



DEPARTMENT OF THE NAVY  
CRANE DIVISION  
NAVAL SURFACE WARFARE CENTER  
CRANE, INDIANA 47522-5000

N00164.AR.000163  
NSWC CRANE  
5090.3a

IN REPLY REFER TO:

5090  
Ser 095/U4691  
9 DEC 1994

U.S. Environmental Protection Agency, Region V  
Region V Waste Management Division  
Attn: Ms. Carol Witt-Smith (HRP-8J)  
77 West Jackson Blvd.  
Chicago, IL 60604

Dear Ms. Witt-Smith:

Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) submits responses to the U.S. EPA's comments on the draft Risk Assessment Work Plan (RAWP) as enclosure (1). NAVSURFWARCENDIV Crane apologizes for the delay in submitting these comments and any inconvenience this might have caused. Of course, a prompt response would be appreciated in order to finalize the RAWP and proceed with the Risk Assessment field work. Enclosure (2) contains the required certification statement.

Encl:

- (1) Response to USEPA Comments
- (2) Certification Statement

Copy to: (w/o encl)  
SOUTHNAVFACENGCOM, (CODE 185ND)  
COMNAVSEASYS COM (SEA 654E)  
USAE-WES, BILL MURPHY (GG-YH)  
RUST, CHARLIE ZEAL

  
G. K. Hill  
Deputy Commander, Naval Surface Warfare Center  
Crane, Indiana 47522-5000

September 8, 1994  
RTSB/94-0029

Ms. Adrienne Wilson  
(Code 1864)  
SOUTHNAVFACENGCOM  
2155 Eagle Drive  
North Charleston, SC 29418

Re: Contract No. N62472-90-D-1298 "CLEAN"  
Risk Assessment Work Plan  
CTO #0076, NAVSURFWARCENDIV, Crane, Indiana  
RUST E&I Project No. 20615

Dear Ms. Wilson:

The purpose of this letter is to transmit a copy of the proposed responses to USEPA Region V comments on the draft Risk Assessment Work Plan (RAWP) associated with CTO #0076. A copy of the June 21, 1994, USEPA Region V comment letter is enclosed. The responses are numbered and identified to reference the USEPA comments as presented in their June 21, 1994, letter. In addition, a copy of the responses to NAVSURFWARCENDIV July 25, 1994, comments on the draft RAWP is included for your review and comment. I have also sent a copy of both response to comments and the USEPA letter to Mr. Tom Brent.

Once you have reviewed the responses, please contact me at (414) 458-8711 with any questions or comments. It is my understanding that once the responses are finalized, either yourself, or Mr. Brent will transmit the responses to USEPA Region V by September 19, 1994, for their review and approval.

Sincerely,



Charlie Zeal, P.E.  
Project Manager

Enclosure: As Noted

cc: Tom Brent, NAVSURFWARCENDIV  
Debra Wroblewski, Halliburton NUS  
John Trepanowski, Halliburton NUS  
Lorrie Ransome, RUST E&I  
Jeff Maletzke, RUST E&I  
Jeff Stevens, RUST E&I  
Allan Hale, RUST E&I  
File

Response to Major Concern No. 1:

As requested by the United States Environmental Protection Agency (USEPA), a residential scenario will be added to the risk assessment as the worst case scenario.

Response to Major Concern No. 2:

The most recent available sampling data will be used during the performance of the risk assessment.

Response to Major Concern No. 3:

The issue of State and Federal rare, threatened and endangered species will be addressed. The analysis of sensitive species from both the regulatory and the ecological frameworks forms an integral portion of the overall analysis conducted as part of the ecological risk analysis activities. As a component of this analysis, the Halliburton NUS Team will contact the state and federal sources of information in order to determine precisely the species of concern, the known locations in which these species have been observed (relative to the study area) and the individual species critical habitat requirements that affect the presence or absence of potential species of concern within the study area. In addition, since NSWCC has been a focus of activities in the past which have involved an ecological component, there are literature and research findings that may be relevant or applicable to the three Solid Waste Management Unit (SWMU) sites of concern (Ammunition Burning Ground (ABG), Old Rifle Range (ORR), and Demolition Range (DR)) to this specific study.

The Halliburton NUS Team understands (based on our August 12, 1994, conference call with the USEPA), that a list of species and personal contact individuals in the state and federal regulatory agencies with knowledge of the site is available through the USEPA and will be provided to the Halliburton NUS Team for inclusion as part of the database to be used for the program.

Comment No. 3 additionally notes that a biological assessment will be necessary for the bald eagle in order to determine if any of the SWMUs have an impact on the species or not. We believe that very recent information included in the Environmental Assessment for the Army Ammunition Peculiar Equipment 1236 Deactivation Furnace at the Naval Surface Warfare Center, Crane Division, Crane, Indiana, revised April 1994 has direct bearing on this issue. As part of NEPA compliance requirements for this proposed program, both the United States Fish and Wildlife Service (U.S.F.W.S.) and the Indiana Department of Natural Resources (IDNR) were contacted to provide a biological assessment for the Bald Eagle based on several operational configuration scenarios described within the document. The U.S.F.W.S. reviewed the environmental assessment of the proposed operation and determined that the proposed program would have no significant effect on wetlands and would not affect any federally endangered species. The IDNR provided supplemental literature information and draft report comments and concluded that because of the distance and location of the proposed activity and its low noise level, that the agency could foresee no demonstrable negative impacts on nesting and wintering Bald Eagles at Lake Greenwood, Lake Gallamore, and other areas used by eagles at the Crane facility.

Considering the above findings, the Halliburton NUS Team believes that since the siting locations for bald eagles is sufficiently distant from all three of the SWMUs that there will probably be little or no direct effect on the bald eagle as a result of continued SWMU operation. However, the procedure of contacting the agencies and soliciting their comments will be conducted for the SWMU sites. In addition, we will contact and discuss with the installation wildlife officers the potential for occurrences and sightings on the three SWMU sites of any species determined either through state or federal review as having the potential for site occurrence.

As a part of the same letter to NSWCC personnel, the comment that a meeting between the consultant and the Resource Conservation and Recovery Act (RCRA) branch toxicologist and ecologist was encouraged. This meeting was held via a telephone conference on August 12, 1994, between Dr. Charles Maurice of the USEPA Region V and Dr. Allen Hale and Mr. Charlie Zeal of Halliburton NUS Team to discuss each of the ecological comments and questions contained in the USEPA Draft Risk Assessment Work Plan (RAWP) comment letter.

Response to Comment (RTC) 1: We will include and utilize the referenced USEPA document.

RTC 2: The text of the RAWP will be revised to incorporate the comment.

RTC 3: A future residential scenario at each SWMU will be added to the RAWP. This scenario will include children ingesting soil and residents drinking groundwater.

RTC4: Figure 3-2 (Surface Drainage Basin) will be edited to show the southern extent (off- facility) of drainage Basins III and IV.

RTC5: Section 3.3.3 will be edited to note that each of three SWMUs are in different drainage basins (separated by divides) from that of Lake Greenwood. Surface water flow within each of the three SWMUs is to the south away from Lake Greenwood. Groundwater flow is more appropriately discussed in Section 3.3.6. Section 3.3.6 will be edited to note that groundwater from the three SWMUs does not discharge to Lake Greenwood. Air dispersion modeling results for the three SWMUs will provide ambient air concentrations of chemicals of potential concern (COPCs) over a wide area including Lake Greenwood. Particle deposition into the lake could be modeled to show impacts to this surface water.

RTC6: Section 3.4.1.1 (ABG location and description) will be edited to incorporate a more detailed description of Little Sulphur Creek as found in the Draft RCRA Facility Investigation (RFI) Phase II Release Assessment for Surface Water at SWMU 03/10 Ammunition Burning Ground (USACE, March 1994).

RTC7: The location of cross-section G-G' is shown on Figure 3-10.

RTC8: The base map for this figure was obtained from the USACE and is presented as it appears as Figure 21 in the Draft RFI Phase II Groundwater Release Assessment, SWMU 06/09 Demolition Area and Phase III Release Characterization Report SWMU 07/09 Old Rifle Range (USACE, Feb. 1994).

As agreed to in the August 3, 1994, meeting with USEPA, Figure 3-15 will be edited to identify location of roads.

- RTC9: The date of the groundwater level measurements was March 1991. This will be noted on Figure 3-12.
- RTC10: Section 3.4.1.7 will be edited to include a description of Johnson Hollow groundwater flow as described in Technical Report GL-88-27, Geology and Hydrogeology of the Ammunition Burning Ground (Hunt, 1988).
- RTC11: The term floodplain will not be used indiscriminately in Section 3.4.1.7. The 100-year floodplain map from Martin County Flood Hazard Boundary Map/Federal Emergency Management Agency (9/4/81) will be consulted. This section will be edited to reflect definition of the floodplain based on available Indiana Department of Transportation (IDOT), IDNR, etc., resources. An Old Rifle Range (ORR) location within a floodplain will not be implied unless it is confirmed through the available resources listed above. Per conversations with Ms. Adrienne Wilson of Southern Division and a representative of the IDNR, it was agreed that the NSWCC will send the IDNR a letter requesting a floodplain elevation determination at ORR. The IDNR representative indicated it might take up to eight weeks to make that determination.
- RTC12: The second sentence within Section 3.4.2.6 should reflect 1991 rather than 1981. Figure 3-15 represents the most recent data as presented in the Draft RFI Phase II Groundwater Release Assessment, SWMU 06/09 Demolition Area (USACE, Feb. 1994). The discussion in Section 3.4.2.6 will be edited to include more detail regarding the groundwater flow patterns as presented in the Draft RFI Phase II Groundwater Release Assessment.
- RTC13(a): The text for Sections 3.4.3.3 and 3.4.3.4 will be edited to be specific to the ORR.
- RTC13(b): The text will be edited to note that surface water runoff is intercepted by sediment ponds. As agreed to in the August 3, 1994, meeting with USEPA, no quantification will be offered.
- RTC14: Silt loan will be corrected to read silt loam on page 3-22.
- RTC15: Air dispersion modeling and subsequent particle deposition modeling will be conducted for all modeled emission analytes. For Scenario B, the risk/hazard associated with breathing the air will be added to the risks from exposure to the other environmental media. In Scenario C, incremental accumulation of these emission substances in off-facility environmental media will be calculated and used to ascertain future impacts of the facility's present activities.
- RTC16(a): The review of the existing analytical data presented in Section 4.2 is a summary of USACE work completed to date. The occurrence and distribution of

contaminants in groundwater is summarized as presented in the Final RFI Phase III, Groundwater Release Characterization, SWMU 03/10 Ammunition Burning Ground. None of these issues are addressed in the Final RFI Phase III Groundwater Release Characterization. NAVSURFWARCENDIV personnel (Tom Brent, Jim Hunsicker) have not been able to link the radioactivity to base operations - the source is unknown. The Indiana Geological Survey (IGS) was contacted to determine if the radioactivity might be naturally occurring within the bedrock units beneath the ABG. The IGS is sending radon data for groundwater samples collected from Mississippian limestones in southern Indiana. The radon concentrations may be indicative of decay of naturally occurring radionuclides. However, it is not known if the IGS data will establish a potential link to the rock units beneath the ABG. In addition, it has not yet been determined which specific radionuclides are accounting for the radioactivity detected in spring samples. The text will be edited to clarify the analytical data from background groundwater monitoring well (03C17) will also serve as the background sampling for the springs.

