

RESPONSIVENESS SUMMARY FOR THE RECORD OF DECISION
CRAB ORCHARD NATIONAL WILDLIFE REFUGE
PCB AREAS OPERABLE UNIT

I. RESPONSIVENESS SUMMARY OVERVIEW

The United States Environmental Protection Agency (U.S. EPA) held a public comment period from August 18, 1989, through December 1, 1989, for interested parties to comment on the Proposed Plan for remediating contamination problems at the PCB Areas operable unit of the Crab Orchard National Wildlife Refuge Superfund site near Carterville, Illinois. Comments were also taken on any documents in the administrative record, including the Remedial Investigation/Feasibility Study (RI/FS). The required public hearing on August 30, 1989, focused on the results of the FS and U.S. EPA's preferred remedial alternative (Proposed Plan). Comments were taken on both the Metals Areas and PCB Areas operable units at the hearing on August 30, 1989. A second public hearing was held on October 3, 1989, to take additional comments on the remedial alternatives for the PCB Areas operable unit. The public comment period was held in accordance with Section 117 of CERCLA.

The public comment period for the PCB Areas operable unit was initiated concurrently with the comment period for the Metals Areas operable unit. The comment period for the Metals Areas was closed earlier (on September 23, 1989) and a Record of Decision was issued for the Metals Areas operable unit on March 30, 1990. Since the hearing held on August 30, 1989, covered both operable units and since the preferred alternative for each operable unit shared some similar components, most of the comments received for the Metals Areas operable unit also apply to the PCB Areas operable unit. The exception is those comments that address specific procedural aspects of the Metals Areas operable unit. The Record of Decision for the Metals Areas operable unit which was signed by U.S. EPA on March 30, 1990, included a Responsiveness Summary which responded to all comments which were raised regarding that operable unit. The Metals Areas Responsiveness Summary is hereby incorporated by reference into this Responsiveness Summary.

The purpose of this responsiveness summary is to document the U.S. EPA's and the U.S. Department of Interior's (DOI) responses to comments received during the public comment period. These comments were considered prior to selection of the final remedy for the PCB Areas operable unit at the Crab Orchard National Wildlife Refuge Superfund site, which is detailed in the Record of Decision (ROD).

II. BACKGROUND ON COMMUNITY INVOLVEMENT

The DOI, in conjunction with U.S. EPA, is responsible for conducting the community relations program for this site. A community relations program was established by DOI for the Refuge in June 1987. It established a process for a two-way flow of project information between local officials, concerned citizens, the media and DOI. The program was updated in July 1988, at the time of the completion of the RI, to broaden



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U.S. EPA's role in community relations activities. Four information repositories were established in the local area: at the Marion Federal Penitentiary, the Marion Carnegie Public Library, the Crab Orchard National Wildlife Refuge Headquarters and the Morris Library at Southern Illinois University in Carbondale. Several different press releases and fact sheets were issued to announce field activities and the findings of the RI and FS. A public meeting on the findings of the RI was held in Carterville in August 1988. Community relations activities are summarized in the ROD, if additional information is desired.

III. PUBLIC HEARINGS

The required public hearing on the Proposed Plans for the Metals Areas and PCB Areas operable units was held on August 30, 1989, from 7:00 p.m. to 10:30 p.m., at the John A. Logan College in Carterville, Illinois. Approximately 140 persons attended, including the U.S. Congressman for the district, several local or federal officials or their representatives, representatives of some companies or industries that have been tenants at the Refuge, and members of the press (television, radio and newspapers).

A second public hearing to discuss only the PCB Areas operable unit was held on October 3, 1989, from 7:00 p.m. to 11:00 p.m., at the Student Center at Southern Illinois University in Carbondale, Illinois. Approximately 95 persons attended. Additional public comment was taken at this hearing.

IV. SUMMARY OF SIGNIFICANT COMMENTS RECEIVED AND RESPONSES

As discussed above, most of the comments taken for the Metals Areas operable unit are pertinent to the PCB Areas operable unit as well. U.S. EPA has responded to those comments in the Responsiveness Summary to the Metals Areas Record of Decision signed on March 30, 1990. The Responsiveness Summary for the Metals Areas is therefore incorporated by reference into this Responsiveness Summary.

Additional questions and comments received during the public comment period for the PCB Areas operable unit are paraphrased and organized into seven discrete sections within this summary. The Agencies' response is given after each question or comment.

- A. Comments on the Superfund Process
- B. General Comments and Questions About the Site
- C. Comments on the Safety of Incineration
- D. Comments and Questions on the Safety of Other Remedial Components
- E. Comments and Questions Regarding Other Remedial Alternatives
- F. Comments and Questions Regarding Implementation of the Remedy
- G. Comments from Sangamo Weston

A. Comments on the Superfund Process

Comment 1:

Numerous commenters felt that the information in the repositories was too lengthy and technical, and that more review time was required.

Response 1:

The National Contingency Plan (NCP) which was effective at the time of public notice of the Proposed Plan required that the Feasibility Study (FS) be available for public comment for not less than twenty one days (40 CFR 300.67(d)). Because of concern that twenty-one days was not sufficient time to review and comment on the FS, the original comment period for this operable unit was thirty days. Based on concern expressed at the public hearing on August 30, 1989, the public comment period was extended for an additional thirty days. Based on additional comments that were received in writing, the public comment period was extended a total of three times, making a total comment period of one-hundred and five days. While the information in the administrative record is technical in nature, it is no more technical than that ordinarily generated for similar sites and U.S. EPA believes that the unusually lengthy comment period provided sufficient time for review and comment on the proposed remedy.

Comment 2:

Some commenters felt that it was difficult to locate information on mobile incineration.

Response 2:

This comment was raised early in the public comment period. In response to this concern, additional material on mobile incineration was sent to the information repositories. The material included U.S. EPA reports and journal articles which included additional references.

Comment 3:

One commenter stated that there was a lot of community opposition to the proposed remedy, but that the Superfund public comment process is structured to make it seem otherwise.

Response 3:

The NCP establishes a regulatory framework for the implementation of CERCLA. As discussed in Response 1, the NCP includes provisions for the minimum requirements for public participation. Among these requirements was that the Feasibility Study (FS) be available for public comment for not less than twenty-one days (40 CFR 300.67(d)). As was stated in Response 1, the original comment period for this operable unit was longer

than the minimum requirement, and three additional extensions to the comment period were granted based on public comment. The total comment period for this operable unit was one hundred and five (105) days. This comment period is far longer than normal, and was allowed in response to specific community concerns.

Comment 4:

Some commenters expressed the opinion that the final remedy had been decided and that the public comments would not have any influence on the final remedy selection.

Response 4:

All public comment which was received during the comment period was seriously considered prior to the final decision on a remedial action. Just because one individual comment, or a number of comments may not have changed the final decision, does not mean that the process is a "token gesture". Comments received expressed a diversity of opinion about what action is needed to clean up the site, and not all opinions could be satisfied by any one decision. Also, community acceptance is only one of nine criteria used to evaluate remedial alternatives, and must be weighed against the other criteria. In addition to the criteria of community acceptance, U.S. EPA is required to meet a number of statutory mandates in the selection of the final remedy. The balance between the decision criteria (including community acceptance), and the assessment of the statutory mandates are discussed in Sections IX. and X., respectively, of the Decision Summary of the Record of Decision.

U.S. EPA believes that the ROD reflects a direct influence by public comment on the decision making process. Opposition to the use of incineration technology at Crab Orchard contributed to U.S. EPA's decision to include in the ROD, a provision for a demonstration of in situ vitrification (ISV) as an alternative treatment technology that meets the performance standards of incineration.

Comment 5:

One commenter expressed concern about the other operable units at the Refuge, specifically the "DOD Areas", and wondered whether they might be "swept under the rug".

Response 5:

The operable units are each on a separate schedule for completion of remedial work. Section 120 of CERCLA requires DOI, the current owner of the Site, to enter into an interagency agreement (IAG) with U.S. EPA before September 30, 1990. Currently, DOI, U.S. EPA and the Illinois Environmental Protection Agency ("IEPA") are negotiating the interagency agreement. The Department of the Army may participate in the IAG. The operable unit, formerly referred to as "DOD Areas", is now referred to as "Munitions/Explosives Manufacturing Areas", and a specific schedule for

work at this operable unit is being developed for the interagency agreement. This schedule will require the initiation and completion of a remedial investigation of areas that may have been contaminated as a result of munitions or explosives production. If contamination is found at levels of concern, options to clean up the operable unit will be developed. The interagency agreement and remedial work done on the operable unit will all be subject to public review and comment.

