that the current 2.5+ years of current on-site meteorological data were not used. What is the reason that these current data were not used, considering they meet the DOE guidelines of duration and site representativeness?

O-55

QUESTION AC-2b: Was the siting/exposure of the original 1985 tower evaluated to see if it met EPA siting guidelines (EPA 450/2-78-027R and EPA 450/4-87-013)? This question is of concern since the diurnal wind patterns shown in Table C.10 (page C-39) indicate an unusual uniformity for direction that could well be linked to shielding or channeling near the raffinate pit site where the 1985 tower was located.)

O-56

O-57 QUESTION AC-3: The average annual concentration for the remediation period, 1993-1999, was computed as described on

Response O-53

The models for the air quality analyses were not preselected, and the rationale for identifying the most appropriate models was explained in the referenced text of Section C.1.1 (see also Responses O-51 and O-52). Far-ranging impacts were indeed modeled in the FS (to a radius of 80 km [50 mi], far beyond the reasonable radius of impact for the site), and radon was very much included in the evaluations, as extensively discussed in Appendix F. The CAP-88 model has been updated, and the current version (1990) was used for the RI/FS-EIS analyses. The terrain assumption for CAP-88 is the same as that used for the ISCST model in these analyses (i.e., simple); hence, a conservative assumption for the chemical plant area was applied for both models. The terrain at the quarry is much different from that at the chemical plant area. Whereas the land near the chemical plant is gently sloping, the topography at the quarry is rugged in one direction and flat (floodplain) in the other, and the proximity of the river results in observed channeling effects. These features were previously discussed in the detailed evaluation of meteorological data for the quarry as part of the earlier remedial action for the quarry (Lazaro 1989), which was referenced in Appendix C.

Response O-54

The radon modeling was discussed in Appendix F of the FS (and the results were also summarized in Chapters 6 and 7), and a detailed discussion of the modeling parameters was presented in a separate technical memorandum incorporated by reference and summarized in that appendix (see Response O-3). The same terrain assumption and sources of meteorological data were used for this model as were used for ISCST. The same radium concentrations were also assumed for the sources evaluated under both models (radon is generated from radium), and additional extensive source terms were developed for radon alone — which were discussed with you at the March 19, 1993, meeting and are provided in the following Table 3.2. Because the RI/FS-EIS documents are very long and of necessity address a variety of issues, not all of the stepwise calculations could be included for each topic. Rather, the methodology and basic elements of the calculations were discussed, and the results were presented and interpreted to support the evaluation of alternatives for site cleanup and to provide information useful to the subsequent design of the remedy following its selection. The DOE has regularly invited further detailed discussion of topics of interest to specific individuals and welcomes the opportunity to provide supporting analytical information.

Response O-55

The recent meteorological data from the site were not used because they do not meet the DOE or EPA guidelines for duration and representativeness. Appropriate (validated) meteorological data from the recently installed on-site station were not available when the detailed analyses for the RI/FS-EIS were performed. The most appropriate on-site data available were from the on-site meteorological station at which data were collected from 1983 to 1985. The evaluation of those data for representativeness was discussed at some length in Appendix C of the FS, and they were found to surpass the EPA standards for data representativeness. Validated on-site data were recently obtained for May 1992 through February 1993, and these

TABLE 3.2 Estimated Radon Releases for the Chemical Treatment Alternative, 1993-1999[a] (Response O-54)

Radon Release Source	Type of Release	Radon Release (Ci)						
		1993	1994	1995	1996	1997	1998	1999
Quarry soil at TSA	Steady	1.10	2.20	2.20	2.20	2.20	1.65	0.55
	Process	-	-	-	-	-	0.758	0.758
Raffinate pit sludge	Steady	1.58	3.16	2.77	1.98	1.19	0.395	-
	Process	-	-	3.87	3.87	3.87	3.87	-
Soil under raffinate pits	Steady	0.054	0.108	0.0945	0.0675	0.0405	0.0135	-
	Process	-	-	0.133	0.133	0.133	0.133	-
Soil/sediment at Ash Pond	Steady	9.70	19.4	19.4	19.4	19.4	19.4	9.70
	Process	-	-	-	-	-	-	0.0586
Soil at North Dump	Steady	0.743	-	-	-	-	-	-
	Process	0.0376	-	-	-	-	-	-
Soil at South Dump	Steady	4.74	9.48	9.48	9.48	4.74	-	-
	Process	-	-	-	-	0.121	-	-
Soil/sediment at Frog Pond	Steady	0.99	1.98	1.98	0.99	-	-	-
	Process	-	-	-	0.0232	-	-	-
Soil at raffinate pits	Steady	1.60	3.19	2.87	2.23	1.60	0.957	0.319
	Process	-	-	0.0262	0.0262	0.0262	0.0262	0.0262
Soil at chemical plant buildings	Steady	15.3	10.2	3.40	-	-	-	-
	Process	0.0148	0.0297	0.0297	-	-	-	-
Soil/sediment at Busch lakes	Steady	-	-	-	-	-	0.0066	-
	Process	-	-	-	-	-	-	-
Annual total		35.9	49.7	46.3	40.4	33.3	27.2	11.4

[a] "Steady" denotes continuous releases, and "process" denotes releases associated with disturbance during excavation and treatment activities. Concentrations were estimated from characterization data and the radionuclide source term analysis (provided in the RI) for each year of cleanup operations. Estimates for the vitrification alternatives are the same except for the process releases associated with treatment activities. The estimated releases from the chemical treatment activities total 17.5 Ci, whereas those for the vitrification treatment activities total 96 Ci (primarily from the stack).

data have been compared with those for 1985. Data collected from the on-site station before May 1992 are not appropriate to support an air quality assessment because of problems associated with instrument calibration and quality assurance (see Response O-15).

The wind direction and wind speed for the new data (which are available for 10 months, May 1992 through February 1993) were compared with the data from 1985 to further assess data representativeness. Because the data set for 1992 to 1993 is incomplete, the usefulness of certain comparisons is limited. The number of hours for which data are available for each season from 1992 through 1993 are 744, 2,206, 1,622, and 1924; the maximum possible numbers of records are 2,208, 2,208, 2,184, and 2,160 for spring, summer, fall, and winter, respectively. Spring of 1992 is notably incomplete and therefore inappropriate for comparison because most of the data are not available. Data for the remaining three seasons are compared in Figure 3.1 (see Response O-4). This comparison indicates that the general patterns and values for wind direction and wind speed are quite comparable.

Response O-56

The chemical plant area of the Weldon Spring site is situated on a topographic high in a wooded area, and no major obstructions are present near the site. As expected from these conditions, no channeling or shielding effects have been observed. Rather, the wind pattern at the site reflects regional phenomena, in which winds from the south and the northwest dominate in summer and winter, respectively. (Annual wind roses for the site area were presented in Figure C.3 of the FS, and the regional wind roses nearest the Weldon Spring site are shown here in Figure 3.2.) In contrast, the wind roses for the 10-m (30-ft) tower at the Labadie power plant — which is located on the flat floodplain along a bend of the Missouri River — do show a channeling effect, as would be expected.

Response O-57

As described in the referenced text, annual average particulate concentrations were in fact estimated for each year, as were the health impacts. The results of the health assessment presented in Appendix F are given as totals for the full 7-year cleanup period; e.g., the risk estimates represent a lifetime effect that is not smoothed or lowered by summing years individually or multiplying an average by the duration. Conservative assumptions were applied to estimate the health impacts, as discussed in Appendix F.