- RTC16(b): Per Carol Witt-Smith's direction at the August 3, 1994, meeting at USEPA Region V, Spring 8 and Spring 10 (off-facility springs) will be sampled for key parameters (trichloroethylene, explosives, degradation compounds). Sampling for alpha and beta radioactivity may also be included. The text will be edited to reflect the addition of Spring 10.
- RTC16(c): Text will be clarified to use the term off-SWMU for the SWMUS and off-facility for areas beyond the base property. Based on the Final RFI Phase III Groundwater Release Characterization (USACE, 1994) and as summarized in Section 4.2.3.3 of the Risk Assessment Work Plan, Spring A and Little Sulphur Creek below Spring A are the primary outlets for groundwater originating at the ABG. A weak dye trace response in Spring 8 suggests a possible connection with ABG groundwater. Dye trace results do not suggest a link between the Beech Creek groundwater and the ABG north springs or other off-facility springs. This will be clarified in Section 4.2.3.3.
- RTC16(d): Per the response noted above for comment 16(a), additional information regarding the possible natural occurrence of the radioactivity will be obtained. If the radioactivity is not naturally occurring, additional testing for the quantity and source of radioactivity may be warranted. The nature of this additional testing will need to be determined in conjunction with the Navy and USEPA. However, in agreement with the USEPA's suggestion, this baseline risk assessment will not consider radioactivity measured in site media as a COPC. If necessary, radioactivity concerns will be addressed in a separate assessment. The text will be edited accordingly.
- RTC16(e): The Big Clifty and Beech Creek analytical values will not be averaged together. Text will be edited.

RTC16(f): The boundary wells (excluding B-10) are screened in the Little Sulphur Creek alluvium and may indirectly sample groundwater that has been in the Big Clifty/Beech Creek Aquifer. As previously noted, groundwater from the ABG discharges to springs and to Little Sulphur Creek (alluvium). However, the boundary wells are not screened within the Beech Creek or Big Clifty Formations and, therefore, do not directly monitor these formations. All of the alluvial and boundary wells will be used qualitatively to address contaminant migration, but only two wells will be used quantitatively to calculate exposure to off-facility residences (see Draft RAWP, page 4-21, Section 4.2.4). These latter two wells are 03B02 and 03B10.

Footnote B of Table 4-11 will be corrected to reflect location of the alluvial wells at/on the NSWCC property boundary.

RTC16(g): If there is a trend in the data (either up or down), the most recent data will be used. However, if there is no trend, it is proposed that all of the data for a given well be averaged.

RTC16(h): The air dispersion modeling results will provide ambient air concentrations of COPCs. These data will be used in this risk assessment for calculating inhalation exposure doses to the on-facility receptors. For the off-facility receptors, deposition modeling will be used to calculate incremental increases in secondary environmental media for a multi-media future impact assessment.

RTC16(i): The proposed Subpart S rule will not be referenced. The June 28, 1994, Region V RCRA Corrective Action Guidance memorandum will be referenced however, and the text in the RAWP changed accordingly.

RTC16(j)(1): In a human health risk assessment, animals consumed by the receptors are considered a medium. Animals as environmental receptors will be evaluated in the ecological risk assessment.

RTC16(j)(2): The line between Deer/Turkey and Base Personnel and Families should be solid, and this change has been made in Figures 4-1 and 4-2 (attached).

RTC16(j)(3): Solid lines have been added connecting Soil and Groundwater and connecting Soil and Surface Water and Sediment in Figures 4-1, 4-2, and 4-3 (attached).

RTC16(k)(a): As agreed to in the August 3, 1994, meeting with USEPA, the appropriate wording will be incorporated into the RAWP text.

RTC16(k)(b): The most current available data will be utilized during the risk assessment.

RTC16(l)(a): Comment noted and the RAWP text will be revised.

RTC16(l)(b): Comment noted and the RAWP text will be revised.

- RTC16(l)(c): The compound/analyte specific list of chemicals were provided in Tables 9-2, 9-3, 9-4, 9-6, and 9-7 in Section 9.0 of the draft RAWP which, according to USEPA's Comment 43, was not reviewed by USEPA. Please provide comments on the referenced lists of compounds/analytes so the appropriate revisions can be made to the RAWP.
- RTC16(m): The reference to the published background data will be deleted from the RAWP.
- RTC16(n)(1): The appropriate wording will be incorporated into the RAWP text.
- RTC16(n)(2): The purpose of the sampling event was to evaluate potential contamination related to past activities. This portion of the text is describing past sampling events that may not be linked to present activities.
- RTC16(n)(3): The text does not state or infer that the northern springs were background locations. Per RTC 16(a), the text will clarify that analytical data from the background groundwater monitoring well will also serve as the background sampling for the springs.
- RTC16(n)(4): Section 4.2.3.2 will be revised to reference the July 1992 data as presented in the Draft RFI Phase II Release Assessment for Surface Water (USACE, March 1994).
- RTC16(o): Identification of the parameter groups on Table 4-3 is consistent with the Draft RFI Phase II Release Assessment for Surface Water (USACE 1994). The RFI Phase II Release Assessment does not contain a complete listing of analytes. Follow-up with the Navy and USACE will be required to identify the analytes and edit Table 4-3 accordingly.
- RTC16(p): At the August 3, 1994, meeting at USEPA Region V, the "other spring" was identified as Spring 10. Per comment response 16(b), Spring 10 will be added to Table 4-4.
- RTC16(q)(1): The risk assessment work plan does not state or infer (nor should it) that Springs D, E, F, and Mountain Spring were used as background.
- RTC16(q)(2): The work plan will be revised to indicate that seasonal variability will also be evaluated.
- RTC16(q)(3): Text will be edited to clarify that Spring 8 is located off-facility.
- RTC16(q)(4): "Background" or upgradient springs have not been identified in the RAWP and therefore will not be included in the risk assessment. Background water quality for the springs that will be investigated in the study will be the upgradient aquifer data from the aquifer which discharges to the spring.

- RTC16(r): All available existing data will be utilized in the risk assessment. As directed by USEPA in the August 3, 1994, meeting, no additional soil and groundwater data will be collected for the ABG. However, the Jeep Trail Area will be investigated as proposed in the draft RAWP. The latest sampling data will be examined to determine if all Appendix 9 analytes are reported.
- RTC17: Text will be clarified to use the term off-SWMU for the SWMUs and off-facility for areas beyond the base property.
- RTC18(a): Based on data presented in the RFI Phase II Old Rifle Range Report for SWMU 03/10 (USACE, April 1991), samples identified as background contained the highest levels of some metals of all samples collected on SWMU. It is unclear why new background sampling locations were not required at the time of the release characterization studies. Per discussions at the August 3, 1994, meeting at USEPA Region V, new locations (approximately three) within similar geologic conditions and as close as possible to ORR will be proposed.
- RTC18(b): The text and Table 4-14 of the Risk Assessment Work Plan clearly identifies T-1 and B-1 as background surface water/sediment sampling locations. These locations are shown on Figure 3-13. Sample collection procedures are described in Section 9.4.4. Per USEPA's direction (August 3, 1994, meeting at USEPA Region V), proposed sample location C-1 will be deleted and two additional upstream locations will be added -- one each in Boggs Creek and Turkey Creek.
- RTC18(c): The text will be edited to avoid assignment of significance.
- RTC18(d): The issue is semantic in nature involving different use and application of the term plume. It was agreed at the August 3, 1994, meeting at USEPA Region V that no text modification is required.
- RTC18(e): See RTC16(i).
- RTC18(f): Based on conversations with NSWCC representatives, additional information regarding a larger flashing area is not available.
- RTC18(g): A future residential scenario will be added to the risk assessment for each SWMU.
- RTC18(h): Comment is noted and RAWP text will be revised.
- RTC18(i): It would appear that with the exception of April 1992 groundwater data, this section does incorporate the most current data. This section will be updated with the April 1992 groundwater data as presented in the Draft RFI Phase III Release Characterization Report (Feb. 1994). The Halliburton NUS Team was made aware of 3 to 5 rounds of "recent" Appendix 9 groundwater data at the August 3,

1994, meeting at USEPA Region V. These data will also be evaluated and incorporated into the RAWP.

- RTC18(j): Section 4.3.3.1 of the RAWP recommends sampling within the Target Area.
- RTC19(a): The soil data bases for the Navy and Army activities at the DR will be segregated because different types of ordnance are destroyed at each location using different operations. The text of the RAWP will be revised to reflect these operational differences. Therefore, different types of chemicals could be expected to be present in the soil. Different analytes and concentrations of analytes have been found in the two sets of groundwater monitoring wells.
- RTC19(b): The appropriate wording will be incorporated into the RAWP text.
- RTC19(c): See RTC16(i).
- RTC19(d): A future residential scenario will be added to the risk assessment for each SWMU.
- RTC19(e): See RTC19(a).
- RTC19(f): Section 4.4.3.3 will be updated with April 1992 data as presented in the Draft RFI Phase II Groundwater Release Assessment (USACE, Feb. 1994). Per RTC18(i), Appendix 9, groundwater data may also be incorporated.
- RTC19(g): The discussion on page 4-32 within Section 4.4.3.3 will be modified to include evaluation of analytical data from monitoring wells within the impact area separately from monitoring wells at the Point of Compliance .
- RTC20(a): As agreed upon at the August 3, 1994, meeting at USEPA Region V, the recent 3 to 5 rounds of Appendix 9 groundwater data will be reviewed for PCB detections. If PCBs were not detected, they will not be included in the groundwater analyte list.
- RTC20(b): See RTC16(a) and RTC16(d).
- RTC20(c): There is concern with the presence of PCDD/PCDF in soils only at ABG, because of the burning of chlorinated solvents. The Halliburton NUS Team will check the CTO#108 draft air modeling report and the Department of Defense (DOD) hotline to determine what studies, if any, have researched PCDD/PCDF formation in open burning/open detonation (OB/OD) activities.
- RTC20(d): Please clarify your suggested application of the "RCRA QAPP model". We believe we have referenced the appropriate guidance and correctly applied it to the RAWP. This request is made in light of USEPA's Comment 43 which states

that USEPA has not provided detailed comments on the Quality Assurance Project Plan (QAPP) in the draft RAWP.

- RTC20(e): It is unclear how this comment applies to Section 4.5 and Table 9-6. Please advise. Section 9 includes the proposed sampling and analysis. Both manganese and nitrite + nitrate nitrogen ( $\text{NO}_2 + \text{NO}_3$ ) will be sampled and analyzed for as listed in Tables 9-4 and 9-7.
- RTC21(a): Text will be edited to use the terms downgradient for groundwater, and downstream for surface water. Downgradient will not be applied to surface water.
- RTC21(b): A future residential scenario will be added to the risk assessment for each SWMU.
- RTC22(a): The future residential scenario will include a receptor drinking from an on-facility spring.
- RTC22(b): Based on discussion at the August 3, 1994, meeting at USEPA Region V, it is our understanding that the trout pond is located near Spring 1. The results of the dye trace presented in the Final RFI Phase III Groundwater Release Characterization did not confirm that Spring 1 was a discharge point for groundwater from the ABG. Followup regarding confirmation of trout-rearing activities will be conducted by the Navy.
- RTC23: See RTC22(a).
- RTC24: See RTC22(a).
- RTC25(a): See RTC22(a).
- RTC25(b): The residents of the Padanaram Community will be the off-facility receptors evaluated in the risk assessment.
- RTC25(c): The exposure duration of children living off-facility will be changed to 6 years (instead of 5 years). In addition, the adult exposure duration will be reduced to 64 years.
- RTC26(a): The algorithms presented in the RAWP are identical to those given in "Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions," U.S. EPA, 1990. Therefore, no changes to the algorithms are required in response to this comment.
- RTC26(b): If dioxins are chemicals of concern for these pathways, the most appropriate bioaccumulation factors for beef and milk in the referenced literature will be used.