Comment 6:

One commenter questioned whether the characterization of the operable unit as the "PCB Areas" masks potential problems with the metal co-contamination.

Response 6:

The creation of separate operable units was discussed extensively in the Responsiveness Summary to the Record of Decision for the Metals Areas (which is incorporated by reference here). The characterization of the operable units at the Site is not intended to be misleading, and the titles of the operable units simply characterize the major contaminants within each unit. This does not mean that other contaminants may not be present, as is the case of the PCB Areas operable unit, where lead contamination has always been acknowledged and discussed, and is addressed in this ROD.

Comment 7:

One commenter stated that there have been problems in the past with other Superfund sites when remedies have been selected because the U.S. EPA will not give 100% guaranties of safety.

Response 7:

U.S. EPA has made the determination that the risk from the unremediated site is of sufficient magnitude that there is an actual or potential risk to human health or the environment. Once the site has been shown to produce a risk, various remedies to address the risk are evaluated. The projected result of each of these remedies must be a reduction of the risk to fall within a range of "acceptable risk" (as defined by CERCLA and the NCP), but no one can give a 100% guarantee that the remedy will entail no risk. However, each of the remedies will result in less risk than would be present were no action taken at the site.

Comment 8:

A few commenters expressed the opinion that the government, or President Bush himself, is behind an effort to push incineration.

Response 8:

Congress has directed U.S. EPA to meet certain statutory mandates for remedy selections at Superfund sites. These mandates include the preference for treatment as a principal element of the remedy and the utilization of permanent solutions and alternative treatment technologies to the maximum extent practicable. The government has not, on a national basis, specifically selected any one treatment method. Incineration is considered a technology that can be used in many circumstances to meet these mandates because it has been demonstrated to treat and permanently destroy organic contaminants.

Comment 9:

A few commenters were concerned that there are no checks and balances on EPA.

Response 9:

CERCLA provides that U.S. EPA must consult with support agencies during the remedy selection process. The support agencies for this remedy selection are the DOI and Illinois EPA (IEPA). Each of these agencies has had opportunities to comment on the remedy selection for the PCB Areas. CERCLA also requires that public comment be taken and considered before the final remedy is chosen. Superfund remedies must comply with all Applicable or Relevant and Appropriate Requirements (ARARs), which ensures that programmatic and legal requirements are met for every remedy. Finally, Section 310 of CERCLA has provisions to allow citizen suits to be brought against the government. These procedures and statutory obligations provide a variety of "checks and balances" on the remedial action selection and implementation at Superfund sites.

Comment 10:

One commenter stated that the public wants an "unbiased" opinion from someone other than U.S. EPA. They supported the creation of a local task force to look into the process and activities at the Site.

Response 10:

Any member of the public, including scientists and technicians, may comment on U.S. EPA's proposed remedial action. In addition, the public may solicit input and comment from anyone they feel will be "unbiased". U.S. EPA supports the idea of a local task force that can be involved in the Superfund activities throughout the entire process. U.S. EPA has a technical assistance grant (TAG) program which allows community groups to receive grant money to hire their own technical consultants. A local group, the Crab Orchard Response Team (CORT), is in the process of applying for this grant money. If CORT is awarded the grant, they may use the money to hire an independent technical advisor. U.S. EPA will

work with any groups and/or individuals that want to be involved in any of the upcoming Superfund activities at the Refuge.

Comment 11:

Commenters asked why the company(ies) responsible for the contamination are not paying for the cleanup.

Response 11:

Since the Crab Orchard National Wildlife Refuge is owned by the Federal government, particular legal standards of CERCLA apply. Section 120(e)(1) of CERCLA states that "...the department, agency, or instrumentality which owns or operates such facility shall, in consultation with the Administrator and appropriate State authorities, commence a remedial investigation and feasibility study for such facility." U.S. EPA would therefore consider that the requirement to conduct the RI/FS is strictly DOI's. Nothing in CERCLA prevents DOI from entering into an agreement with another party for that party to assist DOI with its obligation. In this case, Sangamo Weston, Inc., a company that produced electrical equipment at the Refuge, and DOI entered into an independent, voluntary agreement to perform the RI/FS. Both DOI and Sangamo Weston, Inc. have contributed to the costs of the work which has been done to date at the Site.

Congress has directed U.S. EPA on the broader issue of how to work with private parties that may have been responsible for contamination at Superfund sites. Congress has established provisions in CERCLA that allow private parties to do work at Superfund sites (Sections 106 and 122 of CERCLA) while U.S. EPA retains the oversight responsibility to ensure that the work is done correctly (including any and all additional work U.S. EPA determines to be necessary). Under CERCLA Sections 120(e)(6), 106 and 122 U.S. EPA has the authority to allow or require Sangamo Weston, Inc. or other potentially responsible parties to perform and/or pay for remedial action activities at the Refuge.

Comment 12:

Some commenters wanted to know who has the burden of proof if a suit is brought against U.S. EPA by Illinois or citizens. They felt that the burden of proof should be on U.S. EPA to prove that the operation of the remedy implementation is safe.

Response 12:

Citizens, including the State, may bring an action against U.S. EPA under CERCLA Section 310, 42 U.S.C. §9659, alleging that a removal or remedial action taken under CERCLA Section 104 or secured under CERCLA Section 106 was in violation of one or more of the non-discretionary provisions of CERCLA. However, under CERCLA Section 113(h), 42 U.S.C. §9613(h), no such citizen challenge to a removal or remedial action may occur prior to completion of the remedy. In addition, under CERCLA Section 113(j), 42

U.S.C. §9613(j), judicial review of any issues concerning the adequacy of the response action taken, including issues of short-term effectiveness and safety, shall be limited to the administrative record, and the court will uphold U.S. EPA's decision in selecting the response action unless the objecting party can demonstrate, on the administrative record, that the decision was arbitrary and capricious or otherwise not in accordance with law.

Comment 13:

Some commenters pointed out that the Toxic Substances Control Act ("TSCA"), is U.S.C. §2601 et seq., allows for alternative treatment methods to be used rather than incineration and one commenter read several excerpts of the TSCA regulations into the record.

Response 13:

U.S. EPA is aware of the TSCA regulations, and has considered TSCA in the ARAR process. TSCA does allow for alternative treatment methods to be used. The regulations of 40 CFR 761.60(e) allow U.S. EPA to consider a alternative treatment if the alternative treatment meets the performance equivalent to an incinerator as required by 40 CFR 761.70 (i.e., equal destruction of PCBs) and will not present "...an unreasonable risk of injury to health or the environment." The alternative treatment technology demonstration of in situ vitrification provided in the ROD is based upon the TSCA ARAR for the allowance of alternatives to incineration. Section X.B of the Decision Summary portion of this ROD includes a discussion of the TSCA regulations that will be met by the Selected Remedy for the PCB Areas Operable Unit.

Comment 14:

A few commenters demanded formal written responses to their comments before the end of the public comment period.

Response 14:

Section 117 of CERCLA requires the U.S. EPA to allow an opportunity to comment on the Proposed Plan for remedial action. Section 117(b) requires that the final plan (the ROD) "... be accompanied by ... a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations...." This ROD is the final plan for the PCB Areas at the Refuge. The U.S. EPA is mandated to provide its formal responses to comments as part of the ROD, thus, they were not provided before the end of the comment period.

Comment 15:

One commenter asked about other similar Superfund sites where incineration was not chosen as the remedy, and asked for information on why incineration was not chosen.

Response 15:

A number of Superfund sites have soil and/or sediment contaminated with PCBs, and frequently with other hazardous substances. A U.S. EPA document dated September 22, 1989, titled Draft Guidance on Selecting Remedies for Superfund Sites with PCB-contamination discusses a number of similar sites, the remedies that have been selected for these sites, and the rationale for the remedy selection. For 50% of similar sites with PCB-contaminated soil and sediment, incineration was the selected remedy. For the majority of sites where incineration was not selected, the high cost of incineration was a primary consideration to support another remedy. For additional details, copies of this document have been sent to the information repositories.