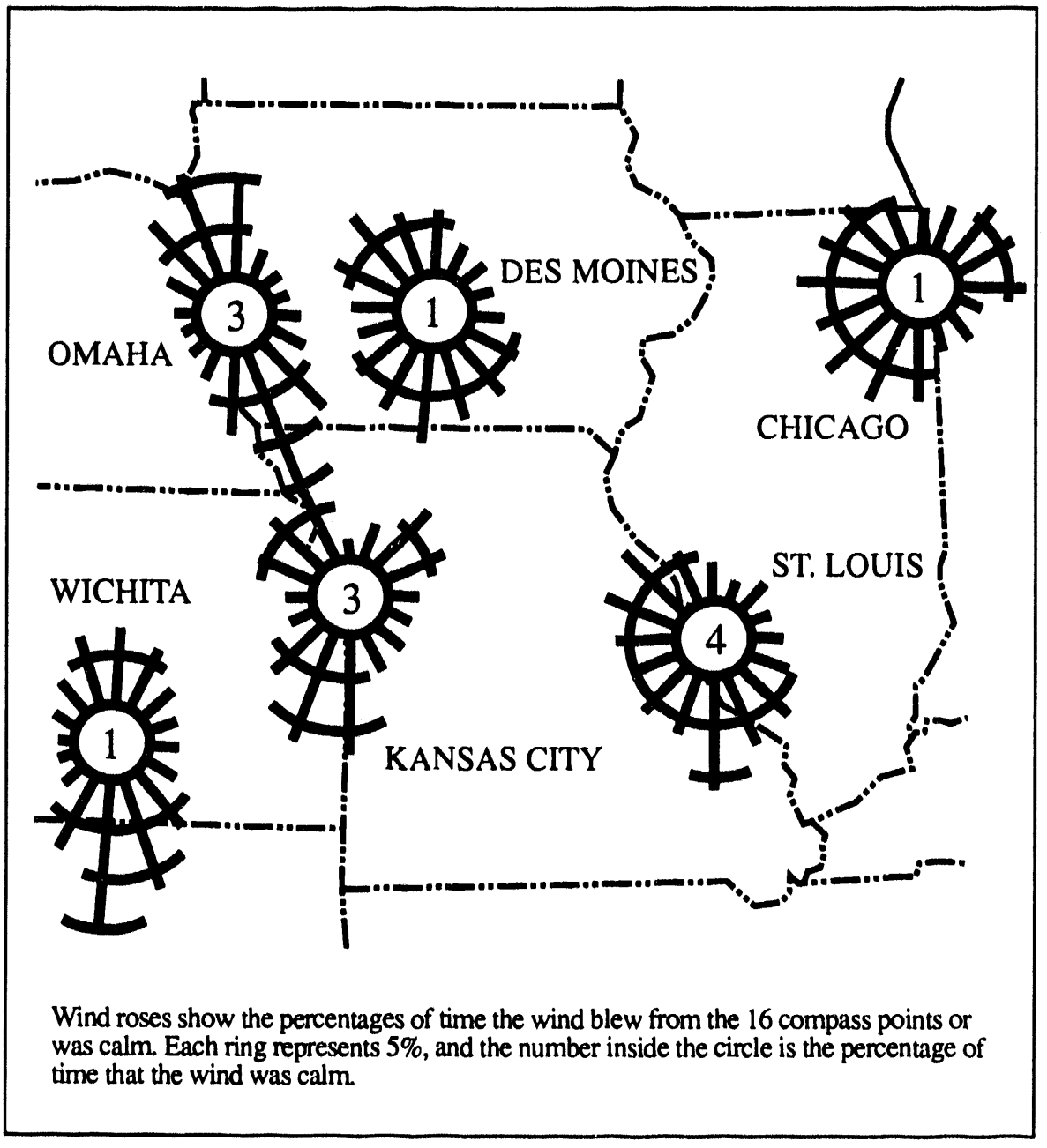

FIGURE 3.2 Annual Wind Roses for St. Louis and Nearby Cities (Response O-56) (Source: Modified from National Oceanic and Atmospheric Administration 1979)

[Letter continues on next page.]

O-57 (Cont.)

pages C-12 and C-13 that combines all years. Why weren't the health impacts of individual years computed as a conservative scenarios rather than the smoothed and lowered 7-year average??

O-58

COMMENT: It should be noted that the modeling does predict three 24-hour average exceedances for the EPA's PM-10 particulate standard (Table C.2 on Page C-14). Yet no comment is made that these modeling predictions indicate that more stringent sources controls would be called for or implemented!

O-59

COMMENT: On Page C-15 there is a statement that addresses control measures that could be applied including "... considering meteorological conditions such as wind speed and direction when scheduling certain activities." (There is a similar statement in the first paragraph of page C-25.) While this strategy sounds practical it should be noted that EPA evaluated such meteorology-based control strategies in the 1970s when they were called "Supplemental Control" and ruled them out since engineering controls were supposed to be primary!

O-60

COMMENT: On pages C-16 and C-17 is an example of simplistic engineering reasoning that indicates why limited impacts are found from these modeling efforts. In discussing the emissions from the vitrification stack the comment is made, but unsupported by the "controlled emission" data in Table 5.5 of the FS (FS page 5-35), that "no significant air quality impacts are expected from these emissions because the facility will be equipped with an extensive off-gas treatment system..." The modeling effort is supposed to examine various alternative operating scenarios and impacts, NOT DISMISS AN IMPACT DUE TO OPTIMISTIC DESIGN ASSUMPTIONS. This treatment of off-gas emissions is an example of the mis-handling of available data that minimizes the potential impacts of these operations. Hence I cannot be certain that proper conservative practices were actually followed in this modeling and evaluation effort.

O-61

QUESTION AC-4: What are the subtle assumption differences between the "janitor" receptor at FHHS and the "student" receptor that leads to a 10-20% difference (Table C-5 for example) in modeled predictions? And for radon, especially, what are the health implications of the radon exposure for the exposed population at FHHS, not just one individual??

Response O-58

The text that accompanies the referenced table does indeed indicate that more stringent controls would be applied (see the discussion on the facing page, C-15).

Response O-59

As discussed extensively in the FS, engineering controls are considered the primary means of minimizing releases during site cleanup. To provide additional control, DOE considers it wise to employ any other measures available that could further minimize the release and transport of airborne material during the cleanup period. For that reason, meteorological conditions such as wind speed and wind direction would be considered as indicated during the cleanup period, as a supplemental strategy to support the primary engineering controls. This intent would have been clear if the sentence had not been excerpted out of context. The sentence immediately follows a discussion of a primary dust control measure (water sprays) and begins with "Other control measures that could be applied . . . ." As noted in the comment, this strategy is also consistent with the EPA's approach.

Response O-60

Rather than assuming optimistic design features, the model in fact took no credit for many off-gas controls that would be incorporated into the system as part of detailed design if a vitrification facility were constructed on-site. Rather than simplistic reasoning, extensive modeling was conducted on the basis of conceptual design information for the off-gas treatment system, which was discussed at length in Chapter 5 of the FS. Further, the actual controls that would be incorporated into such a system — if vitrification were implemented at the site — would achieve lower emissions than those assumed for the modeling effort. The excerpted statement was fully supported by the emission data referenced from Chapter 5 in combination with the modeling effort for the transport and dispersion of those releases. The specific information that supports this statement was presented in considerable detail in Appendixes C and F of the FS.

Response O-61

The location evaluated for the janitor (resident) receptor is approximately 100 m (300 ft) farther from the site than the student receptor at the high school because the janitor resides in a trailer this distance east of the school. This additional distance accounts for the difference in modeled predictions for ground-level, nonbuoyant particulate sources. For radon, the potential risk to an individual student at the high school from site cleanup activities associated with the vitrification alternatives was estimated to be 5×10^{-8}. The estimate for the chemical treatment alternative was 3×10^{-8}. These estimates are well below the range of 1×10^{-6} to 1×10^{-4} targeted by the EPA for the incremental risk to an individual from an NPL site. To derive a risk estimate for a specific population, the risk estimated for an individual in that population is simply multiplied by the total number of individuals it contains. For the 1,600 high school students, this translates to an estimated population risk of 7×10^{-5} for the vitrification alternatives and 5×10^{-5} for the chemical treatment alternative. Similarly extrapolating EPA's target range to a population

O-62 Page C-22 continues the simplistic engineering assumptions by stating the vitrification "stack emission would be very low compared to fugitive dust releases." While gross quantities will indeed be lower, they will probably be from a source located nearer to offsite receptors and hence deserve some modeling to evaluate impact.

O-63 Page C-24 contains further simplistic engineering reasoning (second paragraph in C.1.3.2) when discussing fugitive emissions from stockpiles and the need to model them. "Wind speeds measured at the site indicate that winds are probably not strong enough to cause erosion." ... the fugitive dust releases on potential off-site receptors is expected to be minor because wind speeds high enough to generate wind erosion would also mix the airborne particulates in a large air mass and thus would dilute the emissions, thereby offsetting the potential for impact from other possible on-site sources of fugitive dust."