- RTC27(a): The inhalation rate for a child will be changed to 0.667 M<sup>3</sup>/hr in the RAWP.
- RTC27(b): Yes, the procedure referred to is discussed in Appendix A of RAGS. The equation used to adjust administered dose to oral dose will be added to the RAWP.
- RTC27(c): Nearby, off-facility resident contact with Spring 10 contamination will be quantitatively assessed in the risk assessment.
- RTC28: The ATSDR lead model is different than the UB/K model. The UB/K model is a residential exposure model only, whereas the ATSDR model can account for residential and non-residential exposure. For the risk assessment, the UB/K model will be used to assess lead exposure to the future residential receptors. This discussion will be added to the RAWP.
- RTC29: The proposed blood lead criteria will not be termed RfCs.
- RTC30(a): A sensitivity analysis will be conducted in the risk assessment, but neither a Monte Carlo analysis nor a first-order Taylor series analysis will be performed.
- RTC30(b): A future residential scenario will be added to the risk assessment for each SWMU.
- RTC31(a): The comment concerning the hazard identification and problem formulation section has been noted. The individual discussion within this section will be expanded to include more site specific information concerning the perceptual threats to the environment as well as a further refinement of the definition of the objectives of the ecological risk assessment portion of the program.
- RTC31(b): The comment has been noted concerning the SWMU specific focus of the discussion in the text. Expansion of the consideration and discussion will be included in the RAWP to include the regional ecological units and those physiographic units that have a part in the shaping and composition of the ecological areas and site specific habitats that form the framework within which the individual SWMUs are located. Within this portion of Indiana the NSWCC facility is situated within the South-central Oak and mixed woods division including; the oak-hickory hardwoods region, and the beech, oak, maple hickory region. As a result, there is a large amount of species diversity occurring within the region and incidentally on the NSWCC facility. A detailed discussion of the importance of this regional condition will be incorporated in the discussion included in the ecological risk assessment portion of the RAWP.
- RTC31(c): The comment has been noted. The Halliburton NUS Team concurs with the tiered structure that characterizes ecological risk assessment studies. As part of the formal Ecological Risk Assessment (ERA) process where no previous studies have been conducted, the focus of attention is directed from the general area

characteristics to the site specific conditions influenced by and affecting the ecology of the surrounding area. The conditions are somewhat different at the NSWCC facility. As part of state and federal regulatory requirements concerning site activities and the site specific wildlife management program, a considerable volume of information is currently already available concerning various aspects of the site ecology. As described above, because a significant amount of ecological work has been conducted at various locations of the NSWCC, this work will be summarized as appropriate and included as part of the background information used for the ERA program.

Part of the design of the ERA for the three SWMU's involved the combination of various requirements for site sampling in such a manner that the information derived could be concurrently used for both the Human and the ERA portions of the work plan. To achieve this sampling and analysis efficiency, the program effort is directed at keeping the ERA at the same level as the Human Risk Assessment portion of the program without the need for added field requirements.

As a part of the ERA to be conducted at the three SWMU's, biological surveys and some plant and animal tissue analyses have been incorporated into the program. These specific programs have been included to aid in definitively establishing the ambient chemical contaminant levels existing in various ecological trophic levels at the site. In this focussed and directed manner, it should be possible to establish various ecological endpoints which may indicate the end of a contaminant pathway. The acquisition of this information will be important to a determination of the extent to which individual contaminants are passed through the various media under consideration and will assist in the determination of any bioconcentration or bioaccumulation of contaminants in various site resident species.

The Halliburton NUS Team believes that site specific available information augmented and amplified by the collection of site specific data from field studies will fill site related data gaps and permit the evaluation of ecological risk related to the site in a more complete and timely manner than would be possible if we were to institute site studies at the Preliminary ERA Level of Investigation.

At the time at which the draft RAWP was developed and presented to the agency for review, no air related contaminant modeling and evaluation studies had been conducted for the SWMU's. Since that time however, a study was conducted and modeling was made to delimit the behavior of atmospheric chemical contaminants. Based on a detailed review of this air modeling information, it may be necessary to expand the site ecological investigations into areas for which higher estimated or modeled chemical contaminant concentrations are indicated as probable. The existing program has included adequate design flexibility to permit expansion of the study into these areas if determined to be significant

from either a critical/sensitive habitat basis or if high deposition rates are predicted to occur.

RTC31(d): As a normal part of any Federal or State related environmental program, there is a requirement under the Endangered Species Act to consider the impact of any planned operation on the ecological integrity or viability of sensitive species or habitats occurring near or on the site. As a normal component of this program, the issue of State and Federal rare, threatened and endangered species will be addressed. The analysis of sensitive species from both the regulatory and the ecological frameworks forms an integral portion of the overall analysis conducted as part of the ecological risk analysis activities.

The Halliburton NUS Team will contact the state and federal sources of information in order to determine precisely the species of concern, the known locations in which these species have been observed (relative to the study area) and the individual species critical habitat requirements that affect the presence or absence of potential species of concern within the study area.

As mentioned above, the Halliburton NUS Team understands (based on our August 12, 1994, conference call with the USEPA), that a list of species and personal contact individuals in the state and federal regulatory agencies with knowledge of the site is available through the USEPA and will be provided to the Halliburton NUS Team for inclusion as part of the database to be used for the program.

RTC31(e): This Comment notes that a biological assessment will be necessary for the bald eagle in order to determine if any of the SWMU's have an impact on the species or not. We believe that very recent information included in the Environmental Assessment for the Army Ammunition Peculiar Equipment 1236 Deactivation Furnace at the Naval Surface Warfare Center, Crane Division, Crane, Indiana, revised April, 1994, has direct bearing on this issue. As part of NEPA compliance requirements for this proposed program, both the U.S.F.W.S. and the IDNR were contacted to provide a biological assessment for the Bald Eagle based on several operational configuration scenarios described within the document.

As part of NEPA compliance requirements for this specific program, both the U.S.F.W.S. and the IDNR will be contacted to determine the need for a biological assessment for the Bald Eagle based on several operational configuration scenarios described within the document. In addition, the Halliburton NUS Team understands that Dr. Maurice (USEPA Region V) has several form type letters to state and federal agencies of the type used to request the determination if an assessment is required for this NSWCC site, and will provide the form letters to the Halliburton NUS Team in order that we can begin the consultation process with the appropriate regulatory agencies.

- RTC32: The comment has been noted. For screening purposes at the NSWCC site, an assessment factor of 0.01 of the LD<sub>50</sub> will be used. It is recognized that there are several uncertainties relative to the use of higher concentration assessment factors. The LD<sub>50</sub> value of 0.01 will be used for both the acute and the chronic toxicity level exposures.
- RTC33: Comment has been noted and the word were will be changed to where.
- RTC34(a): The comment is noted and is correct. Table 8-1 will be modified to reflect more properly that the first group listed consists of mammal species.
- RTC34(b): Comment noted. The Bald Eagle and the Indiana Bat will be added to their respective headings in the table. These species will be asterisked and footnoted to indicate their sensitive species status. We will change the heading avifauna to birds for clarity.
- RTC34(c): Comment noted. Indicator species in the specific context of the RAWP for NSWCC includes both terrestrial and aquatic species. An indicator species can be a single species, a group of species (guild) or a particular sensitive threatened and endangered species as required for this program. This use of the indicator species concept is useful in evaluation of the quantity, quality, and extent of habitat areas suitable for use as forage, cover concealment, and rearing areas for the wildlife of the site area. The degree to which impacts resulting from or projected to occur as the result of site activities can be extrapolated to the larger segment of the wildlife community depends largely on careful indicator species selection.

Indicator species can be selected using two approaches; 1) selection of species to be used as indicator species consisting of those species with a high public interest, economic value or similar criterion, and 2) selection of indicator species in order to provide a broader ecological perspective within or throughout a given ecotype. For this type of program in which it is important to increase the ecological perspective of an assessment, the following types of species were considered:

- 1) Species known to be sensitive to specific land use actions. The species selected using this approach serve as "bioindicators" or "early warning" species for the affected wildlife community.
- 2) Species that form a key role in a community due to their role in nutrient cycling or in energy flow.
- 3) Species that represent groups of species that utilize a common environmental resource (guilds). A representative species is selected from the various guilds and predicted environmental impacts for the selected

species can be extended with some degree of confidence to other guild members.

- RTC34(d): Comment noted and the headings will be altered to include the turkey vulture under the bird heading and a separate heading will be established to collectively include insects (both terrestrial and aquatic).
- RTC35: Comment noted. It is correct that only the soil ingestion exposure pathway is discussed in detail in this section. The emphasis in this section is to illustrate the manner in which the various exposure routes will be evaluated including the soil (as used in the example), surface water, ground water and airborne media. The detailed discussion of the ecological exposure pathways including inhalation, dermal contact, and incidental ingestion are described under the heading 8.3.3 Quantitative Environmental Fate Analysis.
- RTC36(general): Figures 8-1, 8-2, 8-3, and 8-4 in the draft RAWP have been consolidated into Figures 8-1 and 8-2 (attached).
- RTC36(a): Comment noted. Discussion was held during the August 12, 1994, telephone conference call concerning this issue. At the time of the preparation of the RAWP it was unclear based on available hydrologic information as to whether a clear solid hydraulic conductivity relationship could be established for the springs near the three SWMU sites. After the discussion, it was agreed to include the springs as a potential surface water source of contamination by designation. The figures will be altered to reflect this change.
- RTC36(b): The comment is noted and we concur. Run-off will be included as a surface water condition and not a ground water one.
- RTC36(c): Comment noted and in much the same manner as described in RTC36a above, at the time of the initial submittal of the RAWP it was not clear that a strong linkage existed between the ground water and the riparian vegetation. We will alter the figure to reflect our recent discussions concerning this matter. At the time of the original submittal, we considered "phreatic water" (near surface ground water) to be more a surface water condition than a ground water condition.
- RTC36(d): The comment is noted. We will reduce the number of figures to reflect the reviewer's comments. In addition, efforts to simplify the individual schematic representations will be conducted.
- RTC36(e): The comment is noted, in the effort to present in schematic format all of the major linkages, we included the major ecological groups and the medias and pathways involved. We will attempt to simplify the figures to an even greater extent than originally shown.

**RTC36(f):** Originally in the RAWP, the future use scenario for the ERA assumed that the site would be converted to a park or natural area. Under this plan, the ORR, ABG, and DR would be cleared of unexploded ordnance by NSWCC or Army personnel, regraded and contoured and planted with ground cover, and possibly tree/shrub vegetation. Given this future use scenario with conversion and complete ground cover, there would effectively be no wind-borne soil exposure pathway.

Subsequent discussions indicated that a future use scenario considering that the current site uses would continue into the future unchanged would result in the potential for a wind-borne soil exposure pathway through either aerosolization, saltation or ablation mechanisms. This future use scenario will be considered and added to the future use scenario to be provided.