Comment 16:

Some commenters wondered why the parties involved in the development of the RI and FS could have different interpretations of the information and different recommendations about a suitable remedy. Specifically, people questioned why O'Brien & Gere Engineers had recommended stabilization treatment rather than incineration.

Response 16:

O'Brien & Gere Engineers, the consultants that produced the RI and FS reports, were retained by Sangamo Weston, Inc., a company that produced PCB-laden electrical equipment at the Refuge. Sangamo Weston, Inc. had hired O'Brien & Gere to do the RI/FS work as part of a cooperative agreement with the Fish and Wildlife Service. In its review of the FS, U.S. EPA requested removal of O'Brien & Gere's recommendation for remedy selection, because the FS should be limited to a comparative assessment of each of the remedial alternatives against the nine remedy selection criteria. O'Brien & Gere and Sangamo Weston, Inc., as members of the public, are entitled to express their comments regarding U.S. EPA's preferred remedy. They are not entitled to select the remedy for the Site. They have supported stabilization treatment rather than incineration based on a different interpretation than U.S. EPA of the balancing criteria, primarily, the cost criteria.

Comment 17:

One commenter stated that U.S. EPA is not meeting its mandates from Congress in the selection of remedies for Superfund sites. Specifically, U.S. EPA is not selecting permanent remedies, is not weighing protection of health more heavily than cost, and is not paying enough attention to community input.

Response 17:

U.S. EPA has met its statutory mandates in the selection of this remedy for the PCB Areas operable unit. There is an extensive discussion of how

this remedy meets these mandates in Section X. of the Decision Summary portion of the ROD.

Comment 18:

One commenter felt that the public should be fully informed and then allowed to vote on the selected remedial action.

Response 18:

Section 121 of CERCLA discusses the selection of remedies for Superfund sites. Congress has directed that the President select remedial actions for sites after evaluating numerous specific issues. The President, in carrying out his Congressional mandate, has delegated the authority for remedy selection to U.S. EPA. CERCLA further specifies the provisions for public involvement in Sections 113(k) and 117. These provisions allow for public input, but do not allow the public to select remedies by voting or other processes.

Comment 19:

Several commenters wondered why the preferred alternative identified in the Proposed Plan was not one which was outlined in the FS.

Response 19:

Although not presented as a consolidated alternative, the preferred alternative identified in the Proposed Plan was outlined in the FS as alternatives 3-1B, 5-1B and 7-1B. For each of the study sites to be remediated, the preferred alternative was fully screened against the remedy selection criteria in each of the relevant chapters of the FS.

Comment 20:

One commenter stated that information was not available at the information repository at Marion Federal Penitentiary.

Response 20:

U.S. EPA's Community Relations Coordinator checked the information repository at Marion Federal Penitentiary and found that the documents are available through the prison library and are up to date.

B. General Comments and Questions About the Site

Comment 21:

People questioned how safe the Refuge is for humans such as children and pregnant women, whether wildlife is endangered, and whether the fish in Crab Orchard Lake are safe to eat. To one extreme, one commenter felt that no one is currently at risk from the PCB-contamination in the ground.

Response 21:

Sediment, water and fish samples were taken from Crab Orchard Lake as part of the Remedial Investigation, and the analysis of these samples was used to support the risk assessment that evaluated the safety of the Site. In general, the risk assessment indicated that Crab Orchard Lake, outside of the Area 9 Embayment, is safe for recreational activities such as swimming and boating, and the water is safe for human consumption. There is a fishing advisory on the Lake which was placed by the IEPA, Illinois Department of Public Health and Illinois Department of Conservation. The advisory was placed because some fish showed elevated levels of contamination. U.S. EPA recommends that people comply with the fishing advisory. The risk assessment in the RI indicates that high levels of fish consumption may pose an elevated risk to individuals. The assumption that no one is at risk from the PCB-contamination at the Site is not supported by the risk assessment. The unremediated study sites pose potential excess risk to both human health and wildlife.

Comment 22:

Some commenters pointed out that the contaminants have been at the Refuge for decades, and asked how long the material remains hazardous.

Response 22:

PCBs and lead are the major contaminants of concern at this operable unit. Lead is a naturally occurring element which is not destroyed in the environment. PCBs are very chemically stable under a variety of conditions, and are exceptionally persistent in the environment.

Comment 23:

One commenter asked why EPA did not take action at the Site sooner, if they knew about the contamination problem.

Response 23:

In proposing the Crab Orchard National Wildlife Refuge for inclusion on the National Priorities List (NPL), U.S. EPA evaluated existing site information and made the determination that a release or substantial threat of a release of hazardous substances had occurred or would occur that would endanger human health or the environment. However, because of the limited access of humans to the contaminated areas and the efforts of DOI to further reduce exposure by issuing warnings and fish advisories, U.S. EPA determined that emergency response action was not warranted. The Fish and Wildlife Service (FWS) and U.S. EPA began action in 1986, prior to final listing of this site on the NPL, by initiating the RI/FS that provides the basis for this informed decision on appropriate remedial action.

Comment 24:

One commenter stated that the time frame to clean up the entire Site could be 20 to 30 years, rather than the 2.5 to 5 years discussed in the Proposed Plan because there are areas at the Refuge that have not been investigated.

Response 24:

Because of the size of the Refuge and the number of potential areas at the Refuge that may have been adversely impacted by industrial activities at the Site, it is true that the entire Superfund process is expected to be lengthy. In order to streamline the process, problems which are apparently related have been grouped into operable units, and each of these operable units will be on independent, but possibly concurrent, schedules to complete the necessary remedial action. The schedules will reflect available information about the magnitude of the threat to human health or the environment, and will prioritize the units accordingly. The schedules for each operable unit are being finalized in the interagency agreement which is expected to be signed by September 30, 1990 (see the Response to Comment 5). The 2.5- to 5-year schedule is an estimate for the implementation of the Selected Remedy for this operable unit using incineration technology.

Comment 25:

One commenter expressed concern with the concept of a "walk away site", if toxics will be left buried in the ground.

Response 25:

The object of the selected remedy is to minimize the areas at the Refuge that will require long-term monitoring and maintenance, and to permanently destroy those compounds that can be treated. The area where the metals will be managed as residuals will require long-term monitoring and maintenance, and property management (including land use restrictions) as long as the contaminated residuals remain at the Site. The areas where remediation is complete and where no contaminants are left above the remediation goals will require no future monitoring or land use restrictions.

Comment 26:

Several commenters expressed concern about the effects of incineration technology on the community in general. Specific concerns were raised about property value reduction, damage to tourism and an adverse effects on enrollment at Southern Illinois University (SIU).

Response 26:

The impact of remedial alternatives on local communities is evaluated through the criteria of short-term effectiveness, long-term effectiveness

and permanence. The design of the Selected Remedy will prevent adverse short-term impacts to the area, such as air emissions, potential dust generation or surface water run-off, by using engineering methods to prevent these from occurring. The impact of the selected remedy on tourism or SIU enrollment is difficult to assess quantitatively. However, the evaluation of short-term effectiveness in the FS indicates that the impact from incineration will be no greater than the impact from the other alternatives, and is likely to be much less than the adverse effects on tourism (or SIU enrollment) that have occurred because of the existing contamination problem at the Refuge. Refuge figures indicate that annual numbers of visitors to the Refuge declined from 1,200,000 to 800,000 because the public is aware of existing contamination problems. Clearly, permanently eliminating these problems can only improve tourism and decrease adverse impacts on the nearby community.

Comment 27:

Some commenters expressed concerns that exposure to toxic compounds can take place through various pathways which will be influenced by the transport process and the receptor organisms.

Response 27:

U.S. EPA agrees that contamination of several media can result in exposure of different organisms through various pathways. To address this concern fully, the risk assessment process includes a comprehensive evaluation of the exposures of various sensitive receptors to a variety of potential exposure scenarios.

Comment 28:

One commenter was concerned that the remedy for the Site does not take the contaminants out of the sediments in Crab Orchard Lake or out of the fish in the lake.

Response 28:

The remedy selected in this ROD does specify a remediation goal for contaminated sediments in Crab Orchard Lake, and removal of sediments which contain concentrations of contaminants above this goal are required. The remedy does not propose any remedial actions specific to the fish population of the lake. However, sediment cleanup targets have been established to protect wildlife, and have been set to minimize bioaccumulation of PCBs into fish tissue. The removal of the sources of contamination (soils and sediments) should allow the levels of PCBs in fish tissue to drop in the future.