COMMENT: If the above statement were true, there would be no fugitive dust problem anywhere! It is the quantity of fugitive dust that must also be considered. AND REMEMBER the old 1970s axiom "dilution is not the solution to pollution."

O-64 Somehow an evaluation of the Salem, Illinois mixing height information has led to the statement on page C-37 in Section C.2.5 that "the lowest seasonal mixing heights are 1500 ft. for a fall morning and 2600 ft. for a winter afternoon." These are important considerations for predicting concentrations and seems far too high.

QUESTION AC-5a: Please describe exactly how these mixing heights were determined.

O-65 QUESTION AC-5b: Were the extensive rural and urban mixing heights from the multi-year EPA Regional Air Pollution Study (RAPS) from the mid-1970s obtained to see what was actually measured seasonally compared to Salem predictions? If not, why not do it now and refine the models to reflect local experience?

APPENDIX F: POTENTIAL HEALTH EFFECT OF REMEDIAL ACTION

O-66 By this point it might be simplest to state that I feel that the only credible health assessment would be those made after incorporating the many suggestions made above. However, I will

of 1,600 for comparison, the target range for this population would be 2×10^{-3} to 2×10^{-1}. Again, the potential collective risk would be well below the target range. Further, the potential incremental risk to an individual student or population at the high school from site activities would be immeasurably low compared with the natural background risk associated with radon, which is estimated to be about 8×10^{-3} for an individual or 13 for a population of 1,600.

Response O-62

Simplistic engineering assumptions were not used in the FS; rather, emissions from the vitrification stack were indeed modeled to evaluate potential impacts, and the model results provided the basis for the statement that was interpreted incorrectly in the comment. Further, the source of these emissions would not be located nearer to the off-site receptors than would the more significant contributors to off-site releases (as acknowledged in the comment), i.e., the mechanical disturbance activities such as excavation and grading. By intent and as indicated in the FS, the treatment facility would be located as far as possible from the nearby public receptors of concern, such as students at the high school.

Response O-63

Fugitive dust is typically generated by either or both of two separate mechanisms. The first is mechanical disturbance, e.g., by heavy equipment during excavation and scraping or by vehicle travel on unpaved road surfaces. This is expected to be the primary dust-generating mechanism at the site during the cleanup period. The second is wind erosion at the disturbed area, such as a stockpile. Except for sandy soil (which is not predominant at the site), soil material will generally form a crust after being wetted, and this serves as a deterrent to wind erosion. As explained in the text from which the excerpt was extracted, wind speeds at the site are relatively slow compared with those at neighboring weather stations, indicating a very low likelihood of dust generation due to wind erosion alone. Further, as presented in the text, it is a statement of physical fact that wind speeds high enough to generate dust emissions also dilute those emissions. This is caused by the large volume of air offsetting the potential for particulate accumulation. No correlation exists between this normal condition of nature and the axiom stated in the comment; moreover, that axiom bears no relationship to the careful manner in which the Weldon Spring project is being conducted.

Response O-64

Twice-daily mixing height data (measured hourly) for Salem were obtained from the National Climatic Data Center in Asheville, North Carolina. The seasonal and annual mixing height data shown in Figure C.8 of the FS were presented to indicate average mixing height patterns in the region. As explained in the accompanying text, these data were not directly employed in the analysis; rather, mixing heights used in the assessment were estimated from these data. This is the standard approach and is necessary to account for the different reporting bases (e.g., hourly versus twice daily). The National Climatic Data Center collects upper-air temperature data and processes them using the method described in a separate report by Holzworth (1972). In that report, mixing heights were calculated and mixing height isopleths were plotted twice for each day of a five-year record (1960 through 1964) of upper-air

observations at 62 National Weather Service stations in the contiguous United States. For the analyses presented in the FS, hourly meteorological data were input to the ISCST and CALINE3 models (discussed in Section C.1.1 of the FS), and mixing heights were interpolated by the Holzworth approach. A comparison of the mixing heights used in the site-specific assessment with those listed in the Holzworth report indicates that the patterns and values of the two data sets are quite similar (Figure 3.3).

Response O-65

Per this request, the mixing height data from Salem used for the air quality assessment in the FS were compared with the mixing height data for Eureka, Missouri. Eureka is 16 km (10 mi) south-southwest of the Weldon Spring site, and data were collected for that location from 1975 through 1977 as part of the EPA's Regional Air Pollution Study. The Salem and Eureka data sets cannot be directly compared because the upper air sounding data for these two locations were collected at different times. That is, the Eureka data were collected at seasonally staged times between 4:00 and 6:00 a.m. Central Standard Time, whereas the Salem data were collected at a fixed time, 1200 Greenwich Mean Time (as were the Holzworth data); this fixed time corresponds to 6 a.m. Central Standard Time. (It is important to note that mixing height is low in the early morning and increases during the day, and most cleanup activities at the Weldon Spring site would be conducted after the mixing height had grown considerably, as explained in the FS discussion toward which this comment was directed.) Further, the methods applied to estimate mixing heights from these data differ (whereas the Salem and Holzworth mixing heights were directly comparable). Nevertheless, an effort was made to normalize the data for comparison, and the results are presented in Figure 3.3 (see Response O-64).

As shown in Figure 3.3, the seasonal average mixing heights for Eureka are generally lower in the morning and higher in the afternoon than those for Salem; the general mixing height patterns are similar for both data sets, and the average difference combined across seasons indicates that the mixing height measured at Eureka is slightly higher than at Salem. Thus, the comparison demonstrates that the annual mixing height data for Salem are slightly more conservative than those for Eureka and confirms that these data are more appropriate for the analyses in the FS.

The annual and 24-hour average particulate concentrations estimated from the Salem data and presented in the FS were also reevaluated with the Eureka data. The Eureka mixing height data are not as complete as the Salem data because they were collected much less frequently (the Salem data were collected hourly). To compare the more general Eureka data with the Salem data, the latter had to be modified to provide a common (more general) basis for comparison. Thus, seasonal average mixing heights were estimated for the Salem data, and the twice daily mixing height data for Salem (measured hourly) were then proportioned by ratios of the seasonal average mixing heights for Salem and Eureka. Hourly mixing height data were then interpolated for Eureka using an EPA preprocessor program (RAMMET).