**RTC36(g):** The comment has been noted. A revised figure will be prepared as part of the RTC36d cited above. This figure will clearly identify the ingestion, inhalation, and dermal contact exposure routes.

**RTC36(h):** This comment has been noted. A revision to the food chain portion of the figure will be made to illustrate the path from fish to piscivorous birds and from fish to mammals as requested by the USEPA for the ERA.

**RTC37(a):** The comment is noted. The deposition of contaminants of concern on vegetation in the area downwind of the three SWMU's was considered as part of the program design. Difficulties in addressing finite percentages of contaminant contribution to this potential uptake route include the conditions that;

- 1) The NSWCC receives an annual precipitation component of 44 inches. This includes from 62 to 68 percent that is received during the active plant growing season. While it is possible to estimate deposition of contaminants resulting from OB/OD at the SWMU's, the "cleansing" effect of the ambient precipitation regime in airborne depositional contaminants of concern is difficult to establish with any level of certainty.
- 2) All three SWMUs and in fact all of the NSWCC are within the Western Mesophytic Forest Region of the Eastern Deciduous Forest (Braun, 1950). As a result, most of the site vegetation produces foliage during the active growing season and sheds the foliage at the end of the season during the fall season. Because of this, the foliage and forage materials are only available to wildlife species during the active growing season which is a lower percentage of the total time during which airborne contaminants of concern are generated from OB/OD at the SWMU sites.
- 3) Depending on the individual contaminant of concern and the individual vegetation species acting as a receptor surface, there is a potential for

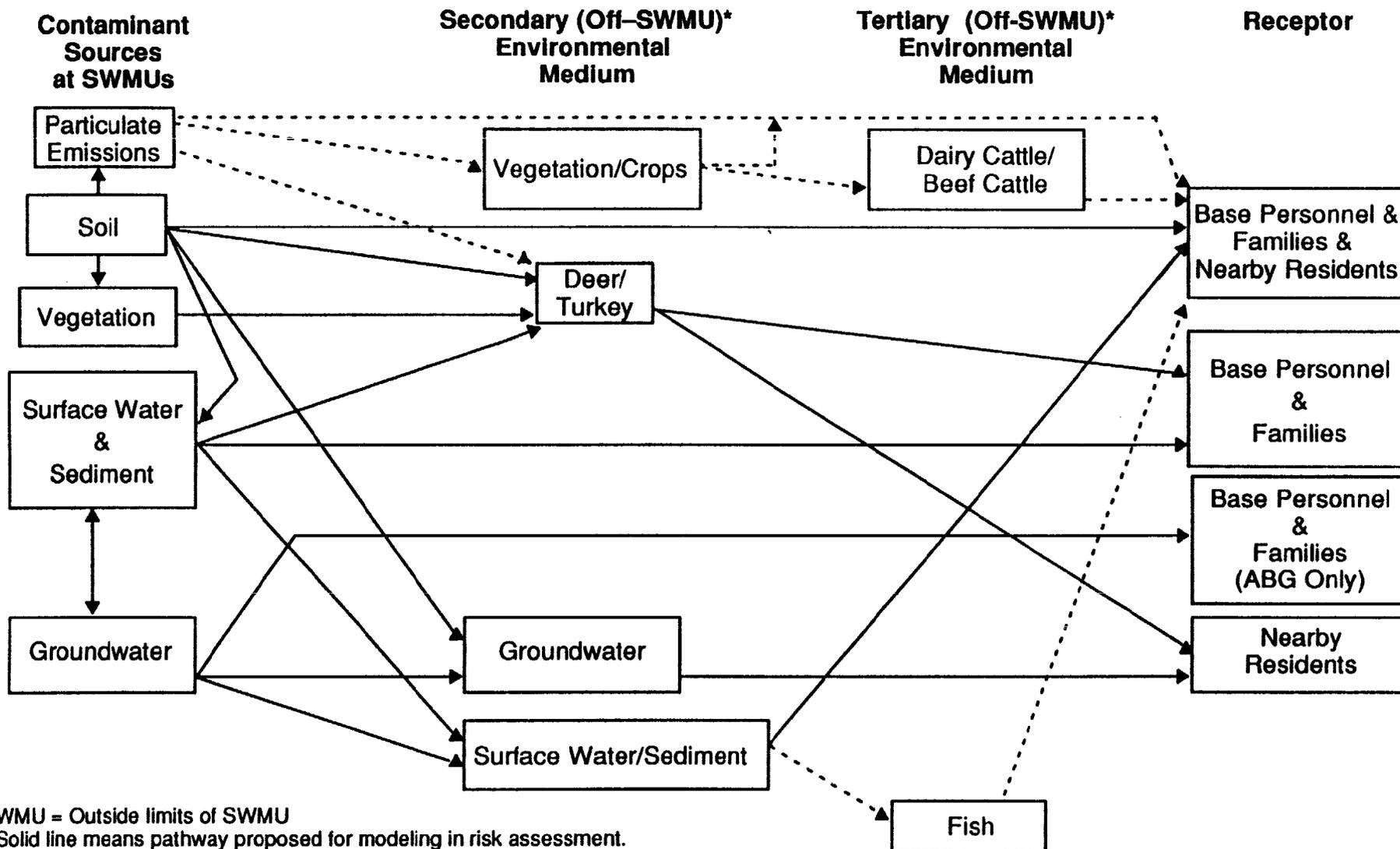
absorption (and adsorption) selectively, of contaminants of concern onto and into the plant tissues. The extent to which this plant absorbed material is available for foraging animals is unknown at the site. For this reason, selected plant tissue analysis has been incorporated into the ERA portion of the RAWP.

- RTC37(b): The comment has been noted. As described in RTC32, for the NSWCC site, an assessment factor of 0.01 of the LD<sub>50</sub> will be used. It is recognized that there are several uncertainties relative to the use of higher concentration assessment factors. The LD<sub>50</sub> value of 0.01 will be used for both the acute and the chronic toxicity level exposures.
- RTC38: The comment has been noted. The ground water exposure pathway will be considered by the addition of text to describe the ground water pathway as an exposure pathway at the three SWMU sites, that can have an influence on the terrestrial and/or aquatic ecosystems of the site area.
- RTC39: At the time of the writing and production of the ERA portion of the draft RAWP, no airborne contaminant modeling studies had been performed for the three SWMU's at Crane. Since that time, however, we have received a "Draft RCRA Air Quality Assessment at the Ammunition Burning Ground, Demolition Range, and Old Rifle Range for Naval Surface Warfare Center, Crane Division." The information contained within this report will be considered and will be used as applicable in determining the airborne contaminant migration directions and locations where increased levels of contaminants are projected to occur.
- RTC40: The comment has been noted. At the meeting with USEPA Region V on August 3, 1994, in Chicago, as well as during the August 12, 1994, telephone conversation, the USEPA expressed interest in increasing the number of locations at which sediment samples were to be collected for analysis. We understand the concern for the potential downstream effects of some of the contaminants of concern. We will, therefore, include several additional sediment sampling locations downstream of the stormwater ponds to determine the potential downstream contaminant concentration levels as part of the field portion of the ERA field sampling program.
- RTC41(a): The comment has been noted. As described in RTC32 and RTC37b for the NSWCC, an assessment factor of 0.01 of the LD<sub>50</sub> will be used. It is recognized that there are several uncertainties relative to the use of higher concentration assessment factors. The LD<sub>50</sub> value of 0.01 will be used for both the acute and the chronic toxicity level exposures.
- RTC41(b): The comment has been noted and the use of the "AQUIRE" acronym will be used where designation of the computer modeling program is indicated in the text of the ERA.

RTC42: The comment is noted. We are in concurrence with the observation that macroinvertebrates are more appropo as indicators of the conditions occurring in the aquatic sediments than they are for the water column. For this specific reason, in Section 8.5.1, Page 8-16 last paragraph, we indicated that in addition to the use of Macroinvertebrates for the sediments, we were specifying fish as indicator organisms for water quality conditions in the water column. The text will be altered to reflect this condition more precisely.

RTC43: Based upon discussions with USEPA during the August 3, 1994, meeting at USEPA Region V offices, it is our understanding that USEPA was going to provide comments on the Sampling and Analysis Plan and Quality Assurance Project Plan by August 31, 1994. To date, we have not received any comments.

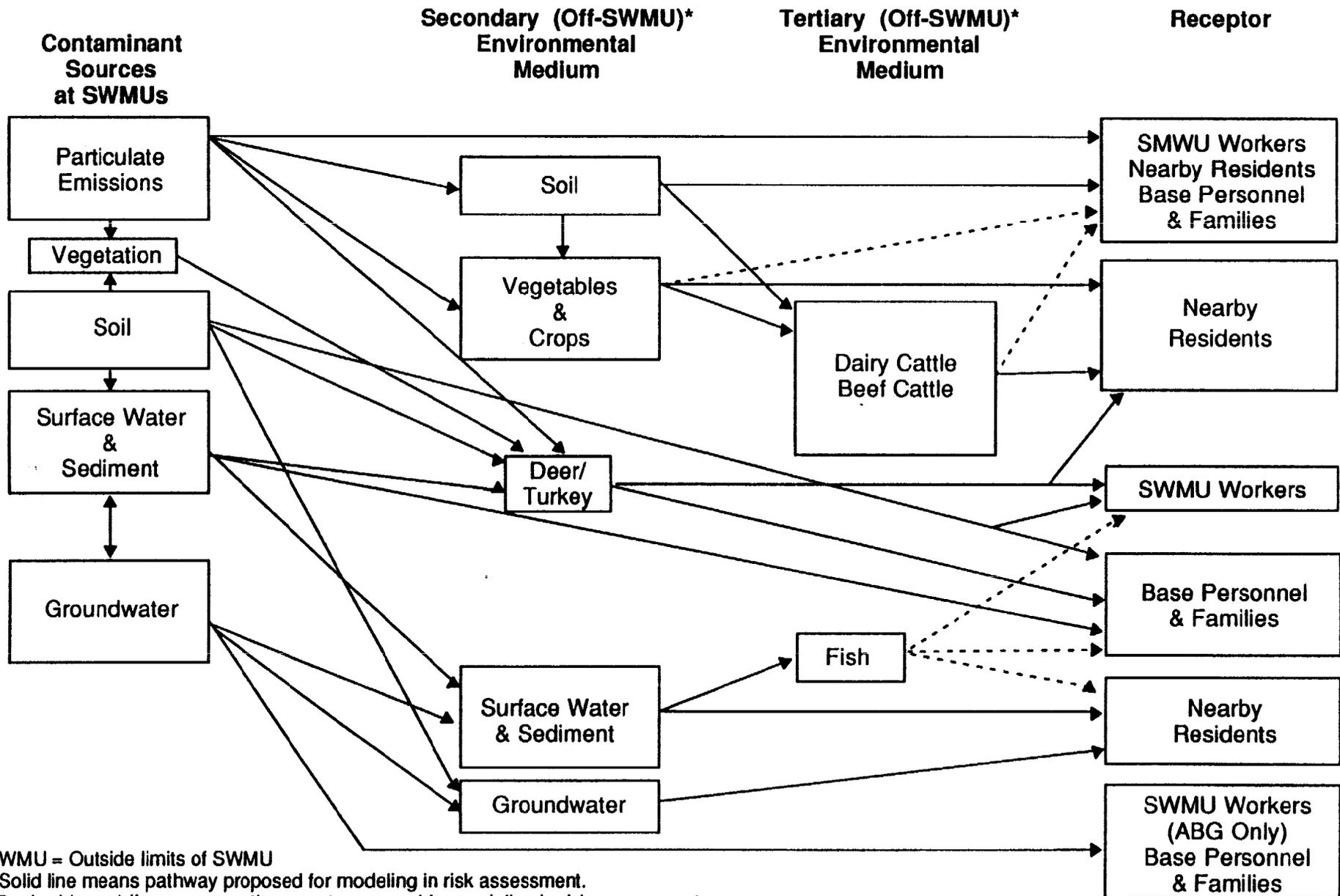
**Figure 4 - 1**  
**Scenario A**  
 (Current OB/OD Activities Cease; Area Remains a Naval Base)



\*Off-SWMU = Outside limits of SWMU  
 Note: Solid line means pathway proposed for modeling in risk assessment.  
 Dashed (- - -) line means pathway not proposed for modeling in risk assessment.