Comment 29:

Several commenters felt that the cost of the incineration alternative is far too high, especially considering the questions about its safety.

Response 29:

Cost is only one of the nine criteria which are considered before a remedy is selected. Although incineration appears to be more costly than other alternatives, implementation of incineration provides a better balance of long-term effectiveness, permanence and reduction of toxicity, mobility and volume than any of the other alternatives. ISV may also provide this balance of the demonstration set forth in Section VIII.A.3 of the Decision Summary is successful.

C. Comments on the Safety of Incineration

Comment 30:

Numerous commenters felt that incineration is not a safe or proven technology and that incineration's "track record" is too short. Commenters said implementation of incineration does not fulfill the overall criteria of protection of public health and the environment. Concern was expressed over the lack of an evaluation of the potential adverse impacts of incineration on wildlife, plants and terrestrial ecosystems.

Response 30:

Incineration technology has been in use since communities first began burning refuse. The technology has evolved and become refined as the waste industry developed its use for disposing of hazardous wastes, among them, PCBs. Numerous applications of incineration technology under the Toxic Substances Control Act (TSCA), which regulates the handling and disposal of PCB-contaminated wastes, have resulted in U.S. EPA's determination that, when operated subject to strict controls and performance standards, incineration represents the best demonstrated technology available to dispose of PCBs in the concentrations found at the Crab Orchard site. Contrary to the concern over a lack of evaluation of adverse impacts to wildlife, plants and associated ecosystems, the risk characterization and exposure assessments conducted during the RI/FS specifically address those impacts and establish remediation goals which will mitigate them.

Comment 31:

Numerous commenters expressed concern with potential air emissions from the incinerator. A group of comments involved the fact that all incinerators, regardless of the standards required, would permit an "allowed" amount of emissions for various contaminants, specifically: metals (particularly lead), dioxins and furans, inhalable particles or compounds that may contribute to acid rain, global warming or depletion of the ozone. In addition, commenters expressed doubt in EPA's methods and ability to model and subsequently measure the amounts of emissions and their potential impacts on human health and the environment. Concerns were also expressed about the adverse impacts of malfunctions of the incineration process.

Response 31:

It is generally true that incinerators, regardless of the air pollution control devices attached, will produce some air emissions. The expected byproducts of combustion are water vapor and carbon dioxide, which would not cause harm to nearby humans or wildlife. For compounds other than water and carbon dioxide, strict emissions standards must be met and the incinerator will be designed to achieve those standards. The first step to minimize emissions is to design the incinerator to assure the most complete combustion of organic material possible by choosing optimum parameters for 1) the retention time of the waste in the combustion chambers, 2) the highest temperature necessary for complete combustion of the waste and 3) ample mixing of the waste to be combusted and the heated combustion gasses. This design will minimize emissions of dioxins, furans, unburned PCBs as well as pollutants which have been associated with global warming and depletion of the ozone layer.

The second line of defense to meet the emission standards involves a specially designed air pollution control system. Typically, such a system incorporates several control devices, usually in a series, which sequentially remove pollutants. When pollutants like heavy metals, and organics, such as dioxins and furans, are entrained on particles of uncombusted material, physical methods such as baghouses, venturi separators and electrostatic precipitators are employed. For removing pollutants that occur as gasses, such as vaporized metals, organic fumes and acid fumes (sulfur and nitrogen oxides), devices such as wet scrubbers and carbon strippers can be used.

Once the appropriate incinerator design and pollution control system are chosen, multiple monitoring systems and safety controls are added. A trial burn of a low concentration waste is conducted to determine the settings and adjustments that provide for day-to-day operation which meets the stringent performance standards. Malfunctions of any of the incinerator processes or pollution control equipment trigger automatic shutdown controls on the incinerator until the malfunction is located and repaired. As discussed in the ROD, ancillary systems are added to the incinerator unit to prevent fugitive emissions from the incinerator or from material handling.

Incinerator designs and their control systems chosen by U.S. EPA are typically conservative or "over-designed", so that emissions standards are met within a large margin of safety. Likewise, the predictive dispersion models used are equally conservative so that incinerators will be sited and operated such that impacts to human health and the environment will be negligible, if measurable at all.

Comment 32:

Some commenters asked questions about the fuel used to fire the incinerator. Concerns were raised over the potential emissions from

the fuel. One commenter felt the energy costs would be extremely high and another asked if there was any connection to a proposed waste blending plant.

Response 32:

The control of emissions generated from the fuel would be addressed in the incinerator design and pollution control systems discussed above. Natural gas, a "clean burning" fuel, will likely be used to maintain the high temperatures needed for complete PCB combustion. Energy costs do make incineration comparatively more costly than non-treatment technologies, however, the result of incineration is permanent destruction of PCBs, as opposed to merely containing the highly toxic compounds with a non-treatment remedy. The Selected Remedy using incineration technology or in situ vitrification, is not related to a proposed waste blending plant.

Comment 33:

Several commenters referred to the Liquid Waste Disposal (LWD) incinerator in Calvert City, Kentucky as evidence that incinerators are unsafe. The commenters expressed concerns that the LWD incinerator has released millions of pounds of carcinogens to the air which have adversely impacted agriculture, the surrounding environment and have caused cancer and other illnesses in the local population.

Response 33:

The LWD incinerator facility in Calvert City is an "interim status" facility under Resource Conservation and Recovery Act (RCRA), which means it is not now operating under a hazardous waste permit. The State of Kentucky is responsible for issuing that permit and for imposing strict requirements for the proper operation of the facility. However, the decision has proved extremely controversial and the State has been unable to complete finalization of the permit. In the meantime, the facility operates under conditions developed during a trial burn at the facility; conditions which will ultimately be imposed in the final permit. The incinerators (there are two interim status incinerators at the facility) are not allowed to burn PCBs in excess of 50 ppm, which would require additional restrictions under TSCA.

Concerns that LWD is responsible for adverse environmental impacts and is the cause of cancer and other illnesses in the local population are unfounded and possibly inaccurate. The Calvert City area is one of heavy industry, particularly known for its several chemical manufacturing facilities. Such chemical facilities have often been associated with increased levels of illness in the surrounding population. However, no epidemiological information has been developed which can directly link specific illnesses with the LWD incinerator. In short, where people have lived in heavily industrialized areas and been exposed for decades to multiple environmental pollutants, it is impossible to differentiate the

sources or the causes of various illnesses in the population. What this means for the Crab Orchard site is discussed in the next response.

Comment 34:

Several commenters stated that communities with operating incinerators have excess cases of cancer and other health effects. They expressed concern that there have been no long-term health studies on such communities.

Response 34:

As discussed in Response 33, some heavily industrialized areas have been known to be areas of elevated incidences of cancers and other illnesses, as compared to the incidence of those same cancers and illnesses in populations in non-industrialized areas. Such industrialized areas may contain steel mills, chemical factories and fossil-fuel power plants, in addition to the incinerators in question. Multiple sources operating over several decades make it impossible to pin any particular increase in illness on a specific source. Where incinerators operate in non-industrialized areas like the Refuge, such health studies cannot separate out those illnesses that may occur due to (or be exacerbated by) an individual's activities, such as smoking or diet.

The remediation goals selected for the Crab Orchard site are intended to reduce the risk from exposure to the PCBs now in place on the Refuge to approximately 1×10^{-6} , or one in one million. This means that in a hypothetical population of one million people who are continually exposed to the PCB residuals left at the site (i.e. Job Corps Landfill and Pond) each day for a lifetime of 70 years, only one has an additional chance of contracting cancer specifically due to the exposure. This should be balanced against the current health risk at the site of 1.1×10^{-3} , or one in 1000 people, using the same exposure scenario. U.S. EPA has deliberately chosen these very conservative levels (1×10^{-6}) for human health protection, which will be virtually unmeasurable against the average lifetime cancer risk of one in every four people.

Comment 35:

One commenter cited a study by the EPA Science Advisory Board dated April 1985, Inhalation Pathway Risk Assessment of Hazardous Waste Incineration Facilities. They stated that this study concluded incineration is not necessarily a safe process, and asked how EPA can now state at this Site that incineration is a safe process.