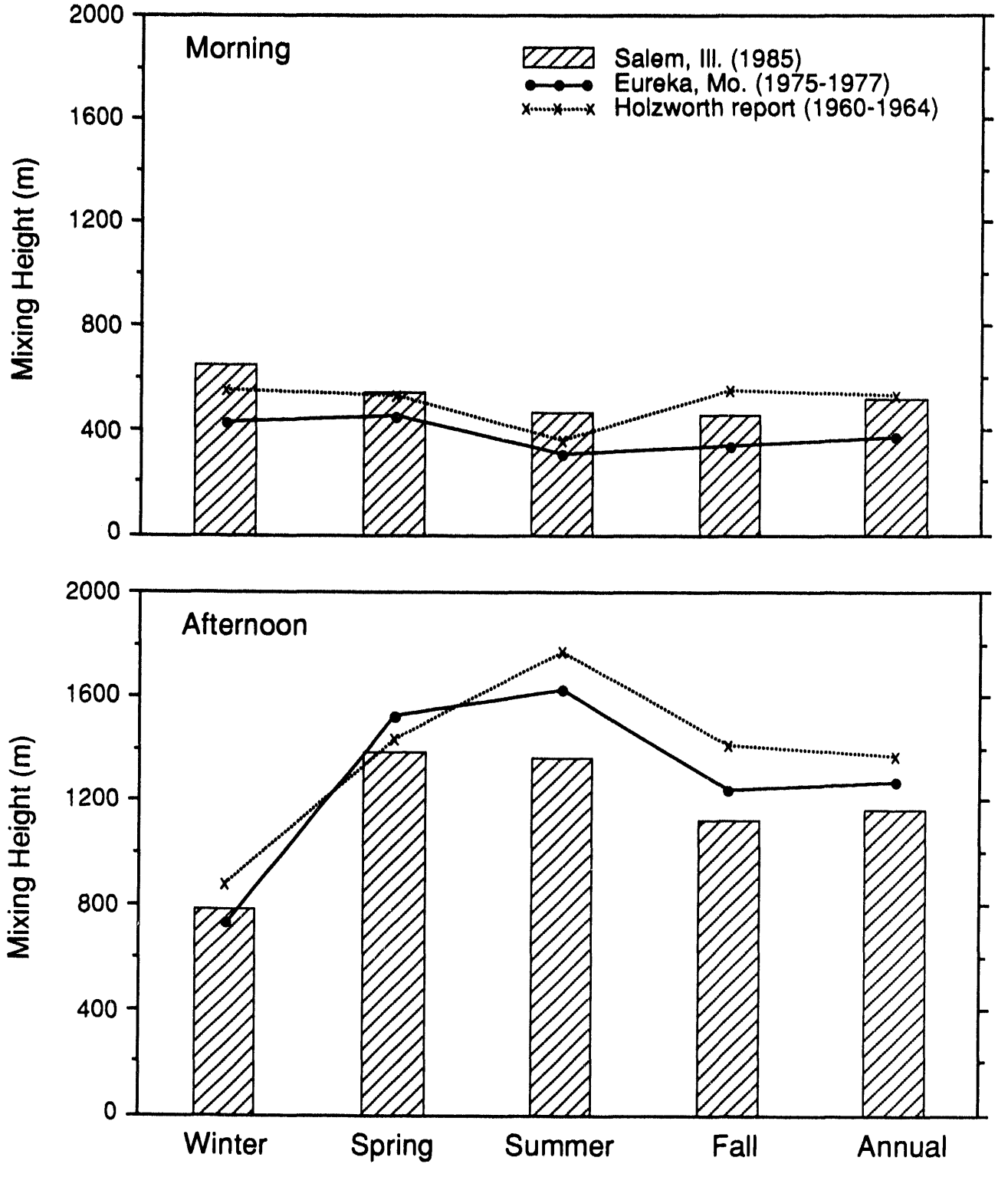

FIGURE 3.3 Comparison of Mixing Height Data from Three Sources (Response O-64)

The results of this data-adjusted comparison indicate that the Eureka data yield particulate concentrations that are essentially the same as those presented in the FS. For example, the average difference in the annual average and 24-hour particulate concentrations estimated for Francis Howell High School was less than 1% for both the chemical treatment (preferred) alternative and the vitrification alternatives. Similarly, the increased mixing height associated with the Eureka data has virtually no effect on the radon risk estimates for receptors close to the site. Even for distant potential receptors (i.e., residents located 64 km [40 mi] from the site), the risks would be less than 2% lower than those presented in the FS (i.e., the FS estimates are slightly more conservative). These results are to be expected because mixing height is considered a relatively insignificant factor in air dispersion for receptors relatively close to a source. Mixing height can come into play to some extent for atmospheric dispersion and transport to distant receptors because of successive reflections between the top of the mixing height and the earth's surface. However, mixing height is not generally a factor near a source, and maximum particulate concentrations are generally found near the emission sources characterized by ground-level or near ground-level, nonbuoyant particulate releases, which describe the releases that would be associated with cleanup activities at the Weldon Spring site.

In summary, the mixing heights obtained for Eureka, Missouri, from the EPA Regional Air Pollution Study were compared with those estimated from the Salem data, and the results of the air modeling using these two data sets were also compared. The results confirmed the appropriateness of the assessment presented in the FS.

Response O-66

The comments provided on the air quality assessment have been reviewed and addressed as indicated in the previous responses. The potential air quality impacts from implementing the various cleanup alternatives for the Weldon Spring site were thoroughly assessed because the results are important to the forthcoming design of this remedial action. The intent of this assessment was to identify the key activities that could contribute to potential impacts such that engineering measures could be specified for those activities to ensure that all releases would be maintained at protective levels. The results of the assessment support DOE's commitment to conduct the cleanup in a manner that would result in no measurable impact from site contaminants at the high school, and these results will be applied during the engineering design phase of this remedial action.

The assessment presented in the RI/FS-EIS went well beyond what is typically done for similar sites; its uniqueness derives from its incorporation of extensive, site-specific information in addition to meteorological data, such as for the location, type, and sequence of activities and the concentrations of contaminants in the media that would be disturbed by each. The approach developed specifically for the site, the standard EPA models that were applied, and the results of the analyses underwent extensive peer review before the RI/FS-FIS was issued to the public. Finally, all additional analyses that have been conducted in response to these comments have fully confirmed the assessment presented in the RI/FS-EIS.

[Letter continues on next page.]

O-66 (Cont.) try to briefly address selected areas in this Appendix so that they are not forgotten.

O-67 The Health Risk evaluation in F6 is still based on the assumptions of little to no releases due to the claim that the "emissions would be treated before release" (see FS.5.3.2 above).

O-68 On page F-19, there is the mild statement that the "annual risk risk of about $2x10^{-4}$/year for cancer induction or about $1x10^{-3}$ over the 7-year cleanup period." Considering that most communities and concerns for regulating air toxics aim at $1x10^{-6}$ risk, these levels are quite high AND they were obtained with, what I consider to be flawed assumptions and flawed meteorological data.

O-69 I appreciate the opportunity to provide comments and hope they will lead to a positive reevaluation of the way air quality issues were handled throughout these assessments.

Very truly yours,

William M. Vaughan, PhD

cc: George Farner (SCCAHW)

BV06:WSSRAP01.LTR

Response O-67

The health risk evaluation summarized in Section F.6 was the result of a thorough assessment of the various releases that could occur during site cleanup, the means by which off-site individuals could be impacted by such releases, and the health effects that could occur as a result of those exposures. Conceptual engineering information was used for this assessment, including representative estimates of airborne releases that could occur from treatment systems such as the vitrification facility. Actual emissions would be expected to be lower because the conservative assumptions used for the analysis did not take credit for certain controls that would be part of the constructed system. Standard engineering measures would be used to reduce such releases to very low levels, as discussed in the FS. (See also Response O-45.)

Response O-68

This comment does not correctly represent the sentence from which it was excerpted. The sentence in the FS describes radiological risks associated with background radiation, not those associated with releases from site cleanup activities. As explained in the preceding sentence, the incremental risks to all members of the general public as a result of site cleanup activities would be less than 1×10^{-6} for all four of the final action alternatives. Thus, they would also be below the level identified in this comment for regulating airborne toxic chemicals. (See also response to General Issue 8.)

Response O-69

The DOE appreciates your interest in this project. Additional meteorological data were evaluated to respond to these comments, and the results confirm the appropriateness of the assessment presented in the RI/FS-EIS. That is, the FS presents an accurate, somewhat conservative analysis of the potential impacts to air quality that could result from site cleanup activities. (See Response O-65.)

Letter P

P-1 There is absolutely no way to "clean up" radioactive waste. Ask the experts why it wasn't done 45 years ago instead of tearing in the plant and dumping tons in the quarry!

P-2 Ask them what is meant by "half life" of radioactive material. Some take hundreds-thousands of years to become ½ as radioactive!

P-3 How many future generations of our children will be effected?

Ask questions - don't always accept the answers!

Response P-1

Radioactive waste can be cleaned up and contained in a safe manner by applying established procedures and practices. Because protection of the environment was not an overriding concern in this country many years ago, waste management was often not given high priority, and control technologies were often not applied. As a result of these past practices (such as disposing of waste in the Weldon Spring quarry), the federal government is currently spending a great deal of money to clean up thousands of contaminated sites across the country. Today's greater understanding of environmental consequences of uncontrolled disposal, the availability of technologies to control releases, and the greater emphasis on proper waste management procedures should ensure that there will be no need to revisit these sites to perform additional remedial actions in the future.

Response P-2

The half-life of a radionuclide is the amount of time it takes for one-half of the initial amount present to undergo radioactive decay. The half-lives of the naturally occurring radioactive materials at the Weldon Spring site are indeed very long. For this reason, the need for long-term management of these materials was an important consideration in the conceptual design of the disposal facility.

Response P-3

The children in the vicinity of the Weldon Spring site are not being negatively impacted. The extensive monitoring system at the site provides information on environmental concentrations of contaminants, and this information indicates that no member of the public is being impacted by site releases. For example, perimeter air monitors at the chemical plant area indicate that radon and radioactive particulates are at background levels. However, known hazards exist within the site under current conditions, and if a child were to repeatedly climb over the site fence and trespass in the buildings or at the raffinate pits, it is possible that these repeated exposures could result in an adverse health effect. To minimize this possibility, the site is fenced, warning signs are posted in contaminated areas within the site, and security guards are present at all times. To further limit the likelihood that any individual could be exposed to hazards at the site, DOE is cleaning up the site in a safe, expeditious manner.