**Figure 4 - 2  
Scenario B**

(Current OB/OD Operations Continue Indefinitely)

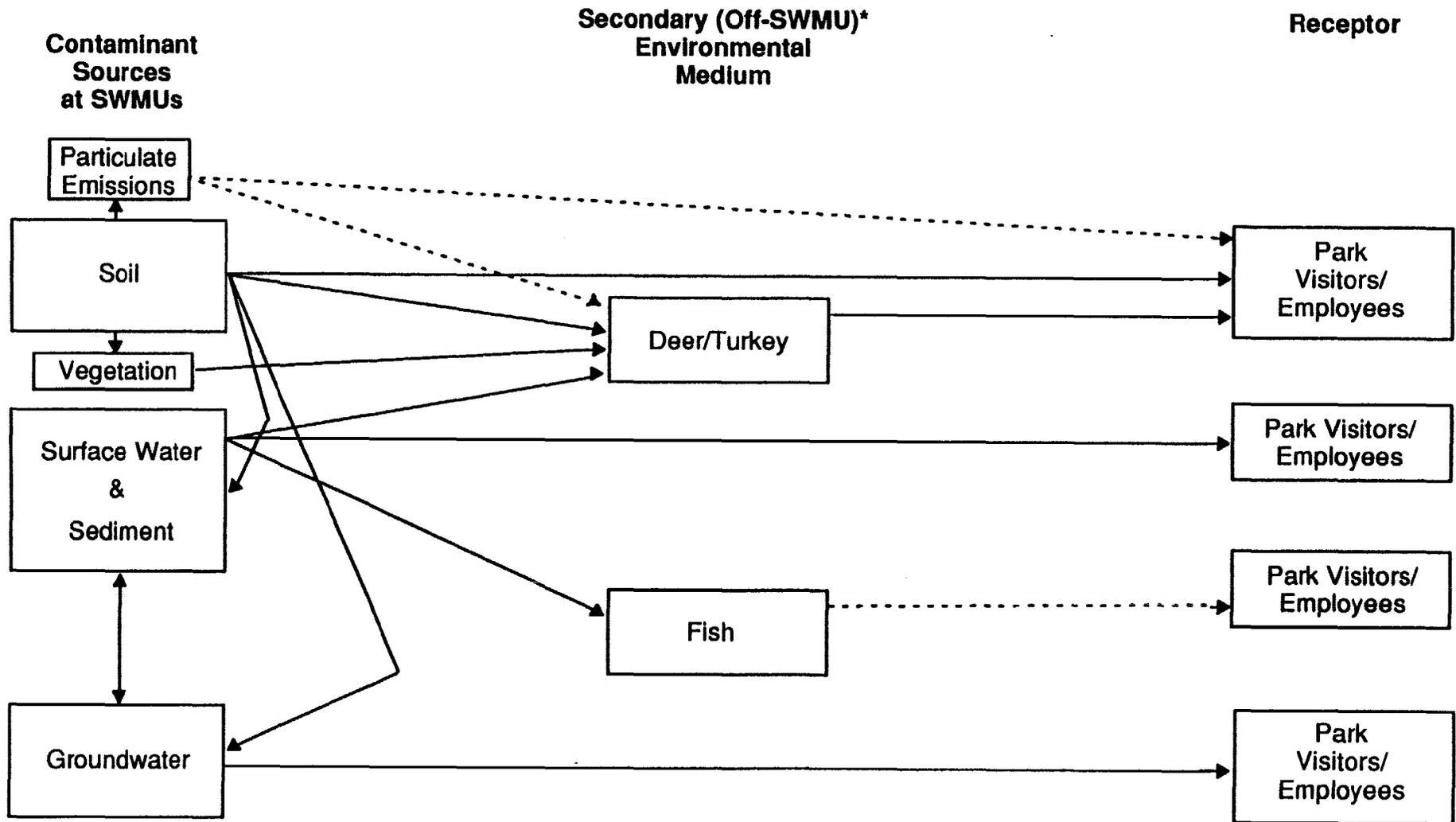


\*Off-SWMU = Outside limits of SWMU

Note: Solid line means pathway proposed for modeling in risk assessment.

Dashed ( - - - ) line means pathway not proposed for modeling in risk assessment.

**Figure 4 - 3**  
**Scenario C**  
 (OB/OD Activities Cease; Area Developed Into a Public Park)



\*Off-SWMU = Outside limits of SWMU

Note: Solid line means pathway proposed for modeling in risk assessment.

Dashed ( - - - ) line means pathway not proposed for modeling in risk assessment.

Figure 8-1

**Ecological Risk Assessment (ERA) Conceptual Model (CM) – Ammunition Burning Ground (ABG),  
Old Rifle Range (ORR), and Demolition Range (DR)  
Current Use and Future Use Under Current Conditions  
CTO #76**

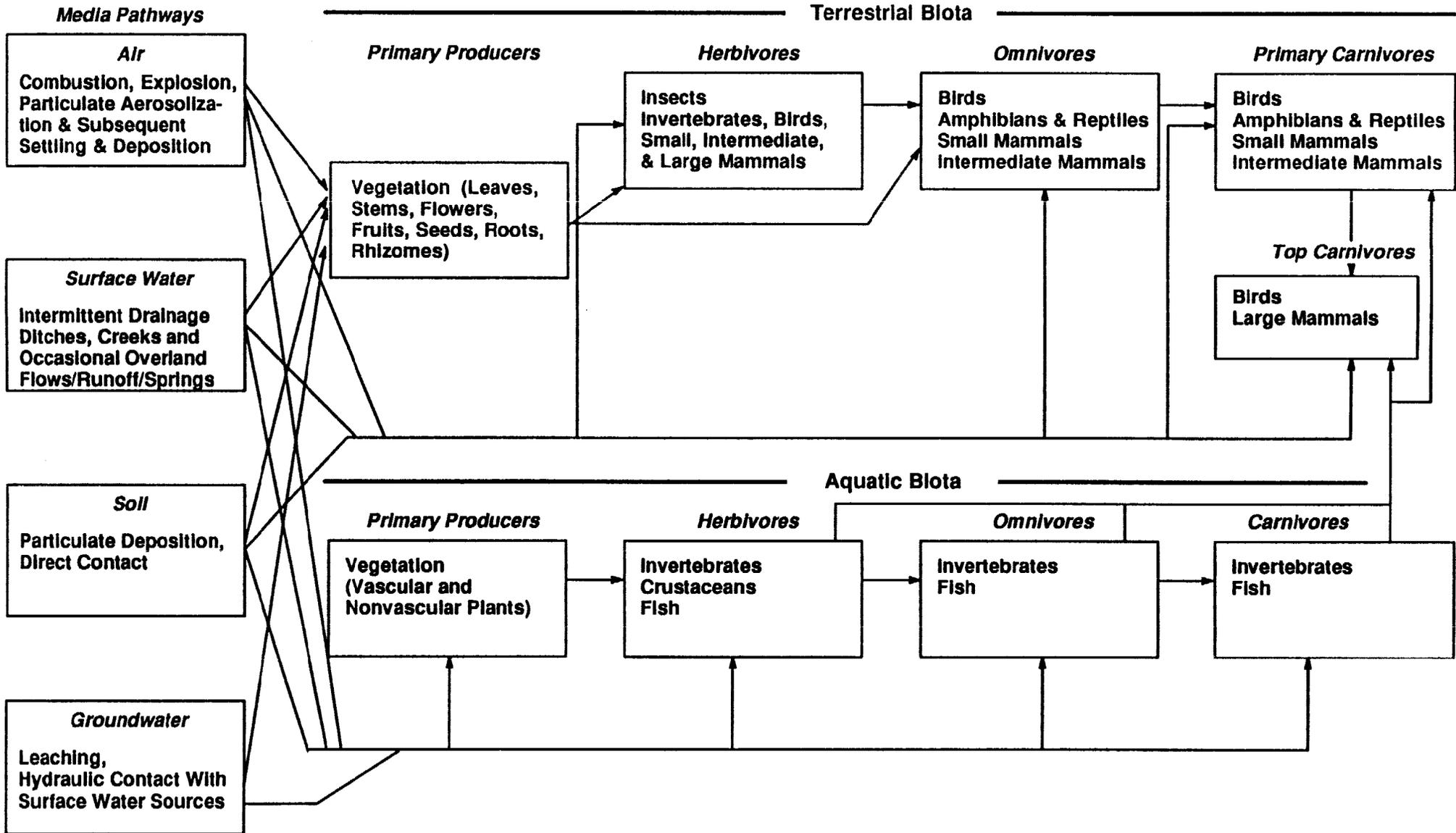
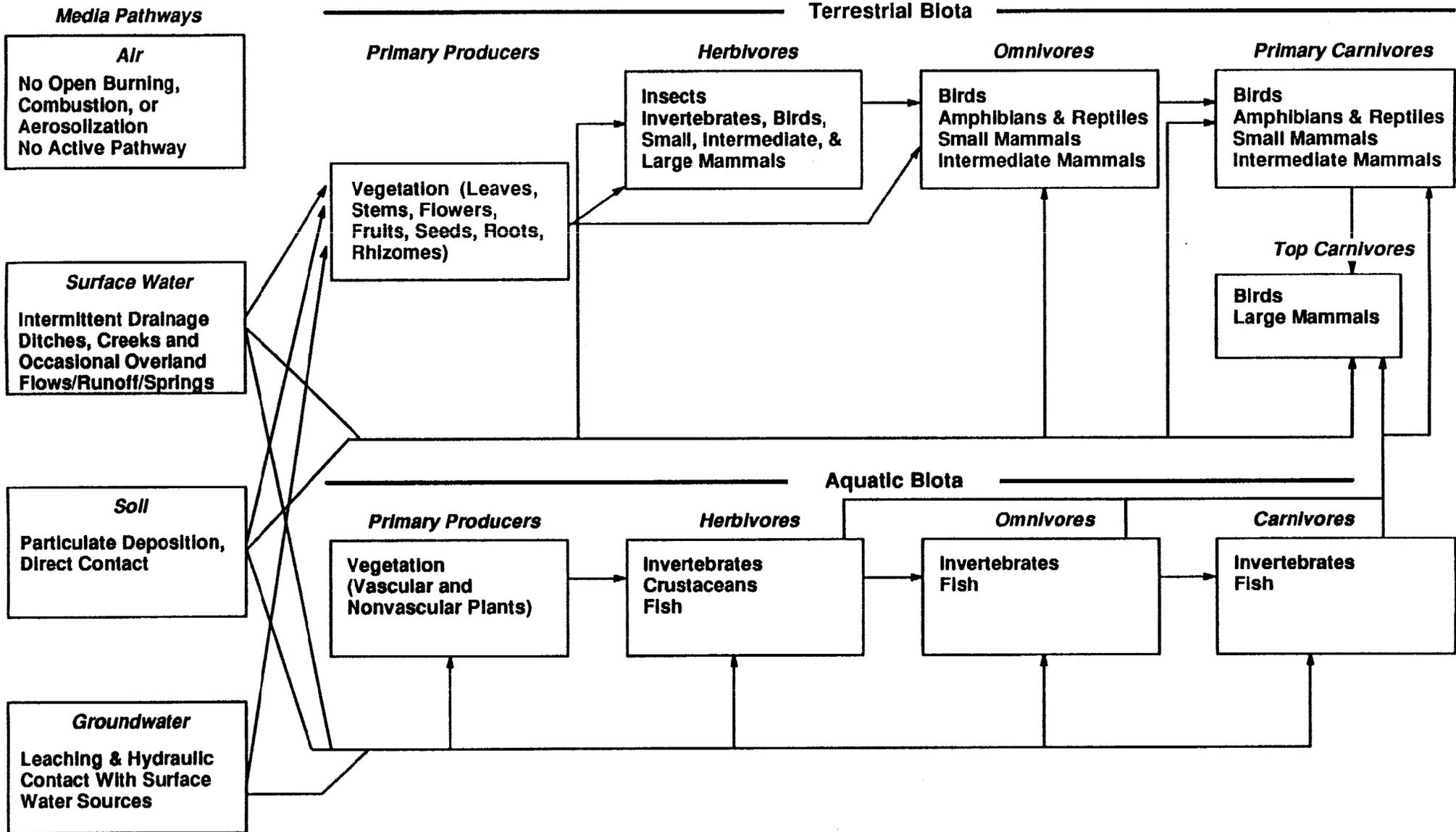