Response 35:

The above referenced report identified safety problems with incinerators operated prior to 1985. Reports such as this have resulted in the application of more stringent standards for incinerator units which have been subsequently selected by U.S. EPA for the incineration of hazardous waste. As discussed in comment 7, U.S. EPA cannot guarantee 100%

"safety" of any remedy. However, incinerators can be operated safely so as to reduce the risk of PCB-contamination at the site to within a range of "acceptable risk" as opposed to the unacceptable risks associated with taking no action at the site.

Comment 36:

One commenter stated that the operation of an incinerator may not be safe because the incinerator operators are "sleazy", that they have no reason to operate well, and are more interested in profit than safety.

Response 36:

In choosing contractors to operate incinerators, U.S. EPA carefully screens out contractors who cannot show that they will operate the incinerator safely and within the law. Once chosen, the operator faces civil and criminal penalties should the operator operate the incinerator in violation of performance standards.

Comment 37:

One commenter wanted to know which incinerator operators U.S. EPA has used or approved in the past.

Response 37:

Many incineration contractors have operated under the various auspices of U.S. EPA programs including Superfund, RCRA, TSCA and under permits issued pursuant to the CAA; however, U.S. EPA does not officially endorse or (without formal proceedings) denounce incinerator operators. Some large incinerator contractors which are operating or have operated in Region V include Westinghouse-Haztech, Chemical Waste Management, Weston and Ogden Environmental.

Comment 38:

Some commenters expressed concerns that the trial burn only provides a snapshot, and does not indicate actual everyday operating conditions.

Response 38:

On the contrary, a trial burn is designed to specifically identify the range of "everyday" operating conditions outside of which the incinerator will not be permitted to operate.

Comment 39:

One commenter questioned why groups such as Greenpeace, the Citizens Clearinghouse for Hazardous Waste, the National Toxic Campaign Against Incineration, and many local groups would oppose incineration if it is safe.

Response 39:

U.S. EPA cannot speak for or represent the opinions of these groups, but generally such groups oppose incineration not as an "unsafe" technology but as a technology that poses too many unacceptable risks to be widely applied in dealing with our national waste disposal problem. They may feel the comparative risks from incineration to the risks of other technologies favor the development of other technologies. In choosing a remedy for Crab Orchard, however, U.S. EPA is making a decision on the comparative risks of incineration, which permanently destroys PCBs, versus the risk of leaving concentrations of PCBs on the Site that may threaten human health and the environment.

Comment 40:

One commenter expressed concern with the potential safety hazard from the location of the incinerator (and its stack) in the vicinity of the county airport.

Response 40:

The stacks of mobile incinerators are generally not tall enough (<100 feet) to pose a physical danger to nearby aviation. However, the possible impact of any water vapor plume will be considered when choosing a site for the incinerator.

Comment 41:

Some commenters expressed concerns with the location of the incinerator in an area of seismic activity, and the potential adverse effects on the incinerator that could occur.

Response 41:

Areas of known and frequent seismic activity will be avoided when choosing the incinerator site. Safety systems will be designed into the incinerator to account for various natural disasters, including seismic activity.

Comment 42:

Some commenters stated that they felt incineration was the best remedy for the PCB-contamination.

Response 42:

U.S. EPA agrees that incineration is the best remedy for the PCB-contamination at the Refuge, and, therefore, U.S. EPA has selected incineration as the remedy for this operable unit. The basis for the selection of incineration is discussed in the Decision Summary portion of the ROD. However, because vitrification may be able to be demonstrated to attain the same performance standards as incineration, it may be

implemented if a treatability study demonstrates that the standards can be met.

D. Comments and Questions on the Safety of Other Remedial Components

Comment 43:

One commenter asked how contaminated dust which could potentially be generated during excavation of contaminated soil and sediment will be controlled.

Response 43:

As explained in the ROD, procedures for dust control during material handling will be required in the design of the selected remedy. U.S. EPA is aware that excavation of contaminated soil and sediment has the potential to create cross-media impacts, such as releases of dust to the air or run-off to surface water. Safeguards are established as a part of the remedial design to prevent these potential adverse impacts. Specific design features will address dust suppression and run-off control. Typical dust suppression measures for earthwork include wetting of the material and certain handling techniques. The design will also include methods to control dust emissions from the stabilization/fixation treatment process. In addition to the engineering controls to prevent releases of contaminants, the remedial design will include monitoring requirements to ensure that the control processes are working and a contingency plan on how to address and correct any malfunction that could damage the environment.

Comment 44:

Some commenters questioned how the determination would be made that the incinerator ash is "clean" before it is replaced into the excavated areas.

Response 44:

Incinerator ash which meets all of the cleanup targets and ARARs discussed in the Decision Summary portion of the ROD would be considered clean. The ash would be tested in accordance with an approved sampling and analysis plan to establish whether the standards had been met. Ash that does not meet the cleanup targets will be solidified in an industrial landfill.

Comment 45:

One commenter questioned whether the incineration of soil and sediment co-contaminated with metals will increase the potential for the metals to leach.

Response 45:

The metal contamination may be less mobile because of its association with certain soils such as clay. Incineration should not affect this relationship. However, the selected remedy requires that ash be monitored for the mobility of the metals, and all of the soil and ash with mobile metals (EP Toxicity or TCLP) will be treated in order to render the metals less mobile.

Comment 46:

One commenter felt that the requirements for the long-term monitoring of the on-site landfill were too vague, especially as to how long the monitoring would continue.

Response 46:

Monitoring of the landfill would be required for the life of the landfill. CERCLA requires a review at least every five years to ensure the continued safety of completed remedies when hazardous substances are left on-site. Since the metal waste constituents will be treated and left at the Refuge, the integrity of the landfill will be monitored to support the evaluation.

Comment 47:

Some commenters expressed concern that landfills will ultimately leak and contaminate the groundwater.

Response 47:

The problems of potential leaking from the landfill are addressed in two ways. First, the landfill is designed with a leachate collection system. This system is monitored routinely to see if any leachate is generated by the landfill, and if so, whether it contains hazardous substances. The second method to assess potential groundwater contamination is the requirement for routine groundwater monitoring around the landfill. These monitoring assessments allow early detection of any releases from the landfill, so that corrective action can be taken.

Comment 48:

A number of commenters opposed the location of the landfill on-site, and expressed a preference that the material be moved off-site.

Response 48:

Because metal contamination can be treated but not permanently destroyed, the remedial alternatives evaluated in the FS all included a component of long-term containment (except the no action alternative). The FS Report includes an assessment of both on-site and off-site landfills, with or

without treatment of the material prior to disposal. The alternatives of on-site versus off-site landfilling were compared against the nine criteria used to evaluate potential remedies, and were also evaluated against the goals and mission of the DOI for long-term Refuge management.

The comparative assessment of the landfill locations indicates that an on-site landfill is preferred. The Agencies believe that it is easier to ensure the long-term effectiveness and permanence of an on-site landfill for the treated material through aggressive long-term operation, monitoring and maintenance. Disposal of the treated material in an off-site landfill may allow the material to be mixed with other waste which might adversely affect the treatment process and increase the mobility of the contaminants. In addition, the costs of disposing of the material in an off-site landfill are significantly higher without providing any additional benefit.

CERCLA Section 121(b) states that "The off-site transport and disposal of hazardous substances or contaminated materials ... should be the least favored alternative remedial action" IEPA has assessed the capacity of commercial landfills in the State of Illinois and this assessment indicates that capacity is limited. In addition, DOI believes that an on-site landfill is consistent with its mission and obligations for the Refuge. Because the Agencies believe that an on-site landfill is safe and provides the best balance of the remedy selection criteria, an on-site landfill has been selected as the disposal component of the selected remedy.

Comment 49:

Several commenters expressed the opinion that a RCRA design for the landfill component of the remedy is more suitable than a solid waste landfill design. They felt that a RCRA landfill would be more protective in the long run.

Response 49:

A solid waste landfill was selected because the regulatory requirements for landfill design are based on the type of waste to be disposed. A RCRA landfill is required for the disposal of hazardous waste, as defined in 40 CFR 261.3. Since the material to be disposed here will not be a hazardous waste when it is disposed, a RCRA landfill design will not be selected as an ARAR. However, as part of the remedial design process, various landfill designs will be evaluated to see which design provides the necessary containment of the waste. The final landfill design will be based on technical requirements, and will meet, at a minimum, the legal design requirements.

Comment 50:

Several commenters questioned whether a water tank at the Refuge could be safely retrofitted to dispose of hazardous waste residues.