3.2 COMMENTS SUBMITTED AT THE PUBLIC MEETING

This section presents copies of the comments submitted to DOE at the public meeting on December 16, 1992, at the Columns Banquet and Conference Center in St. Charles, Missouri. These comments were written on cards distributed by DOE at the meeting. The cards were numbered (in a box labeled "For official use") before being handed out to interested members of the public. The purpose of the numbers was to assist in tracking the receipt of comments. Because many cards were not returned with comments, the comment cards reproduced in this document are not numbered consecutively. Oral responses to these comments are provided in the meeting transcript, which is part of the administrative record for this action. A short handout was passed out by trade unionist community activists at the public meeting; a copy of this handout follows the comment cards. Follow-up responses to labor issues unrelated to the RI/FS-EIS are provided in a separate document (MK-Ferguson Company and Jacobs Engineering Group 1993).

WELCOME TO THE
WELDON SPRING SITE REMEDIAL ACTION PROJECT
PUBLIC HEARING

THERE ARE TWO WAYS TO PARTICIPATE IN THE DISCUSSION THIS EVENING

(Please check the appropriate box if you wish to participate this evening.)

☐ Make a comment or ask a question during the question and answer forum tonight.

Or...

☑ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

Will Uranium be shipped to this disposal facility from any other sites

Please provide the following information so the record can be accurate.

Name:

Address:

Representing:

5
For official use

You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

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PUBLIC HEARING

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Or...

☑ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

I have been told we don't have the trained people to do the work. Who trains the workers? Why don't we have local contractors and workers doing some of the major work?

Please provide the following information so the record can be accurate.

Name: JOHN FEMMER

Address: 3449 HOLLENBERG BRIDGETON MO 63044

Representing: OPERATING ENGINEERS LOCAL 513

1
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Or...

☒ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

Comment - The documents at the library seem to minimize the closeness of the high school and the fact that most of the people in this county live closer to the site, than St. Charles city. (See Back)

Please provide the following information so the record can be accurate.

Name: John Jacobs

Address: 45 Cimmarron Dr.
St. Charles MO 63304

Representing: My Children.

8
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You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

Question - Please explain in detail what safe guards are to be in place to protect the high school children?

Question - Will this site become a magnet for waste from other areas of the midwest, especially if the incinerator is built?

WELCOME TO THE
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☐ Make a comment or ask a question during the question and answer forum tonight.

Or...

☒ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

Need Training & Jobs in Area

Please provide the following information so the record can be accurate.

Name: Ray Bruck

Address: 137 Misty View

Representing: Labor 660

 # 12
For official use

You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

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PUBLIC HEARING

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(Please check the appropriate box if you wish to participate this evening.)

☐ Make a comment or ask a question during the question and answer forum tonight.

Or...

☑ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.) I HAVE TAKEN THE 80 HOUR COURSE FOR HAZARDOUS WASTE AND THE 40 HOUR CLASS FOR ASBESTOS. I AM A UNION LABORER FROM 660 AND I WOULD LIKE TO KNOW WHY I CANNOT GO TO WORK AT THE WELDON SPRINGS SITE.

Please provide the following information so the record can be accurate.

Name: KEN RUFKAHR

Address: 601 S. 4th

Representing: LABORERS LOCAL 660

 # 13
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You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

WELCOME TO THE
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PUBLIC HEARING

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Or...

☑ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

I live in the area. Have the Training so I want to know why I don't have a chance to work there

Please provide the following information so the record can be accurate.

Name: Labor Local 660

Address: 601 S. 4th St. Charles MO. 63301

Representing:

14
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You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

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Or...

☑ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

Are the people doing hazardous waste clean up fully qualified.

Please provide the following information so the record can be accurate.

Name: John HAYS

Address: 3225 Highgate St. Charles

Representing: Laborers Local 660

15
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You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

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Or...

☒ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

I've Been A Resident of st. charles all my life. I work out of Local 660 in st. Charles. I have Been Trained in this field For 5yrs and Cannot Get on the site. I would like to Know why.

Please provide the following information so the record can be accurate.

Name: LaBor's Local 660

Address: st. Charles

Representing:

16
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You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

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(Please check the appropriate box if you wish to participate this evening.)

☐ Make a comment or ask a question during the question and answer forum tonight.

Or...

☑ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

I Have the proper training to work on the Site. I want to know why I cant work! why train people on the job while we have Local trained people!

Please provide the following information so the record can be accurate.

Name: Labor LOCAL 660

Address: ~~601~~ S 4TH ST. CHARLES MO

Representing:

18
For official use

You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

WELCOME TO THE
WELDON SPRING SITE REMEDIAL ACTION PROJECT
PUBLIC HEARING

THERE ARE TWO WAYS TO PARTICIPATE IN THE DISCUSSION THIS EVENING

(Please check the appropriate box if you wish to participate this evening.)

☐ Make a comment or ask a question during the question and answer forum tonight.

Or...

☒ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

We Have people trained to do the Job. Why are they hiring people off the street to try and do the Job

Please provide the following information so the record can be accurate.

Name: B.J. Lewis

Address: ~~2324 Fair~~ 601 S. 4TH

Representing: Labore Local 660.

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☒ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

I HAVE THE PROPER TRAINING TO work ON SITE I WANT TO KNOW WHY I CANT WORK THE JOB WHILE WE HAVE LOCAL TRAINED PEOPLE

Please provide the following information so the record can be accurate.

Name: LABOR LOCAL 660

Address: 601 South 4th

Representing: ST Charles MO.

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☐ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

I've went thru considerable time and expense to aquire certifications to work on this site. And would like to know why local qualified persons were not given a chance to work.

Please provide the following information so the record can be accurate.

Name: Chris Bruck

Address: 38 Oakridge West

Representing: Laborers Local 660

21
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Or...

☐ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

How safe is the removal of your asbestos contracton (ecologic)

Please provide the following information so the record can be accurate.

Name: J.M Norwood

Address: 601 4th St

Representing: 660

22
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You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

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☐ Make a comment or ask a question during the question and answer forum tonight.

Or...

☒ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

I am a Qualified union construction laborer Certified in 80 Hrs. of Hazardous waste removal and clean up procedures Yet along with several others I am now been hired at Weldon Spring, I want to know why

Please provide the following information so the record can be accurate.

Name: Scott Wright

Address: 11 Amber Ct.

Representing: LABORERS' LOCAL 660

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☑ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

Why is the work being done with untrain people on this job. Or people being train on the job what laws are there.

Please provide the following information so the record can be accurate.

Name:

Address:

Representing:

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You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

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[X] Make a comment or ask a question during the question and answer forum tonight.

Or...

[ ] Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

I Care about this ~~issue~~. But, I don't understand why I'm not able to work at this Site because I have the training to work at this site, Laborers Local 660 St Charles addr: 601 South 4th St Chas Mo

Please provide the following information so the record can be accurate.

Name: Julia Jarvis

Address: 3820 Wisconsin

Representing: Laborers Local 660

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Or...

[✓] Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

Could you please tell us how the students at the high school could be affected by your work? What are the risks?

Please provide the following information so the record can be accurate.

Name: Joan Rigby

Address: 427 Country Ridge Dr.

Representing: citizen

29
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Or...

☒ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

(1) CAN YOU ELABORATE ON MONITORING PROCEDURES AFTER THE CELL IS BUILT (MEANING AFTER THE 100 YRS) ...

(2) CAN YOU EXPLAIN WHY THE RISK FOR GENERAL PUBLIC (3×10^{-5}) WITHIN 5 KM OF THE SITE IS HIGHER THAN THE RISK FOR REMEDIAL ...

Please provide the following information so the record can be accurate.

Name: C. RAO AYYAGARI, PH.D

Address: LINDENWOOD COLLEGE, ST. CHARLES, MO

Representing:

For official use

You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

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☐ Make a comment or ask a question during the question and answer forum tonight.

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☐ Submit a written comment or question that will be read aloud by the panel and responded to tonight. (Use the space provided below, and the back if needed.)

Will this site become a magnet for waste from other areas of the Midwest, specially if the incinerator is built?