Figure 8-2

ERACM – ABG, ORR, and DR  
 Future Use (Natural Area/Park Lands Use)  
 CTO #76



M. Hill (Postmark 6-24-94)  
203 6-27-94  
20015

JUN 21 1994

HRP-8J

**CERTIFIED MAIL: P 401 182 471**  
**RETURN RECEIPT REQUESTED**

Mr. G.K. Hill  
Public Works Directorate  
Department of the Navy (Code 09A)  
Naval Surface Warfare Center  
Crane, Indiana 47522-5000

RE: Risk Assessment Workplan  
Naval Surface Warfare Center  
Crane, Indiana  
IN5 170 023 498

Dear Mr. Hill:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the Risk Assessment Work Plan for Solid Waste Management Units #03/10, #06/09, and #07/09, dated June 1993. Our detailed comments are enclosed.

Overall, the workplan was very well written and organized. The background information on facility operation, hydrogeology, and analytical data were very informative, and much more extensive than the background information usually supplied in such documents. The Navy has obviously committed considerable resources to preparing the workplan, assembling the current data base, and planning for the formal risk assessment.

We have three major concerns with the document. These are:

1. In the conceptual model scenarios there needs to be a worst-case scenario that a resident will be built at the unit, and the exposure involved in this scenario. Although the Navy may retain the land for many years, this may not always be the case, especially with military base closures presently occurring across the country. This worst case scenario will be looked at in comparison to the other scenarios in the risk evaluation.
2. Due to the timing of the submittal, more recent Corrective Action sampling has occurred at the sites being addressed in this assessment. A revised workplan should utilize this more recent data.
3. The issue of State and Federal rare, threatened, and endangered species must be addressed. A biological assessment will be necessary for the bald eagle in order to determine if any of these units have an impact on the species or not. Please be aware that this type of assessment will also be necessary when investigations proceed at the other Solid Waste Management Units at the facility.

The Navy should assess whether a facility-wide assessment versus a unit specific approach would be more cost effective. The Navy has previously done a unit specific approach with the proposed incinerator.

Please submit a revised Risk Assessment Work Plan within 90 days of the date of this letter. We would encourage a meeting between your consultant and the RCRA Permitting Branch toxicologist and ecologist prior to the revision submittal, in order to speed the review process, and to ensure that any necessary sampling to fill in data gaps can be completed in this field season.

If you have any questions regarding this matter, please contact Ms. Carol Witt-Smith of my staff, at (312) 886-6146 for assistance.

Sincerely yours,

Hak K. Cho, Chief  
Indiana Section  
RCRA Permitting Branch

cc: Jim Hunsicker, NSWC  
Tom Brent, NSWC  
Adrienne Wilson, South Div.  
Charlie Zeal, RUST ✓  
Tom Linson, IDEM  
Mike Sickels, IDEM  
Bill Murphy, ACDE  
James May, ACDE  
Stephen Schick, CAAA

COMMENTS ON THE  
RISK ASSESSMENT WORK PLAN  
FOR  
SOLID WASTE MANAGEMENT UNITS 03/10, 06/09, AND 07/09  
NAVAL SURFACE WARFARE CENTER  
CRANE, INDIANA

1. Page 1-2, 1.2

Include and utilize the U.S. EPA document "Framework for Ecological Risk Assessment" (EPA/630/R-92/001, February 1992).

2. Page 1-2, 1.3

The third sentence of the third paragraph should incorporate ecological receptors (i.e., "...toxic properties of chemicals toward humans and other biota, the fate of chemicals...")

3. Page 1-3, Objective (Scenarios)

A scenario where the units are closed and the facility closed and sold must be included. A worst-case scenario of "eating the soil and drinking the ground water" should be discussed for comparison.

4. Figure 3-2, Surface Drainage Basins

Supplement or add an additional figure showing the southern extent off-site of the continuation of the drainage basins for Regions III and IV, until they end at the East Fork of the White River. Also, identify the lake at the southern edge of Turkey Creek. This is needed to determine any potential transport off-site impacts to the environment.

5. Page 3-4, 3.3.3 Hydrology

Include a description on how ground water flow and air dispersion/deposition from the 3 SWMU areas can or can not impact Lake Greenwood.

6. Page 3-7, 3.4.1.1 ABG Location and Description

Since the headwaters of Little Sulfur Creek initiate in the ABG Valley also, this must be described in the plan.

7. Figure 3-10 or 3-11

Show the cross section location of G-G'.

8. Figure 3-15

Identify on the figures the location of roads and the units.

9. Figure 3-12

Note the date of the water level information used.

10. Page 3-17, 3.4.1.7

Include a description of how Johnson Hollow is also a receptor point of ground water flow.

11. Page 3-19, 3.4.2.4

This section states that "...The ORR appears to be located within the floodplain of Turkey Creek...." What type of floodplain (i.e., 25 yr, 100 yr, etc.) should be described, not just "floodplain." Is it a floodplain only or a wetland?

12. Page 3-20, 3.4.2.6 Hydrogeology

Use more recent ground water elevations to describe local flow.

13. Page 3-22, 3.4.3.3 Topography and 3.4.3.4 Physiography and Hydrology

- a. The text of these two sections should be specific to the ORR; the DR was discussed previously.
- b. The document states that "some" of the surface water runoff gets collected by the sediment ponds. The unit must be operated such that all surface water runoff from the active areas of the DR are collected.

14. Page 3-22, 3.4.3.5 Geology, Soils

"silt loan" should be "silt loam."

15. Scenarios B and C

In Scenarios B and C, open burning or detonation are proposed to continue for at least 100 years. It is explained that air dispersion and deposition from the 3 SWMUs will be modelled and estimated in two separate CTOs. This modelling of dispersion/deposition will presumably lead to estimates of ambient air levels as well as contamination in secondary and tertiary media (i.e., soil, ground water, vegetation). Will the contamination resulting from air dispersion be "added" to current levels of contaminants already present in secondary and tertiary media, or will current levels of contaminants only be considered under Scenario A? This part of the plan should be clarified. Consideration of current levels of contamination in each Scenario would be the desired alternative.

16. Page 4-3, 4.2 ABG Conceptual Model

- a. The analytical data for the four springs north of ABG revealed the presence of TCE, RDX, mercury, barium, methoxychlor, dibutylphthalate and alpha and beta radioactivity. Apparently, the radioactivity was above the MCL level on more than one occasion. What is the source of this radioactivity and why should it exceed the MCL level? The description of the operations at the SWMUS gives no indication that radioactivity should be present or could be formed by the operations taking place. Does the Facility have an explanation for the presence of radioactivity? Does the Facility have a permit for some operation using radioactivity or requiring the storage of radioactivity? Were other springs and wells sampled for radioactivity? Also, it is not clear as to which set of data are serving as the background sampling for the springs.
- b. Because Spring 8 is reported to have a "long history of use by the public", it should be sampled for alpha and beta radioactivity in addition to VOCs, SVOCs, inorganics, and explosives.
- c. Concerning ground water at ABG, it is stated that the Beech Creek aquifer is the most chemically contaminated (Page 4-11) and the "most important hydrogeologic unit in terms of conducting ground water off-site". Beta-radioactivity exceeding the MCL was detected "at several wells on-site and off-site". Presumably, "off-site" wells refer to those not directly in the vicinity of the SWMU. Is Beech Creek ground water also the most likely to migrate outside the Facility property? Is it likely that Beech Creek ground water and radioactivity have a connection to the radioactivity seen in the ABG north springs and in Spring 8?
- d. Based on the discussion in parts A, B, and C above, it would appear that additional testing for the quantity and location of radioactivity would be warranted. If the additional testing is not performed, how will it be possible to rule out radioactivity as one of the Contaminants of Concern (COCs)?
- e. According to the RAWP, no new analytical data will be obtained from the Big Clifty Wells because of their proximity to Beech Creek. However, Big Clifty and Beech Creek analytical values should not be averaged together. This could have the unwanted effect of lowering the apparent contaminant levels in the Beech Creek area.
- f. Apparently, the Alluvial Wells and Boundary Wells are those located nearest to the boundary of the Facility property. It is stated (Page 4-18) that the existing analytical data base for these wells "will be summarized for the risk assessment but will not be used as data input for the risk assessment." What is the meaning of this statement? Explain how the boundary wells monitor the alluvial area not the Beech Creek or Big Clifty formations.

Also, there is some confusion as to the location of the Alluvial and B Wells. Footnote B of Table 4-11 states that the Alluvial wells are "located at the confluence of Johnson Hollow drainage and Little Sulphur Creek, **approximately 2,500 feet south of NAVSURTWARCENDIV property boundary.**" This data is incorrect. Explain why the data from these wells won't be used for the risk assessment?