Response 50:

There is a five-million-gallon concrete tank on the Refuge which was constructed as a water reservoir in 1942. Based on an initial engineering review of the as-built drawings of the tank, it appears to be technically feasible that the tank could be retrofitted to meet the design requirements of the selected landfill. However, before this could be chosen as the final landfill site, an assessment would be made as part of the design process to establish whether the current condition and setting of the tank would meet all of the ARARs. The exact location of the on-site landfill was not identified in the FS, although several locations were proposed. The Refuge is a large area and there are several potential locations that would meet the requirements of an on-site landfill. The RI Report provides an initial hydrogeologic assessment of many of the study sites. This data can be extrapolated to indicate good candidate areas for further investigation during the design phase of the remediation. The remedial design will include further investigations of the most suitable areas, including the water tank, before the final location is selected. The final location will be the one which is the most appropriate and least disruptive to the Refuge of those that meet all of the legal requirements and standards discussed in this ROD.

E. Comments and Questions Regarding Other Remedial Alternatives

Comment 51:

In commenting on the remedial alternatives, numerous commenters expressed opinions on whether a remedy for the PCB-contaminated material needs to be selected and implemented now, or whether a remedy could wait until some time in the future.

The range of opinions on this issue is expressed below:

- a. Some commenters felt that the PCB-contamination requires immediate action, especially since PCB-contamination has been found in the fish of Crab Orchard Lake.
- b. Some commenters felt that, given the questions regarding the safety of incineration, it is better to wait and do nothing at this time.
- c. Some commenters felt that since the waste has been sitting at the Site for a long time, it would be better to cap (i.e., a TSCA cap or a plastic sheeting cover) the material now, and wait to evaluate future technologies.
- d. Some commenters felt that since alternative technology is being developed, the remedy selection should wait.

e. Several commenters suggested that the PCB-bearing material be placed in above-ground storage and monitored until future technologies develop.

Response 51:

CERCLA Section 121(b) requires that U.S. EPA "... conduct an assessment of permanent solutions and alternative treatment technologies or resource recovery technologies that, in whole or in part, will result in a permanent and significant decrease in the toxicity, mobility or volume of the hazardous substance, pollutant, or contaminant.... The President shall select a remedial action that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery to the maximum extent practicable."

While interim measures can be designed for the PCB operable unit which are protective in the short-term of public health and the environment, a remedy which required storage until future technologies develop would not meet the statutory requirement to select permanent solutions. The remedy selected would also not result in a permanent decrease of toxicity, mobility, or volume. The risk assessment for the study sites comprising the PCB Areas operable unit indicates that there is existing potential risk to human health and wildlife from the unremediated Site. This documentation of endangerment from the Site requires that a remedy to address the principal threats must be selected. Because a proposal to defer action indefinitely would not meet the statutory requirements, it could not be selected by U.S. EPA.

Comment 52:

Some commenters questioned whether degradation of the PCB-contamination by microorganism or other biological means had been fully considered. One commenter felt that although the research on biodegradation of PCBs has not shown full success, this is a possible solution for the future.

Response 52:

The initial screening of remedial alternatives includes an evaluation of three criteria: effectiveness, implementability and cost. Biological treatment of the PCB-contaminated soil and sediment was not fully considered because the data on bioremediation of PCBs indicate that, at this time, the processes are not fully effective or implementable.

U.S. EPA agrees that the research on biodegradation of PCBs looks promising for the future. New research indicates that different strains of organisms may be developed that are more viable over a broader range of environmental conditions (including resistance to co-contaminants), and that are better able to handle the wide range of PCB isomers. However, at this time, bioremediation technologies have not been fully effective at handling the types and concentrations of contaminants found at the Refuge.

Comment 53:

One commenter suggested that a two-phase process to handle the PCB-contamination might be more acceptable. The first phase would be separation of the PCBs from the soil, which would eliminate the immediate risk to the environment. The second phase would be incineration of the separated PCBs utilizing newer incineration technology such as the plasma torch.

Response 53:

Although innovative separation technologies are currently being investigated, no proven technology exists for physical separation of PCBs from a soil substrate. Thermal treatments such as incineration using a plasma torch achieve the objectives of both proposed "phases" above. However, plasma torch technology has not been adequately developed to be included in consideration of alternatives for the Crab Orchard site.

Comment 54:

Some commenters expressed a preference for containment of the waste as the selected remedy. One commenter suggested the construction of an earthquake-proof building to store the waste.

Response 54:

Response #51 explains that CERCLA requires that U.S. EPA must select a remedy which is permanent and will reduce the toxicity, mobility or volume of contaminant to the maximum extent practicable. Storage, even in an earthquake-proof building, is not a viable alternative because it does not fulfill either of these goals. Storage is particularly unacceptable when compared with technologies such as incineration, which permanently destroys PCBs.

Comment 55:

A few commenters had questions and comments about polyethylene glycolate dechlorination treatment processes (commonly known as APEG or KPEG).

Response 55:

Chemical dechlorination processes use specially synthesized chemical reagents to destroy hazardous chlorinated molecules (like PCBs) or to detoxify them to form other compounds that are considered less harmful and environmentally safer. These treatment processes are currently being investigated by U.S. EPA, but are not developed enough to be considered for full-scale use for Superfund sites for, among other things, the following reasons:

1. Water can adversely affect the rate of reaction.
2. Reaction byproducts are currently not well understood and may be more toxic than the contaminants being treated.

3. The need to deliver, mix and heat the reagent (which is expensive and non-recoverable when used in situ) and the soil may limit the applicability of the technology.

Comment 56:

One commenter asked why a specific amount of the contaminated material (up to 10,000 cubic yards) could not be given to a number of treatment vendors to allow them to demonstrate their own systems. One commenter suggested that innovative technologies such as the use of ultrasound, light and ozone, or technologies using electron donors be used to destroy the PCBs.

Response 56:

U.S. EPA maintains information on technologies suitable for the treatment of various types of hazardous wastes. Among the information which is available and updated on a regular basis are reports on treatment technologies in use, treatability studies and reports on developing innovative technologies. In assessing the treatment technologies available for the PCB and lead bearing waste from the PCB Areas operable unit, these sources were consulted. Consideration of the applicability of a technology includes an evaluation of whether the technology has been demonstrated to be effective, whether the process is available at full scale, whether it has potential adverse effects on the co-contaminants, and legal restrictions on what type of treatment may be used. Although the above-mentioned technologies may one day score highly under such an evaluation, they are not viable for selection at this time.

A Site-specific remedy is not the place to allow a number of different treatment vendors to try to demonstrate that their processes may be effective. A major problem with this proposal is that an successful system may make the situation at the Site worse.

Comment 57:

One commenter, a vendor of waste treatment processes, submitted information pertaining to two treatment processes that felt would adequately remediate the Site. The processes are: the ABSKO process which is said to be an organic reduction process which removes chlorine from hydrocarbons and produces a synthetic fuel; and the BioVersal process which is said to remove hydrocarbons from soil. The commenter requested a sample of material to run tests to demonstrate the two processes.

Response 57:

The data submitted to support the processes raise serious questions and concerns. First, the processes were used on oils, but there is no data specific to PCBs. Second, the processes were said to leave approximately 200 parts per million (ppm) of residue, which far exceeds the acceptable cleanup target for the Refuge. Third, the ABSKO process is said to

produce a synthetic fuel which is not characterized and may be hazardous or toxic. This fuel would require subsequent treatment or disposal which cannot be evaluated since its makeup is unknown.

Comment 58:

Some commenters expressed a preference for stabilization/fixation treatment of the PCB-contaminated material because it is cheaper and appears to be safer and effective.

Response 58:

Stabilization/fixation was evaluated as a technology and incorporated into the Consolidated Alternatives in the FS and Proposed Plan. It is also incorporated into the Selected Remedy to address soils and sediments contaminated with heavy metals (approx. 3,600 cubic yards) and incinerator residue, as appropriate. Although stabilization/fixation appears to be cheaper than incineration and may have fewer short-term risks than those attributed to incineration, stabilization/fixation does not provide treatment of PCBs to reduce their mobility, toxicity or volume to the degree that incineration does. When compared to the Selected Remedy, stabilization/fixation fails to fulfill the CERCLA statutory mandate for treatment of the principal threats at a site and the mandate for permanent remedies where possible.