Please provide the following information so the record can be accurate.

Name:

Address:

Representing:

For official use

You may also submit written comments by January 20, 1993. Send to Community Relations: WSSRAP, 7295 Highway 94 South, St. Charles, MO 63304

TRADE UNIONIST COMMUNITY ACTIVISTS DEMAND ANSWERS

REGARDING WELDON SPRINGS RADIOACTIVE WASTE CONTROVERSY

Since World War II, the Weldon Spring site has been a repository for thousands of tons of radioactive waste. The United States Department of Energy has already spent almost $180 million to clean up the site. Estimates run as high as $678 million to complete the work. **But who is doing the work? Is it being done properly? And is the community at risk?**

"There are just too many questions that have not been answered--and it is more than just our right to know. Our lives and our livelihood may very well depend on it," stated Roger Pryor, Business Manager of Laborers' International Union of North America Local 660. Members of Pryor's union have been specially trained to do hazardous waste remediation--but have not been hired by the site's contractor, the M.K. Ferguson Company. Meanwhile, the U.S. government is paying an additional premium to train unskilled workers on the site.

Among the questions that will be asked of Stephen H. McCracken and Jerry Van Fossen of the Department of Energy, and Robert Morby of the Environmental Protection Agency, at tonight's meeting (which will be held at the Columns at 7:00 p.m.) include:

- Are the people (imported from other states) presently doing the remediation properly trained to do this work?

- Why aren't workers from the local community (like the trained members of Laborers' Local Union 660) given the opportunity to do the remediation? Why aren't local contractors being utilized?

- Are the children attending the Senior High School near the plant in danger? What about the community at large?

- Since the Department of Energy is policing itself at the site, isn't it foolish to assume that health and safety regulations are being aggressively monitored and corrected?

- Are the most competent people training the workers employed to do the remediation? How do we know?

The Weldon Spring site comprises 229 acres located 30 miles west of St. Louis. In the 1950s and 1960s the Atomic Energy Commission used Weldon Spring for the processing of uranium and thorium. The site is currently on the EPA National Priorities List.

CONTACT: James Norwood, Jr.
314/965-1881

Roger Pryor
314/946-8766

3.3 COMMENT LETTERS FROM THE FISH AND WILDLIFE SERVICE

This section presents copies of letters received from three FWS field offices regarding the biological assessment for this remedial action (Appendix I of the FS). These letters are designated as FWS1, FWS2, and FWS3 and are accompanied by individual responses, as described for the comment letters on the RI/FS-EIS (Section 3.1).

Letter FWS1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
UTAH STATE OFFICE
2078 ADMINISTRATION BUILDING
1745 WEST 1700 SOUTH
SALT LAKE CITY, UTAH 84104-5110

In Reply Refer To

(FWE)

December 31, 1992

Jerry S. Van Fossen
Weldon Spring Site
Remedial Action Project
Department of Energy
7295 Highway 94 South
St. Charles, Missouri 63304

Dear Mr. Van Fossen:

This is in response to your letter of December 2, 1992 concerning the biological assessment for the remedial action at the Weldon Spring Chemical Plant Area, St. Charles County, Missouri. This site was contaminated by explosives production, and uranium and thorium processing. Alternatives include off-site disposal of the wastes at a commercial facility near Clive, Tooele, Utah. The bald eagle (*Haliaeetus leucocephalus*) and the peregrine falcon (*Falco peregrinus*) were identified as occurring in the area.

FWS1-1 The biological assessment concluded that no adverse impacts to Federally listed species would be expected from any of the proposed alternatives. The U.S. Fish and Wildlife Service concurs with this assessment for the Clive site.

Sincerely,

Robert Berton

for Robert D. Williams
State Supervisor

Response FWS1-1

The DOE notes the concurrence with the biological assessment by the Utah State Office of the U.S. Department of the Interior, Fish and Wildlife Service.

Letter FWS2

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Columbia Field Office
608 East Cherry Street
Columbia, Missouri 65201

IN REPLY REFER TO:

FWS/AES-CMFO

JAN 1 1 1993

Mr. Stephen H. McCracken
U.S. Department of Energy
Weldon Spring Site Remedial Action Project Office
7295 Highway 94 South
St. Charles, MO 63304

ATTN: RI/FS-EIS Comments

Dear Mr. McCracken:

This is in response to your request for review of the draft RI/FS-EIS concerning the biological assessment for the remedial action at the Weldon Spring Chemical Plant Area, St. Charles County, Missouri. Various contaminants, including uranium and thorium, are present at this site.

FWS2-1 The biological assessment concluded that no adverse impacts to federally-listed species would be expected from the preferred alternative or from the contingency alternative. The U.S. Fish and Wildlife Service concurs with this determination for the Weldon Spring site in Missouri.

Should you have questions or require additional information, please contact Mr. Tom Nash at the address above, or by telephone at (314) 876-1911.

Sincerely,

Jerry J. Brabander
Field Supervisor

cc: MDC; Jefferson City, MO (Attn: Dan Dickneite)
MDC; Jefferson City, MO (Attn: Dennis Figg)
MDNR; Jefferson City, MO (Attn: Nick DePasquale)
EPA; Kansas City, KS (Attn: Kathy Mulder)

TJN:tn:1190/STWELCHA

Response FWS2-1

The DOE notes the concurrence with the biological assessment by the Columbia Field Office of the U.S. Department of the Interior, Fish and Wildlife Service.

Letter FWS3

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3704 Griffin Lane SE, Suite 102
Olympia, Washington 98501-2192
(206) 753-9440 FAX: (206) 753-9008

March 16, 1993

Jerry S. Van Fossen
Deputy Project Manager
Department of Energy
Weldon Spring Site
7295 Highway 94 South
St. Charles, Missouri 63304

FWS Reference: 1-3-93-I-312

Dear Mr. Van Fossen:

This is in response to your letter dated December 7, 1992, transmitting the biological assessment concerning clean-up activities at the Weldon Spring Chemical Plant in St. Charles County, Missouri. The assessment discusses alternatives regarding contaminated waste disposal and construction of a combination disposal cell at the Hanford Works facility near Richland, Washington, and at the Envirocare facility near Clive, Utah. The following is a response prepared only for the alternative connected with the Department of Energy (DOE), Hanford facility, in Washington.

FWS3-1

The U.S. Fish and Wildlife Service does not concur that the proposed activity will have "no effect" to bald eagles and peregrine falcons. The assessment states that because of human activity associated with cell construction, maintenance, and other activities, the likelihood of bald eagles foraging in the project area would be limited. The assessment further states that peregrine falcons would be expected to avoid the disposal sell area because of the same reasons. The statements appear to indicate bald eagles and peregrine falcons "may be adversely affected" as a result of the project since these species would avoid the area as a result of project activities. Activities related to disposal cell construction, operation and maintenance, including waste material delivery, transport, and unloading, and their effect on these species should be discussed at length and described in more detail.

FWS3-2

A "not likely to adversely affect" determination by the DOE could be deemed in compliance with section 7(a)(2) of the Endangered Species Act (Act) of 1973, as amended, if information could be provided to the Service indicating the activities are found to have discountable or insignificant effects upon listed species. However, that determination would require Service concurrence. If a "not likely to adversely affect" determination cannot be made during informal

Response FWS3-1

Comment noted. As stated in the biological assessment (Appendix I of the FS), bald eagles are known to forage and roost along the Columbia River, approximately 8 km (5 mi) from the 200-West Area. As also discussed in the FS, this distance far exceeds that documented to evoke departure by eagles. In addition, no suitable foraging or roosting habitats occur in the 200-West Area; therefore, bald eagles are not expected to occur in that area and no adverse impacts would be anticipated. If an eagle were to venture into this area, it would likely be distracted by human activities ongoing at that location, which have no relation to the action evaluated in the RI/FS-EIS. That is, a number of environmental restoration and waste management activities are being conducted by the DOE Hanford Field Office at the 200-West Area, and these activities are expected to continue for several years.