- g. For Beaver Bend wells, the statement was made (Page 4-13) that TCE levels may be decreasing over time. This brings up the questions as to which analytical data will be used for the risk assessment. As a general policy, the "old" data which may represent high values may not be dropped in favor of "new" data having lower values. However, all the data may be averaged together in the appropriate manner to give a representative collection of data which will not be biased by date of sampling.
- h. The RAWP proposes (Page 4-22) to use the current contaminants levels in each medium as the exposure assessment input to all three Scenarios based on the assumption that air emissions will be identical with those in the past, thus creating a steady-state condition regarding air deposition. If this is the case, what is the purpose of conducting air dispersion/air deposition modelling in the separate CTOs? Will the results of air dispersion/air deposition modelling actually be incorporated into the risk assessment which is the subject of this RAWP?
- i. Since the Subpart S rule is still proposed, do not reference it.
- j. Figures 4-1, 4-2 and 4-3
  - 1) Animals are an environmental receptor not a medium.
  - 2) Why isn't the line between Deer/Turkey and Base Personnel & Families solid? This aspect is discussed in later chapters.
  - 3) There should be a line connecting Soil and Ground Water, due to leaching aspects. And a line between Soil and Surface Water, due to runoff.
- k. Section 4.2.3.1. Soil, Sentence 1
  - a. Change "chemical release to soil" to "hazardous constituents in the soil."
  - b. Update this section with current data available.

l. Page 4-6, Paragraph 2

- a. The Phase I RFI sampling was meant to look at hot spots.
- b. RCRA considers surface soil to be up to 2 feet deep not 6 inches.
- c. Why are you referencing CERCLA lists when this is a RCRA site?

m. Page 4-6, Paragraph 3

Delete the references to published background data without justifying them (i.e., State they are in). They will not be applied in this case.

n. Page 4-7, 4.2.3.2. Surface Water/Sediment

- 1) Change the reference to "chemical release" to "hazardous constituents".
- 2) Potential contamination may be related to both past and present activities.
- 3) The northern springs were background locations.
- 4) Revise this section to reference current data available.

o. Table 4-3

A complete listing, of analytes, not just groups will be necessary.

p. Table 4-4

Spring 8 and the one other spring close to the base used as a water supply must be sampled.

q. 4.2.3.3 Springs

- 1) State that Springs D, E, F and Mountain Spring were used as background.
- 2) Also reference that seasonal variability is being evaluated.
- 3) Include the fact that Spring 8 is off-base.
- 4) Should the background springs be included in the risk assessment if they aren't directly connected to the ABG area?

r. Page 4-11

Since Appendix 9 parameters were analyzed several rounds, why is more analysis necessary? Incorporate existing data available.

17. Terminology

Using the term "off-site" causes confusion. In most investigations it means off the property owned by the Navy. Use a different reference.

18. Page 4-22, 4.3. ORR Conceptual Model

- a. Under the discussion of soil contamination, it was suggested that the background samples for ORR contained some of the highest metal levels "on-site". Are the authors under the impression that the background is already high due to previous burning activities? If so, then some other background site should probably be used to avoid the accumulation of "false negative" analytical samples. Perhaps the background metals data from ABG could be used, or background data on metals should be contained from some other locations within the Facility. The Navy must obtain a new background for the ORR.
- b. In regards to surface water/sediment sampling, it was not clear as to how and where Facility background data for these two media would be collected.
- c. Under the Section on Environmental Fate, the RAWP states that: a) there were only occasional "hits" of contaminants; b) there were no ground water plumes; and c) ground water contamination is insignificant. However, data was presented earlier that levels of metals exceeded MCLs on several occasions and that explosives were detected. Why is it concluded that contamination is insignificant?
- d. If no ground water plumes exist at ORR (or at ABG), what is the subject of the 1984 document by J.B. Dunbar titled "Definition of Contaminated Ground-water Plumes at Selected Waste Disposal Sites, Naval Weapons Support Center, Crane, Indiana?"
- e. Do not reference the proposed Subpart S rule.
- f. Describe also that historically a larger flashing area was used and the area may not have always been lined. Clarify this.
- g. Add the additional worst-case scenario of a resident at the unit with a drinking water well, and eating the soil.
- h. 4.3.3.1. Soil, Paragraph 1  
Flashing is a thermal treatment process, not an incineration process.

- i. Update this section with the latest analytical data.
  - j. The target area should be assessed for contamination.
19. Page 4-29, 4.4. DR Conceptual Model
- a. The RAWP states that the soil data for DR will be divided into separate data bases for the Navy and Army activities. Is it already known that these activities result in significantly different contaminant levels in soil?
  - b. Change the reference from "chemical contamination" to "hazardous waste or hazardous constituent contamination."
  - c. Delete references to the proposed Subpart S rule.
  - d. Add the fourth scenario.
  - e. Why is soil data separated for the two operations when they both are in the same impact area?
  - f. Update this section with current data.
  - g. Reevaluate the ground water descriptions based on where wells are located. Some data was from within the impact area versus outside at the Point of Compliance.
20. Page 4-34, 4.5 Selection of Chemicals of Potential Concern, and Table 9-6 Target Compound List
- a. Earlier in Section 4 the RAWP mentions that polychlorinated biphenyls (PCBs) were part of the existing data base for ground water and springs at ABG. However PCBs do not appear to be included in the Target Compound List (TCL). Why were PCBs analyzed in the original investigation? Are PCBs present in the uncombusted waste stream or are they suspected to be by-products of combustion? Why should PCBs not appear on the TCL?
  - b. The RAWP states that radioactivity was detected above the MCL on more than one occasion in spring water and ground water, and the RAWP does not suggest that this radioactivity is the result of background radiation as opposed to radionuclide contamination. There is no discussion of a plan for assessing the risk to radioactivity with regard to any of the following important factors: 1) Origin of radioactivity within the Facility operations; 2) Distribution of radioactivity in the Facility media (soil, ground water, surface water); 3) Identification of the types(s) of radionuclide present; 4) Assessment of potential exposure and dose to the human population. Under the assumption that the radiation is not the result of open burning detonation activities, then it seems logical that the radiation question should be answered in a separate assessment from the current RAWP.

If that is the plan which the Facility wishes to follow, then U.S. EPA, State, and DOD health risk guidelines may apply.

- c. The general description of the burning processes and the combustion feeds suggests the following: 1) The average burn temperature is relatively low since burning is not occurring in a fuel-fired incinerator; 2) Some of the waste feeds contain chlorine in the form of chlorinated solvents; 3) Products of Incomplete Combustion (PICs) containing chlorine have already been detected and are expected in further testing. (These PICs include carbon tetrachloride, chloromethane, trichloroethane, dichlorobenzenes, hexachlorobenzene and several others); and 4) Most of the waste feeds contain metals, such as copper and iron, which are expected to catalyze PIC formation. For these reasons, the U.S. EPA considers it imperative that polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF) should be evaluated in the hazard assessment. Perhaps the Facility was planning to address PCDD and PCDF emissions in the two CTOs designed to cover the air dispersion and air deposition issues. However, this will not address the concern that PCDD and PCDF are already present as contaminants in site media as a result of past burning and current activities. PCDD and PCDF formation should be evaluated from all burning operations and SWMUs in which chlorine was present or suspected. Addition of PCDD and PCDF to the sampling plans will have to be considered. Some documents to be consulted would include "Estimating Exposure to Dioxin-Like Compounds" (U.S. EPA, 1992) and "Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions" (U.S. EPA, 1990).
- d. Referencing CLP compliance might not be sufficient at a RCRA site. Refer to the RCRA QAPP model concerning this issue and the non-detect issue.
- e. Metals such as nitrates and manganese need to be evaluated since they are in the waste streams.

21. Page 5-2, 5.2.1 Current Use

- a. Clarify between downgradient for ground water and down stream for surface water. Do not use downgradient for both.
- b. Include the residential scenario at the unit for a worst-case comparison.

22. Table 5-1A: ABG-Exposure Pathway Analysis

- a. Include the exposure route of drinking from an on-base spring.
- b. Should an exposure scenario be included for the neighbor's trout ponds that are fed by ground water and springs? Please check if this is still being done.

23. Tables 5-1B: ABG-Exposure Pathway Analysis

Include the Exposure Route of drinking from an on-base spring.

24. Table 5-1c: ABG-Exposure Pathway Analysis

Include the Exposure Route of drinking from an on-base spring.

25. Page 5-3, 5-4, and 5-5: Scenarios

- a. Include the Exposure Route of drinking from an on-base spring.
- b. In the receptor populations for Scenario B, a group of people called the "Padanaram Community" is described as living in the downgradient direction of ground water or within the air dispersion plume. Hopefully, the risk assessment document will adequately describe the specific risk to this community regarding direct and indirect exposure paths.
- c. In the discussion of exposure factors, the receptor populations have been divided into "On-site" and "Off-site". The On-site personnel are Facility officers and their families who are projected to live at the Facility for 4 years. For this circumstance, it is acceptable to consider the child receptor to be a "toddler" with a 4-year exposure duration. However, for off-site persons who are permanent residents of the community, the usual convention (Superfund) is to use a childhood exposure duration of 6 years (instead of 5 years) when calculating the intake rate by each route of exposure. The adult exposure duration can consequently be reduced by 1 year down to a total of 64 years.

26. Page 5-6, 5.4. Quantitative Environmental Fate Analysis

- a. The discussion of Environmental Fate Analysis (Section 5.4) is very informative, however, this reviewer would suggest that the authors consider the following. The equations suggested for estimates such as soil contaminant level (cs), vegetation contamination level (cv) and beef contamination level appear to be based on either a 1987 U.S. EPA publication on municipal waste combustion or earlier literature. The U.S. EPA has updated its guidance on estimating environmental fate from combustion sources chiefly through the manual titled "Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions" (U.S. EPA, 1990). This manual has a considerable coverage of air dispersion modelling and should be consulted to compare the fate and transport equations and algorithms with those presented in the RAWP. The algorithms given in this guidance manual should be adopted whenever possible.

- b. For selection of Bioaccumulation Factors in beef and milk, the literature which should be consulted includes articles by Washburn (1991) titled "The accumulation of PCDD and PCDF in milk and beef" found in "Health Effects of Municipal Waste Incinerators;" CRC Press, Boca Raton, FL; and Webster and Connett (1990) titled "The use of bioconcentration factors in estimating the 2,3,7,8-TCDD content of cow's milk found in Chemosphere 20(7-9): 779-786. The articles by Stevens (1991, 1992) are also appropriate. The factors which result in the most conservative estimates of media concentrations should be selected.

27. Page 5-10, 5.5 Human Exposure Dose Algorithms

- a. Under Human Exposure Dose Algorithms, an adult inhalation rate of  $0.83 \text{ m}^3/\text{hr}$  is suggested and this is acceptable. However, a childhood inhalation rate of  $0.38 \text{ m}^3/\text{hr}$  is suggested. The problem with this value is that it represents the inhalation rate for sedentary activities such as sleeping, reading, and watching television. A more realistic value is  $0.667 \text{ m}^3/\text{hr}$ , which accounts for play and vigorous outdoor activity. The manual titled "Exposure Factors Handbook" (U.S. EPA 1990) should be consulted.
- b. Under the discussion on dermal contact with ground water, the RAWP suggests performing a calculation for adjusting skin absorbed dose to oral absorbed dose using the adjustment given in the RAGS guidance. Does this refer to Appendix A of the RAGS guidance? If yes, then this procedure is acceptable. The equation used to adjust administered dose to oral dose should be presented in the risk assessment document.
- c. 5.5.7. Ingestion of Contaminated Household Water  
  
Include a discussion of spring water being used as a drinking water source. Since a nearby off-site resident uses a spring along Little Sulphur Creek as his sole water supply.

28. Page 5-23, 5.6. Evaluation of Lead Exposure

Under the discussion of exposure to lead, the RAWP states that the intake values for lead contamination will be converted to blood lead levels. This is the desired approach, and it is stated to be based on empirically derived slope factors provided by ATSDR. Is this approach equivalent to using the U.S. EPA Uptake Biokinetic Model (UB/K Model) for lead? It would be useful to calculate blood lead levels by both methods and report the most conservative results. Also, lead exposure from each medium (soil, water, air, food) should be included in the intake values.