Comment 59:

One commenter questioned whether the hazardous materials could be recovered and recycled.

Response 59:

Recovery technologies are not available for the contaminants found at the study sites comprising the PCB Areas operable unit. Technologies such as those used in mining have not been applied to hazardous waste and have not been shown to achieve the cleanup targets required. Soil washing is one technology which has potential to be used on metal contamination. This process extracts contaminants from the soil using a liquid medium as a washing solution. This technology will reduce the volume of contaminated soil and increase the concentration of the contaminants in the residual. The potential theoretically exists that the metal contaminants could be concentrated to the point where recovery was feasible. However, there are several reasons why this technology was not considered for the metal co-contamination at the Refuge. The reasons include: 1) the process is not commercially available for soils contaminated with metals; 2) the process works best on coarser soils, while the soils at the Refuge tend to consist of fine particles (silts and clays), so the feasibility of the treatment is questionable; 3) lead contamination poses problems for the process because lead is not chemically associated with any particular fraction of the soil and therefore there are difficulties in washing it; 4) the cadmium, chromium and lead react differently to chemical and physical conditions so that a

washing solution suitable for all of them would be difficult to specify; and 5) concentrating the metal contamination from the soil and sediment at the Refuge might make the concentrations high enough to render the immobilization treatment less effective.

Comment 60:

The Shawnee Group of the Sierra Club recommended a remedial alternative that would include incineration of only those materials that are not co-contaminated with metals, treatment by stabilization/fixation of toxic incinerator ash and non-incinerated soils, and landfilling of the residue preferably in an above-ground landfill (otherwise in a TSCA landfill). This recommendation was made with caveats that certain assurances and implementation requirements (discussed elsewhere in this Responsiveness Summary) would be met.

Response 60:

The remedial alternative proposed virtually mirrors the Selected Remedy chosen by U.S. EPA and described in the ROD. The one exception to the Club's proposal is the inclusion of an Alternative Treatment Technology, ISV, to replace the incineration and stabilization/fixation components of the Remedy. This Alternative Technology will only be used, however, after a demonstration that ISV successfully meets the remediation goals and performance standards established for the Selected Remedy.

The assurances sought by the Club include stringent monitoring and malfunction controls for the incineration (discussed in Response #31) as well as testing of the ash for hazardous characteristics and proper landfilling and closure for residuals which remain on-site. Steps to provide those assurances are discussed in this ROD.

F. Comments and Questions Regarding Implementation of the Remedy

Comment 61:

Some commenters felt that if incineration is used, there should be independent studies and oversight to monitor the performance of the incinerator, and that the public should have input into all of the monitoring plans and data.

Response 61:

As much as possible, U.S. EPA will allow interested parties to conduct independent studies and monitoring of the implementation of the Remedy. As discussed in Response #10, U.S. EPA recommends the TAG process as a forum for achieving the input desired in the planning and implementation of the Selected Remedy.

Comment 62:

Commenters again raised questions regarding specifics of incinerator design and operation. Examples include: Specifically where will the unit be located? What type and model will it be? What will the technical and operational specifications of the unit be? Others made recommendations as to conditions to be met as a pre-requisite to operation. Such recommendations included: having emergency procedures in place against operational failures, having monitoring schedules and testing methods specified, and periodic monitoring to ensure performance standards are being met.

Response 62:

Several of these concerns were discussed in Response #31 as well as in the ROD itself, however, most of these concerns cannot be addressed until the design phase of the remedial action begins. A general discussion of the incinerator and its control/safety systems is given in response #31. However, the actual design and specifications will be developed by an experienced incinerator design contractor. Once designed and built, the incinerator operating conditions will be determined after an actual "trial burn" is conducted. A range of operating parameters will be established for long-term operation, such as 1) the feed rate of waste, 2) the amount of fuel needed to maintain combustion and 3) threshold levels for shutdown of the incinerator in malfunction situations. The methods and schedules for effluent and emission testing, will also be established after the trial burn. As discussed earlier, input from community interest groups is encouraged during the design and implementation process and U.S. EPA will place the appropriate information in repositories for access to all interested parties.

Comment 63:

One commenter stated that scrubbers (pollution control devices) produce sludge and questioned what would be done with the sludge.

Response 63:

Because the objective of the scrubber is to remove heavy metals and organic fumes, the scrubber sludge would probably be determined to be RCRA hazardous, thus, the sludge would be treated with stabilization/fixation to render it nonhazardous and landfilled in the on-site industrial landfill.

Comment 64:

Several commenters expressed concern that once an incinerator was brought to the Site, other waste material from off-site would be brought in and the incinerator would be left running full-time.

Response 64:

The Selected Remedy will be designed and implemented only for the hazardous substances found on the Refuge. Although an on-site Superfund incinerator does not require an operating permit, it must meet the substantive requirements of TSCA and RCRA. In order to accept other wastes from off-site, U.S. EPA would need to obtain a RCRA permit for commercial operation of a hazardous waste incinerator. Since U.S. EPA has no such permit, and will not be applying for one, the incinerator will be prohibited from accepting any wastes from off-site.

Comment 65:

Commenters questioned whether wastes from other operable units at the Refuge would be candidates for treatment in the incinerator.

Response 65:

Incineration may prove to be a feasible technology to deal with wastes from future operable units, for example, destruction of any ordnance material found in the explosive/munitions areas. However, the incinerator design necessary for destruction of PCBs may not necessarily be appropriate for ordnance destruction. At this time, it is not prudent to try to develop a "dual-design" incinerator on the speculation that the incinerator might be used for other operable units.

Comment 66:

One commenter had specific questions and concerns regarding components of the remedy other than the incinerator. These include:

- a. How will the landfill be constructed?
- b. What type of cap will be constructed, and how will it be monitored and maintained?
- c. Will funds be available for maintenance of the cap?

Response 66:

The performance standards and requirements for the landfill design are discussed in Section VIII.A.1. of the ROD, however, specific design parameters such as siting and cap specifications will be refined in the remedial design process. The monitoring and maintenance of the cap will be conducted by the party implementing the ROD (i.e., DOI or potentially responsible parties (PRPs)), who will be required to maintain adequate funds for long-term operation and maintenance of the cap.

G. Comments from Sangamo Weston, Inc.

Comment 67:

Sangamo Weston, Inc. repeated the comments that they made for the Metals Areas operable unit regarding the creation of separate operable units. They provided their comments on the Metals Areas as an attachment to the comments on the PCB Areas. In general, Sangamo commented that they opposed U.S. EPA's decision to treat the Metals and PCB Areas as separate operable units.

Response 67:

U.S. EPA reiterates its response to Sangamo's original comments regarding the creation of operable units. U.S. EPA stands by its decision to create the two separate operable units from the study sites discussed in the FS (at least two more operable units have been developed, pertaining to the "munitions areas" and "miscellaneous areas." Moreover, since the ROD for the Metals Areas was signed by U.S. EPA, the National Contingency Plan (NCP) has been revised (Federal Register Vol. 55, No. 46, March 8, 1990, effective date April 9, 1990). The new NCP states in 40 CFR 300.430(a)(ii) that operable units generally should be used "when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup." The stipulation is that "Operable units... should not be inconsistent with nor preclude implementation of the expected final remedy." The creation of separate Metals and PCB Areas operable units clearly meets these requirements and management principles.

Comment 68:

Sangamo Weston, Inc. commented that the potential risks from the sites comprising the PCB Areas do not warrant the "extreme" remedy. Sangamo Weston, Inc. stated that "... the desire for 'permanence' does not alone justify selection of the most extreme and costly treatment remedy available...." They state that costly treatment technologies should be reserved for highly mobile or highly toxic wastes that cannot be reliably controlled through other means. Sangamo Weston, Inc. believes that alternatives other than complete incineration fully satisfy CERCLA criteria and goals and states that "Sangamo believes that EPA did not adequately balance the statutory criteria in developing its incineration remedy."