The peregrine falcon is a transient migrant to the Hanford site and, like the bald eagle, would be associated with the Columbia River rather than the 200-West Area. As discussed in the biological assessment, the falcon is not known to occur in that part of Washington during the summer so no impacts would be expected from summer construction activities. Thus, if such activities were conducted at the Hanford site to provide a disposal cell for the Weldon Spring waste, no adverse impacts would be expected to the peregrine falcon. The intent of the analyses presented in the RI/FS-EIS was to provide a comparative evaluation of disposal alternatives for waste from the Weldon Spring site, and this evaluation was of necessity based on conceptual information. A detailed description of waste material delivery, transport, and unloading and the potential effects on the indicated species would be provided as part of follow-on detailed engineering activities if the alternative selected for the Weldon Spring site included waste disposal at the Hanford site. However, DOE's preferred alternative, as stated in the RI/FS-EIS, is on-site treatment and disposal of the Weldon Spring waste.

Response FWS3-2

Comment noted. If the 200-West Area were selected as the disposal location for waste from the Weldon Spring site, additional information would be provided to the Fish and Wildlife Service regarding potential impacts to listed species in the area of the Hanford facility. The DOE would also initiate informal consultation with the Service in accordance with Section 7(a) of the Endangered Species Act, as amended, as described by the implementing regulations in 50 CFR 402.13. However, DOE's preferred alternative — as stated in the RI/FS-EIS — is on-site treatment and disposal of the Weldon Spring waste.

FWS3-2 (Cont.) consultation, then formal consultation is required for those actions that "may affect" listed species.

FWS3-3 During your reanalysis of effects upon listed species the Service recommends that measures be taken to minimize impacts to federal candidate species. In particular, the western sage grouse *(Centrocercus upophasianus phaios)*, ferruginous hawk (*Buteo regalis*), and the loggerhead shrike (*Lanius ludovicianus*) are of concern. Candidate species are included simply as advance notice to federal agencies of species which may be proposed and listed in the future. Protection provided to candidate species now may preclude possible listing in the future.

Your interest in endangered species is appreciated. If this office can be of further assistance or if you have questions concerning your responsibilities under the Act, please contact Jeff Haas or Jim Michaels of my staff at the letterhead phone/address.

Sincerely,

David C. Frederick
State Supervisor

c: WDW, Olympia (Nongame)
WDW, Yakima (Fitzner)
WNHP, Olympia

Response FWS3-3

During the implementation of remedial action activities for the Weldon Spring site, measures would be taken to minimize impacts to listed and candidate species. As indicated in the comment, candidate species are not accorded protection under the Endangered Species Act, as amended. Nevertheless, the biological assessment component of the RI/FS-EIS did evaluate potential impacts to each candidate species noted in the comment — i.e., the western sage grouse, ferruginous hawk, and loggerhead shrike. As discussed in the FS (Appendix I), no potential for adverse impacts was identified for the western sage grouse. If the 200-West Area were selected as the disposal location for waste from the Weldon Spring site, surveys would be conducted to determine the status of the ferruginous hawk and loggerhead shrike in that area. Appropriate mitigative measures would be developed to minimize potential impacts to these species if such surveys indicated that they were present in the general area intended for waste disposal. However, DOE's preferred alternative — as stated in the RI/FS-EIS — is on-site treatment and disposal of the Weldon Spring waste.

4 FLOODPLAIN STATEMENT OF FINDINGS FOR THE RI/FS-EIS

4.1 PROJECT DESCRIPTION

The purpose of the proposed cleanup action at the chemical plant area of the Weldon Spring site and the alternatives evaluated for that action are described in considerable detail in the FS component of the RI/FS-EIS. The site location is shown in Figure 4.1. Cleanup of the chemical plant area is expected to involve the excavation of approximately 519,000 m^3 (679,000 yd^3) of contaminated sludge, sediment, and soil from a number of contaminated locations. To determine whether remediation activities could impact floodplains, Flood Insurance Rate Maps were reviewed to identify floodplains at all locations that could be affected by the remedial action (as discussed in Appendix H of the FS). From this review, it was determined that one of the contaminated areas targeted for excavation is in the 100-year floodplain of a creek that flows northwest of the site (see Figure 4.1). (No 100-year floodplains occur in other areas that would be impacted by additional remedial action activities, including construction of a disposal cell either on-site or at the alternative locations.) Potential impacts to this floodplain and the mitigative measures that would be implemented to limit such impacts are discussed in the floodplain assessment in Appendix H of the FS and summarized in the following sections. All cleanup activities at the Weldon Spring site are being conducted in compliance with Executive Order 11988, Floodplain Management. To the extent possible, DOE would avoid or minimize adverse impacts to floodplains during cleanup activities.

4.2 FLOODPLAIN EFFECTS

Remedial action at the chemical plant area of the Weldon Spring site would disturb a portion of the Ash Pond drainage within the property fence and the extension of this drainage (vicinity property A6) located on the U.S. Army Reserve and National Guard Training Area (Figure 4.1). This affected area occurs within the 100-year floodplain of the Schote Creek-Dardenne Creek drainage basin, within the headwaters of Schote Creek. Water flow in this area is intermittent, with water typically present only during and following precipitation events. As discussed in the FS, the contamination at vicinity property A6 extends approximately 200 m (660 ft) from the site fence along the drainage channel from Ash Pond, at a width of about 3 m (10 ft). The portion of the Ash Pond drainage channel inside the site fence that is within the 100-year floodplain is located immediately upstream of vicinity property A6 and encompasses about 0.5 ha (1.3 acres).

Removing contaminated soil and sediment from the Ash Pond drainage within and beyond the site fence could therefore temporarily disturb up to 0.6 ha (1.5 acres) of land in the 100-year floodplain. The total area that could be disturbed represents a very small fraction (<0.001%) of the entire 100-year Schote Creek-Dardenne Creek floodplain. Remedial action activities at this location would consist of excavating contaminated soil and sediment followed by restoring the disturbed area; no flood storage volume would be displaced by structures, access roads, or fill material. Following removal of the contaminated soil and sediment, the