29. Page 6-1, 6.0. Toxicity Assessment

Under the discussion of lead toxicity (Section 6.0), the proposed approach is acceptable, however blood lead criterion levels such as 1 ug/L should not be thought of as estimated RfCs, since an RfC always has ambient air concentration units such as ug/m<sup>3</sup>. Actually, the U.S. EPA now recommends that combustion operators use an RfC value (also called a Reference Air Concentration [RAC] in some publications) of 0.09 ug/m<sup>3</sup> for assessing risk to lead in ambient air only. This is a value based on 10% of the national ambient air quality standard for lead.

30. Page 7-1, 7.0 Risk Characterization

- a. Under the Risk Characterization Section, the RAWP states that major uncertainties in each area will be given a general review. It is also useful to show how uncertainty is propagated or magnified during the exposure and risk characterization by using a semi-quantitative analysis (e.g., sensitivity analysis) or a quantitative analysis (e.g., first-order Taylor series or Monte-Carlo simulation). These statistical analyses of uncertainty are becoming more common, especially for assessments which involve a multitude of fate, transport, and exposure parameters.
- b. Include a description of the fourth scenario residents living at the unit once operations have ceased.

31. Page 8-1, 8.0. Ecological Risk Assessment (ERA)

- a. The hazard identification section is weak in its problem formulation. A better discussion concerning the perceived threats to the environment and the questions to be addressed through the ERA is required in this initial section of the ERA, in order to bring the scope and purpose of the ERA into focus.
- b. Attention is focussed in a SWMU-specific manner, which in general is appropriate; however, some attention in ERAs must be expended on the overall landscape perspective, such that impacts to other areas of the facility and off-base are considered. An ecosystem versus unit approach may be necessary for certain species and habitats.
- c. The ERA is a tiered process in which the assessments increase in complexity, detail, and sophistication with successive iterations. It seems that a second tier ERA, i.e., a preliminary ERA or PERA, is the appropriate level of effort to be expended for an initial ERA at Crane. A PERA usually involves integration of available information, new physical and chemical data, and qualitative to semi-quantitative ecological observations from field reconnaissance. PERAs do not include intensive biological surveys or tissue analyses. PERAs do not include intensive biological surveys or tissue analyses.

PERAs are appropriate for cases such as Crane where a substantial database of site-specific information is already available for limited areas within the facility, but for which insufficient information is available, outside of those limited areas, to allow the presumption of ecological impact. It is from this perspective that the quantitative biological surveys and tissue analyses proposed in the current workplan are viewed as premature, i.e., a potential threat to biotic receptors through exposure to contamination should be established before biologically-based indications of impact are explored.

d. The following State and Federal agencies must be contacted as sources, of ecological information within the facility boundaries:

- 1) The Indiana Department of Natural Resources (IDNR) concerning:
  - a) The known or potential occurrence of rare, threatened, and endangered species (Natural Heritage Data Center);
  - b) wetlands greater than 5 acres or having known or potential ecological significance;
  - c) migratory bird, flyways; and
  - d) fisheries, wildlife, and non-game species.
- 2) The Endangered Species Specialist at the Bloomington Field Office of the U.S. Fish and Wildlife Service (U.S. FWS) concerning the known and potential occurrence of threatened and endangered species and critical habitats.
- 3) The National Wetland Inventory concerning wetlands greater than 5 acres.

Correspondences with the IDNR and the U.S. FWS must be thoroughly documented. The purpose of the ERA, including a description of activities and the resulting types and magnitudes of emissions at the Ammunition Burning Grounds, Old Rifle Range, and Demolition Range, must be clearly communicated to each of the contacts at the IDNR and U.S. FWS.

- e. A Biological Assessment is necessary for the Bald Eagle in order to assess whether the units are impacting the species or not.

32. Page 8-4, 8.2.1.2 Selection of Chemicals of Concern to the Project

0.1 of the LD50 is not nearly conservative enough for hazard identification screening. An assessment factor of not more than 0.01, is necessary to compensate for the uncertainties involved, i.e., differences in intra- and interspecific sensitivities, between acute and

chronic toxicities, between lethality and subtle effects, and between field and laboratory conditions. For further guidance refer to U.S. EPA (1984) and Nabholz (1991).

33. Page 8-4, 8.3 Exposure Assessment, Sentence 2

"were" should be "where".

34. Table 8-1

- a. The group heading "Vertebrate Species" should be changed to "Mammals" since only mammals are listed in this group and since all of the other groups also consist of vertebrates.
- b. Indiana Bat should be listed under mammals, even if parenthetically noted as potentially present, and Bald Eagle should be listed under birds (avifauna is an unusual designation for birds).
- c. Are you making a distinction between indicator species, versus any species at the site, versus rare, threatened and endangered species? This needs clarification.
- d. Turkey Vultures and Insects are not addressed.

35. Page 8-6, 8.3.2 Exposure Pathways

Only the soil ingestion exposure route is discussed in this exposure pathway section, to the exclusion of other environmental media and inhalation and dermal contact.

36. Figures 8-1, 8-2, 8-3 and 8-4

- a. Add in springs specifically, not just as a creek.
- b. Run-off is a surface water issue not a ground water one.
- c. Change the weak link from ground water to vegetation to a strong link.
- d. Since the conceptual models are identical for each scenario, only two figures should be presented, i.e., one current and one future conceptual model.
- e. The conceptual models are too busy, i.e., extraneous and ecologically insignificant information should be excluded and the ecologically most significant pathways should be highlighted.
- f. The future use scenario ignores the wind-borne soil exposure pathway.

- g. The exposure routes (ingestion, inhalation, and dermal contact) need to be clearly indicated.
  - h. The food chain exposure pathway from fish to piscivorous birds (e.g., great blue heron) and mammals (e.g., mink) should be indicated.
37. Page 8-7, 8.3.2.2 Exposure Point Locations for Receptors
- a. When estimating herbivore ingestion of contaminants via herbivory, as addressed in the third paragraph, deposition of contaminants on leaf surfaces should also be considered.
  - b. See previous comment concerning assessment factors for LD50 levels.
38. Page 8-9, 8.3.3 Quantitative Environmental Fate Analysis
- In the discussion in the second paragraph, the ground water exposure pathway should be considered, as illustrated by the dye emergence at Spring A.
39. Page 8-10, 8.3.3.1 Air Dispersion Modeling of Analytes
- There should be a projection concerning when the results from the modelling of airborne contaminant migration will be available and a statement concerning whether these results will be addressed in the ERA report. If the modelling results will not be available in time to be included in the ERA, an alternative method of addressing airborne contaminant migration should be proposed.
40. Page 8-10, 8.3.3.3 Sediment Concentrations of Analytes
- Sediment sampling should not be limited to locations associated with the stormwater ponds, but also should include locations where surface soils from the ammunition burning ground (ABG), DR, and ORR are deposited directly into streams, and downstream of the ponds.
41. Page 8-14, 8.4.2 Environmental Benchmark Concentrations
- a. See previous comment concerning assessment factors for LD50 levels.
  - b. On Page 8-15, Paragraph 1.  
"ACQUIRE" should be "AQUIRE."
42. Page 8-16, 8.5.1 Environmental Risk Analysis, Paragraph 4
- Benthic macroinvertebrates generally are not good bioindicators of water quality in the water column. Inhabitants of the water column such as fish typically are much better for this purpose.

43. Chapter 9 Sampling and Analysis Plan and Quality Assurance Plan. (QAPP)

Because of the outstanding issue as to whether more sampling is warranted in all the media or not, the U.S. EPA is not providing detailed comments at this time on this chapter. The Navy needs to reassess the current data available and revise the plan accordingly.

**RESPONSES TO NAVSURFWARCENDIV COMMENTS  
ON CTO #0076 DRAFT RISK ASSESSMENT WORK PLAN**

General Comment No. 1:

Instead of consecutively numbering all text pages, figures, and tables, all tables consisting of more than one page will be numbered 1 of the total, 2 of the total, etc. This additional numbering, along with the table of contents, will allow the readers to determine if they have a complete document.

General Comment No. 2:

The Halliburton NUS Team has requested a copy of the Building 146 incinerator risk assessment, but has not yet received a copy.

General Comment No. 3:

With respect to all exposure media other than air, Scenarios A and B are the same. The reason why we initially separated these two scenarios was to determine what the non-air exposure pathways risks are apart from those due to the air emissions. This separation was made to enable USEPA's two technical programs (RCRA and Air) to evaluate the sites independently. However, per our meeting with the USEPA on August 3, 1994, it was decided to a) combine Scenarios A and B (essentially eliminate Scenario A) in the revised work plan and b) add a future residential land use scenario.

The chemical accumulation equations in the text are for calculating future, off-facility incremental impacts of OB/OD activities. All on-site media are considered to be at steady-state. This off-facility calculation of future impacts is consistent with and a requirement of EPA's current multi-media assessment of air toxics (for permitting).

The Halliburton NUS Team agrees that if OB/OD activities would cease, there should be a gradual decrease in chemical levels in the three areas, and that if the Navy held the property for some specified time, the levels may indeed go below risk-based remediation goals. USEPA, however, is reluctant to utilize half-life analyses in risk assessments such as this since site-specific data are never available. However, we can and will provide for the Navy our "best guess" on likely chemical degradation rates in these areas and incorporate these findings into the uncertainty section of the document. An analysis can also be made in the CMS concerning this option of ceasing activities and holding on to the property.

Specific Comment No. 1:

The calculation of vegetable contamination is for determining the potential for future off-facility impacts of the current OB/OD activities. This methodology is consistent with USEPA's indirect exposure analysis of air toxics. This methodology was specified by USEPA for inclusion in this risk assessment at the August 3, 1994, meeting.

Specific Comment No. 2:

See justification in response to specific comment No. 1.

Specific Comment No. 3:

Typographical error; text will be changed to read "total area of arms and hands" for adult receptors. Value for toddlers (arms, hands, legs and feet) will be changed to 3580 cm<sup>2</sup>.

Specific Comment No. 4:

Typographical error; text will be changed.

Specific Comment No. 5:

Error noted; text will be changed.

Specific Comment No. 6:

- a) Comment noted and text will be changed accordingly.
- b) Text will be changed accordingly.

Specific Comment No. 7:

Text will be changed accordingly.

Specific Comment No. 8:

- a) Comment noted, and text will be clarified.
- b) The Halliburton NUS Team agrees. However, 0.05 L/d for 30 d/yr are the default contact variables that USEPA has established for surface water and wants incorporated into their risk assessments. If potential risks are calculated due to this hypothetical exposure to surface water, the uncertainty section and risk characterization section will both discuss this issue. Alternatively, discussions with the USEPA will be needed to arrive at agreed-upon assumptions.
- c) See rationale above in response to 8(b).
- d) USEPA's default swimming exposure duration is 2.6 hours. Text will be changed to reflect this. If the Navy would like another alternative used, discussions with USEPA would be needed.
- e) Comment noted, and text will be changed to "Ingestion Rate."
- f) See rationale above in response to 8(b).

Specific Comment No. 9:

The Halliburton NUS Team agrees. We have utilized 100 mg/day (toddlers) and 50 mg/d (adults) for sediment ingestion in other assessments and will incorporate this change here. Soil ingestion rates are the default sediment ingestion rates, according to USEPA.

Specific Comment No. 10:

The dermal exposure frequency for workers should be the same as for oral exposure - 30 days/year. This will be changed in Table 5-17.

W/6/UPJOHN1/C/NAVYRESP