Response 68:

The Decision Summary of the ROD and the accompanying Administrative Record document in great detail how U.S. EPA applied the risk assessment and remedy selection process to choose the Selected Remedy. U.S. EPA believes that the CERCLA criteria and goals were applied consistent with

the National Contingency Plan (as required) and disagrees that the risks at Crab Orchard do not support the choice of incineration or ISV. These technologies were chosen not out of a "desire" for permanence, but in response to a clear statutory mandate from Congress. The mobility and toxicity of such contaminants as heavy metals and PCBs, particularly at the levels found at Crab Orchard, clearly warrant reliable control technologies, as Sangamo has stated. Incineration and stabilization/fixation technologies have been repeatedly demonstrated to provide that reliability, or permanence, at full-scale operation. Other alternatives, including the least-costly alternative of in-place containment preferred by Sangamo, are not permanent solutions and compared to the Selected Remedy, leave unacceptable risks of exposure at the Refuge.

Comment 69:

Sangamo Weston, Inc. is concerned that the cleanup targets for the PCB Areas are overly stringent, inappropriate or unfounded in light of the risk assessment in the RI/FS. Specific concerns with the cleanup standards follow:

a. Sangamo Weston, Inc. felt that the threshold criteria above which excavated soil and sediment would be treated and below which the materials would be disposed of without treatment was not clear in the Proposed Plan. They felt that an approach consistent with RCRA and other laws would be to treat by stabilization/ fixation only the excavated material that exhibits the characteristic of Extraction Procedure (EP) Toxicity when tested in accordance with U.S. EPA protocols.

b. Sangamo Weston, Inc. objects to the blanket application of a cleanup criteria for soil and sediment of 1×10^{-6} excess cancer risk. The reasons for their objection follow:

(1) They state that the compound-specific cleanup targets as developed in the RI/FS prepared for Sangamo by O'Brien and Gere are sufficient because they were developed to protect against the potential risks of the substances identified in the RI/FS, and that "There is no need to specify a cleanup criterion in the ROD for other substances that have not been discovered ..."

(2) They are concerned that U.S. EPA failed to assure that calculations of cumulative risk would be based on "realistic and site-specific exposure scenarios rather than on potentially inappropriate general assumptions."

(3) Further, they believe that "The 10^{-6} risk level should not be a rigid requirement, but at most a goal to be considered", and that the ROD should provide for the cleanup goal to be stipulated as an excess risk range of 10^{-4} to 10^{-7} .

c. Sangamo Weston, Inc. states that they believe the stated cleanup level for groundwater of 10^{-6} excess cancer risk is inappropriate for several reasons. These reasons are outlined below:

(1) Because there are no current users of the Refuge groundwater, and no future use is expected for groundwater, there are no receptors for this route of exposure. Sangamo Weston, Inc. states that the ROD should therefore not establish a specific groundwater cleanup standard.

(2) The RI/FS did not analyze impacts of using a 10^{-6} risk level as a cleanup standard for groundwater, and Sangamo Weston, Inc. expressed concern that this standard might require substance-specific cleanup levels that are below the method detection limits for such compounds. This would make the cleanup level technically impracticable to attain at the site.

(3) As with soil and sediment, Sangamo Weston, Inc. is concerned that U.S. EPA has not assured that the calculation of risk will reflect realistic and site-specific exposure scenarios.

(4) As with soil and sediment, the use of 10^{-6} as the cleanup standard, rather than a risk range of 10^{-4} to 10^{-7} , is inappropriate.

Response 69:

In order to clarify some of the issues raised by Sangamo Weston, Inc. and to address some of their concerns, U.S. EPA expanded the discussion of the cleanup standards in the Decision Summary portion of this ROD. Specific concerns are addressed below:

a. U.S. EPA agrees with Sangamo's position with regard to using threshold criteria which delineate which waste must be treated and which waste will be landfilled without treatment. In the Proposed Plan, the criteria for the stabilization/ fixation treatment process was "Soils and sediments which are considered hazardous because of their characteristic to leach metals would be treated..." This approach is consistent with RCRA and other laws. The intent of this was to require treatment of only material which is RCRA hazardous because of the characteristic to leach metals (EP Toxicity). Language has been added in the Decision Summary portion of this ROD to clarify this.

b. U.S. EPA is retaining the 1×10^{-6} excess cancer risk as a cleanup standard for soil and sediment for this operable unit. This criterion is established for the protection of public health and falls within the 10^{-4} to 10^{-6} risk range established in the revised NCP and considered by the Regional Administrator when choosing remediation goals. The 10^{-6} excess risk standard has been selected in numerous RODs issued by Region V in the past, and is consistent

with criteria established at other sites where multiple contaminants are present. Responses to Sangamo Weston, Inc.'s specific comments follow:

(1) The compound-specific cleanup targets, as developed in the RI/FS, the Proposed Plan and this ROD, were developed to protect against the potential risks of the target substances identified in the RI/FS, including the risks to exposed wildlife for the specific compounds addressed. However, the target compounds were refined without estimating the risk from other compounds that were found at the study sites. The risk assessment assumed that many of these other compounds would be addressed by the remediation for specific chemicals. However, U.S. EPA must assure that this occurs and the 10^{-6} excess risk level is the criterion against which this will be assessed. CERCLA requires that hazardous substances that "have not been discovered" must also be addressed if they are found at the site.

(2) U.S. EPA's policy in assessing risk from Superfund sites is that the assessment be based on a reasonable, worst case risk assessment. Therefore, in estimating the residual risk from the remediated areas, the calculations of risk to establish whether the cleanup target has been met will be based on "realistic and site-specific exposure scenarios rather than on potentially inappropriate general assumptions." The final assessment for the remediated areas will follow the U.S. EPA guidance on performing risk assessments.

(3) The revised NCP allows for consideration of cleanup targets within an excess risk range of 10^{-4} to 10^{-6} . However, U.S. EPA Region V has determined that 10^{-6} provides an appropriate standard of protectiveness as a cleanup target, based on the Regional Administrator's decision on acceptable risk management practices. There is no evidence that the 10^{-6} excess cancer risk cleanup target for the PCB Areas operable unit is in conflict with the statutory mandates of CERCLA. Also, the risk assessment in the RI supports that these levels are attainable for the study sites to be addressed. Therefore, this risk level will be retained as the cleanup level for the soil and sediment in this operable unit.

c. In the preamble to the revised NCP, U.S. EPA's approach to groundwater remediation is discussed. The preamble states "The goal of EPA's Superfund approach is to return usable ground waters to their beneficial uses within a timeframe that is reasonable given the particular circumstances of the site." The groundwater at the Refuge is a usable resource and contributes flow to a unique environment. The RI Report indicated that there was groundwater contamination associated with the PCB Areas operable unit, but did not document risks from the groundwater. U.S. EPA believes that the removal of sources of contamination will control any potential

groundwater problems. However, if monitoring activities during and after remediation indicate that there is potential risk from the groundwater, additional remediation activities will be considered.

Since a remedy other than source control was not selected for groundwater, the 10^{-6} excess cancer risk target level discussed in the Proposed Plan and selected in this ROD will not necessarily be a cleanup level, but will trigger a review of conditions at the sites. Language has been added to the Decision Summary portion of the ROD to clarify this. In addition to the excess cancer risk standard to trigger a review of the groundwater conditions at the study sites, there are standards for non-cancer chronic health effects. These standards have also been clarified in this ROD.

Specific comments are addressed below:

(1) Groundwater is an environmental media that has been impacted by the past disposal activities at the study sites comprising the PCB Areas operable unit. Because groundwater is a valuable resource, U.S. EPA's goal is to maintain the beneficial uses of groundwater. In addition, the groundwater at some of the study sites discharges to Crab Orchard Lake and potential discharge of contaminants to the Lake is a concern. As discussed above, since the risk from the sites should be addressed by the removal of contaminant sources, the standards specified in the ROD are not cleanup standards, but standards to evaluate how effective source control has been. If the standards specified in the ROD are exceeded, the groundwater situation will be evaluated to determine if further remedial action is necessary.

(2) As stated, the standards specified in this ROD for groundwater are not cleanup standards, but triggers for further review and evaluation of groundwater conditions. Therefore, the RI/FS did not analyze the impacts of using them as cleanup standards for groundwater. Sangamo Weston's concern regarding substance-specific levels that are below the method detection limits for such compounds is one which is easily addressed in the remedial design phase. Remedial design and remedial action will require a workplan that specifies, among other things, the constituents to be monitored for groundwater and the quality assurance required. The risk assessment is most likely to include constituents that have actually been detected in accordance with the approved Quality Assurance Project Plan.

(3) As discussed in paragraph b(2) above, the risk assessment calculations for groundwater will reflect realistic and site-specific exposure scenarios, in accordance with U.S. EPA guidance.