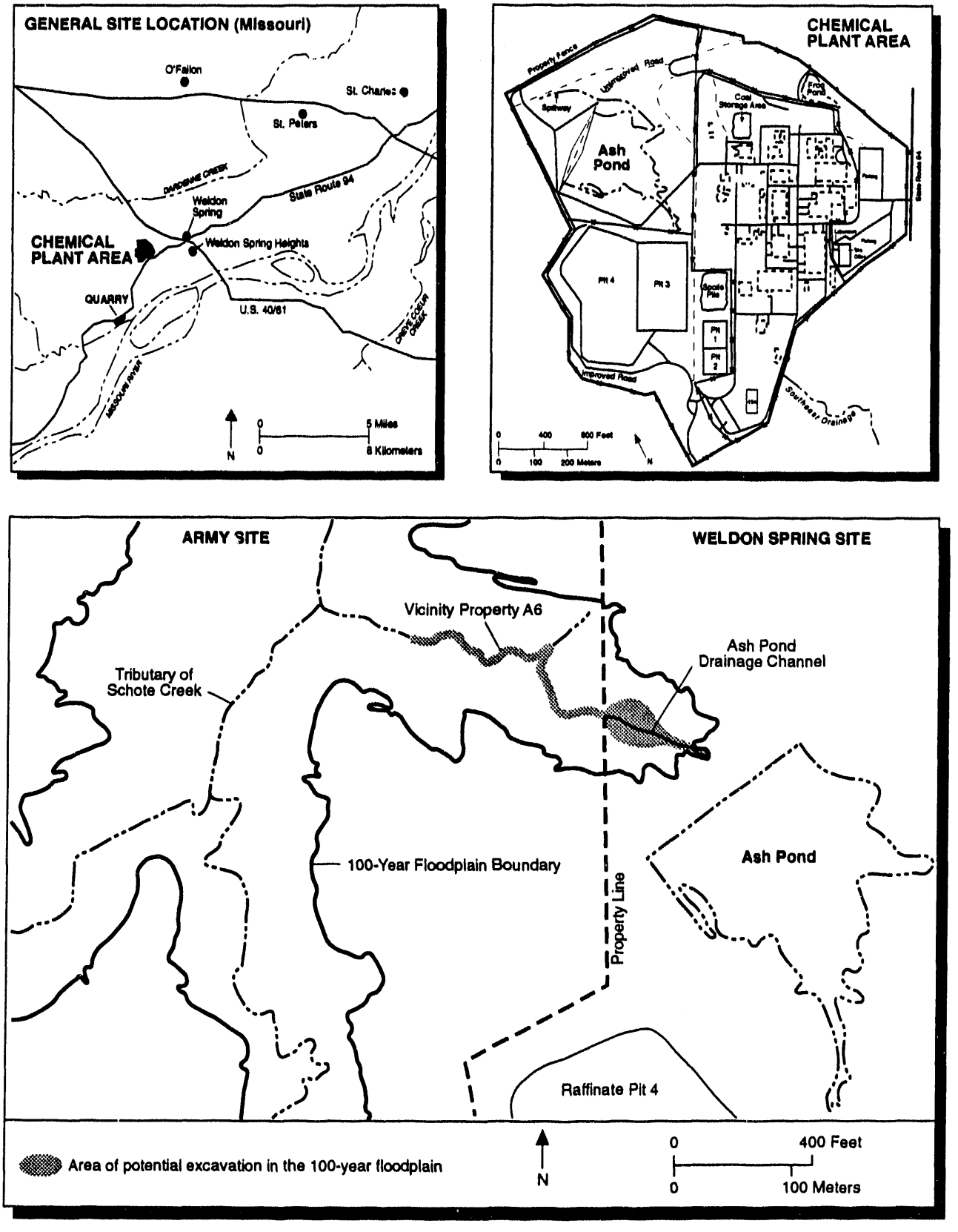

FIGURE 4.1 Location of the Chemical Plant Area and Demarcation of the 100-Year Floodplain

excavated areas would be backfilled with clean fill and graded to the extent possible to original contours. Thus, the long-term flood storage volume of the Schote Creek-Dardenne Creek floodplain would not be affected by remediating the Ash Pond drainage within the chemical plant area and vicinity property A6.

Excavating and removing contaminated soil and sediment from the floodplain could temporarily disrupt local drainage patterns; increase localized erosion, sedimentation, and contaminant transport; and destroy and displace certain biota. Impacts to vegetation and wildlife in the floodplain would not be significant, as discussed in the FS. The types of old-field and forest habitats that would be disturbed are widespread throughout the Busch and Weldon Spring wildlife areas, the types of wildlife that would be disturbed are not unique to the area, no federal listed or Category 2 species are known to utilize the area, and no state listed species or unique natural areas are associated with the floodplain location. Mitigative measures would be applied to ensure that the temporary impacts in the floodplain would be localized and minimal. These impacts would cease upon recontouring and revegetation of the excavated portions of the floodplain, and the original flood storage volume would be restored.

4.3 ALTERNATIVES

Five final alternatives have been identified for addressing contaminated material at the chemical plant area of the Weldon Spring site and vicinity properties, including sediment and soil in the areas of floodplain involvement. These alternatives, which are described in Chapter 5 of the FS, are:

Alternative 1: No Action;

Alternative 6a: Removal, Chemical Stabilization/Solidification, and Disposal On-Site;

Alternative 7a: Removal, Vitrification, and Disposal On-Site;

Alternative 7b: Removal, Vitrification, and Disposal at the Envirocare Facility near Clive, Utah; and

Alternative 7c: Removal, Vitrification, and Disposal at the Hanford Facility near Richland, Washington.

Within the context of these broad alternatives, Alternative 1 is not acceptable for the affected floodplains for several reasons. First, implementing this alternative would not reduce contaminant toxicity, mobility, or volume. Second, the potential for exposure of vegetation, wildlife, and humans would continue. Finally, the contamination could migrate further (e.g., by leaching to groundwater), so that additional exposures could occur over time. The remaining four alternatives are similar to one another in that they each include the excavation and disposal of contaminated sediment and soil from the floodplain area. These alternatives differ from one another in the proposed treatment and disposal of the contaminated materials, but the extent of floodplain disturbance would be the same for each. Each of these alternatives is considered to

represent a permanent solution to the potential threat to human health and the environment posed by the contaminated sediment and soil at the site and the vicinity properties, and each would provide for long-term protection of human health and the environment associated with related exposures. The removal and subsequent disposal of the contaminated sediment and soil is also consistent with current plans for complete remediation of the Weldon Spring site.

Within the context of this site-specific floodplain assessment, there is no practical alternative to removing contaminated material from the affected floodplain area. As described for the broad site alternatives, the potential exposures of biota to contaminated media would continue under the no-action alternative. Thus, adverse impacts are associated with leaving the contaminated material in the affected floodplain area, and no alternative action to removing this material as proposed would effectively mitigate potential impacts for the long term. The small area of affected floodplain would be graded and recontoured to restore the flood storage volume after the contaminated soil was removed.

4.4 MITIGATIVE MEASURES

No long-term impacts to flood storage capacity are anticipated from the proposed remediation of the Ash Pond drainage and vicinity property A6. Potential short-term impacts, resulting primarily from vegetation clearing and excavation activities, would be mitigated by using good engineering practices and implementing the following mitigative measures:

- Erosion and sediment control measures, such as berms and silt fences, would be used during all excavation, fill, and contouring activities.
- Contaminated soil and sediment would be excavated only when the Ash Pond drainage channel was dry.
- Only clean fill would be used.
- Excavated areas would be filled as soon as practicable after excavation and graded to original contours as much as possible.
- Revegetation activities would be implemented as soon as possible following recontouring of the refilled areas.

5 DISTRIBUTION LIST FOR THE RI/FS-EIS

The individuals who received the four RI/FS-EIS documents issued in November 1992 (i.e., the RI, BA, FS, and PP) are listed in Section 5.1. A number of additional individuals received the PP; these individuals are identified in Section 5.2. Individuals who received only the PP were informed of the availability of the RI/FS-EIS. Copies of the RI/FS-EIS were also placed in the on-site public reading room and the four other information repositories identified in Chapter 7 of the PP, and the public was notified of its availability by newspaper notices. The distribution list reflects titles and affiliations as of November 20, 1992, when the documents were issued to the public. A number of individuals subsequently requested and received copies of these documents. This comment response report is being circulated to all individuals, organizations, and agencies that submitted substantive comments on the November 1992 documents. The commenters who had not received the initial set of RI/FS-EIS documents are also being sent a copy.

5.1 INDIVIDUALS WHO RECEIVED THE RI/FS-EIS

U.S. Senator Christopher S. Bond
c/o Ms. Jo-Ann Digman
Office Manager
800 Maryland Avenue
St. Louis, Missouri 63105

U.S. Senator John Danforth
c/o Ms. Karla Roeber
District Administrator
800 Maryland Avenue
St. Louis, Missouri 63105

U.S. Representative William L. Clay
c/o Ms. Pearlie Evans
District Assistant
6197 Delmar
St. Louis, Missouri 63112

U.S. Representative Joan Kelly Horn
c/o Ms. Judy Roman
District Director
9666 Olive Blvd., Suite 115
St. Louis, Missouri 63132
and
c/o Ms. Anne Zerr
St. Charles County Coordinator
820 South Main
St. Charles, Missouri 63301

U.S. Representative-Elect James M. Talent
c/o Ms. Barb Cooper
Office Manager
955 Executive Parkway, Suite 200
St. Louis, Missouri 63141

U.S. Representative Harold L. Volkmer
c/o Mr. Lee Viorel
District Administrator
370 Federal Building
Hannibal, Missouri 63401

The Honorable John Ashcroft
Governor of Missouri
State Capitol
Jefferson City, Missouri 65101

The Honorable Fred Dyer
Missouri State Senator
1025 Sherbrook
St. Charles, Missouri 63301

The Honorable George Dames
Missouri House of Representatives
623 Highway P
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6 ERRATA FOR THE RI/FS-EIS

The following errata are noted for the RI/FS-EIS.

In the BA:

- On page 3-36, Equation 3.7 should begin with $log\ BCF_{fi}$ instead of $log\ C_{fi}$.
- On page 3-43, the number of days in 70 years given in Section 3.4.2.7 should be *25,550* instead of *25,500* (as correctly presented in the companion Section E.4.1.2 of the FS).
- On page 3-52, the exposure point concentration given for asbestos in Section 3.4.8.2 should be *0.028* fibers/cm^3 instead of *0.23* fibers/cm^3 (as correctly presented in the companion Section 3.3.6.2).

In the FS:

- On page 2-41, the unit for soil concentration in the column heading of Table 2.5 should be *pCi/g* instead of *pCi/kg* (as correctly presented in the companion tables, Table 2.3 of the FS and Table 4 of the PP).

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