DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

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NSWC CRANE
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IN REPLY REFER TO:

5090
Ser 095/0217

03 OCT 2000

U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Illinois, Indiana, and Michigan Section
ATTN: Mr. Peter Ramanauskas (DW-8J)
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) submits four copies of change pages and response to comments for the Final Risk Assessment Work Plan (RAWP) for Solid Waste Management Units (SWMUs) 4, 5, 9, & 10, as enclosure (1). This enclosure contains four attachments that include response to comments, RAWP change pages, and updated analytical standard operating procedures. The permit required Certification Statement is provided as enclosure (2).

NAVSURFWARCENDIV Crane point of contact is Mr. Thomas J. Brent, Code 09510, telephone 812-854-6160.

Sincerely,

James M. Hunsicker
Director, Environmental
Protection Department
By direction of the Commander

Encl:
(1) Final RAWP for SWMUs 4, 5, 9, & 10
(2) Certification Statement

Copy to:
ADMINISTRATIVE RECORD
SOUTHNAVFACENGCOM (Code 1864) (w/o encl)
IDEM (Doug Griffin)
TTNUS (Ralph Basinski) (w/o encl)

5090
Ser 095/0217

03 OCT 2000

The letter Ser 095/0217 was for the submittal of replacement pages for the Draft Risk Assessment Workplan MCG, OPB, PCA, & RKI. The replacement pages have been incorporated into the previously submitted Workplan on 12/10/99.

ATTACHMENT 1

RESPONSES TO EPA JUNE 8, 2000 COMMENTS
ON DRAFT WORK PLAN FOR
RISK ASSESSMENT AT SWMUs 4, 5, 9 AND 10
REVISION 0 - DATED OCTOBER 1999

RESPONSE TO EPA COMMENTS
DRAFT WORK PLAN FOR RISK ASSESSMENT
AT SWMUs 4, 5, 9, & 10 – REVISION 0 - DATED OCTOBER 1999
NAVAL SURFACE WARFARE CENTER CRANE, INDIANA

WORK PLAN

Comment 1:

In the Acronyms section on Page 9, the definition of OMOE is incomplete. On page 10, in the definition of RQAC, there is a typo.

Response: The definition for OMOE (Ontario Ministry of Environment and Energy) was completed, and the typo in the definition of RQAC was corrected.

Comment 2:

Section 4.1.4, Potential Receptors, lists Adolescent Trespassers as a potential receptor under the current and future land use scenario. Why are adult trespassers (e.g., hunters, adult civilians or family of military personnel) not included as potential receptors for the risk assessment? Similarly, why are adolescent recreational users not included? For construction workers, why aren't the surface water and sediment exposures considered to be factors? For the ecological receptors, provide an explanation of why the subsurface and air pathways are not considered pertinent for terrestrial receptors. Make all required changes to this section as well as the individual SWMUs (Sections 5, 6, 7, & 8) and Risk Assessment Methodology (Section 10.0).

Response: Based on the rationale provided below, no changes are proposed to the selected receptors and exposure pathways. However, text was revised to include the rationale for justifying the elimination/selection of receptors and exposure pathways.

Instead of evaluating adults and adolescents for every possible exposure scenario under current and/or future land use, the potential receptors selected for evaluation in Section 4.1.4 were chosen to bracket the risks for a site. The selection of these general receptors was not meant to imply that other receptors, such as adult trespassers, were not applicable for a site. For the current/future trespassing scenario, an adolescent was selected for evaluation based on the assumption that adolescents would most likely trespass onto the sites more frequently than adults. The adult receptor was selected to represent the future recreational scenario if the Base closed and was turned into a state park. Considering the various activities that one could take part in at a state park (i.e., hunting fishing, boating, biking, hiking, etc.) and cumulative exposure from various activities, it was assumed that the adult would participate in more of these activities on a more frequent basis than adolescents. Additionally, the risks for adult trespassers and adolescent recreational users can be inferred based on the results of the evaluation of adolescent trespassers and adult recreational users; this evaluation was completed in the Risk Characterization section of the risk assessment.

Construction workers were not selected for evaluation to surface water and sediments since anticipated exposure is expected to be minimal. Surface water bodies at the sites, where surface water and sediment samples are proposed, are located only on the peripheral of the SWMUs. Typical construction activities (i.e., the placement of a building foundation, etc.) are not expected to be conducted in these areas of the sites.

As shown on the SWMU-specific conceptual site model figures (i.e., Figures 5-7, 6-7, 7-7 and 8-9), exposure to air and soil is expected to be relatively insignificant for terrestrial receptors. Inhalation will not be evaluated because air concentrations are expected to be minimal since the majority of the

sites are covered with grass and vegetation. Also, the inhalation (and dermal) pathways are typically not evaluated in ecological risk assessment because of the significant uncertainty associated with estimating exposures and effects concentrations. See the response to Comment 32 for details on subsurface soil exposure.

Comment 3:

Table 4-1 shows that the occupational worker is a potential receptor for SWMU 9 in the current scenario but not in the future scenario, while the narrative in Section 4.1.4 states that there are no current receptors at SWMU 9, but they will be considered in the future scenario. Please resolve these discrepancies. Also, correct the table to reflect that occupational and maintenance workers are considered as future potential receptors for SWMU 10 as noted in Section 8.5.1. Similarly for SWMU 9, correct the Table to show that future maintenance workers are considered as receptors as noted in Section 4.1.4.

Response: Table 4-1 was changed to indicate that 1) occupational workers are not considered for current land use for SWMU 9, and 2) maintenance and occupational workers are potential receptors for the future scenario for SWMUs 9 and 10.

Comment 4:

In Section 4.2.5, page 4-14, decision rule #2, change the elimination of the SWMU from further consideration to an examination of the need for a CMS. Decision rule #3, recommend that a CMS be initiated, not just a risk management plan. Figure 4-1 should reflect these changes. Also, on Figure 4-1, there need to be changes to the decision point where Current Chemical Concentration > SL. If this condition results in a "No" determination, the chemical may be removed as a COPC and the next chemical considered; however, a risk analysis should be performed on all chemicals eliminated as COPCs to determine if there is any unacceptable cumulative risk. If this condition results in a "Yes" determination, the chemical is identified as a COPC and the next chemical is considered. Provide separate screening decision rule flowcharts for the different media considered (i.e., soils, sediment, ground water, surface water).

Response: The sentence in Decision Rule 3 was changed, as follows: "In this instance, the performance of a corrective measures study (CMS) was recommended." Figure 4-1 was edited, accordingly. Also, a footnote was added to the diamond in the figure labeled "current chemical concentration > SL?" to indicate that this step was performed for each chemical detected at the site. Reference to a risk management plan was deleted from the work plan because all aspects of a risk management plan was incorporated into the CMS.

The same decision process outlined in Figure 4-1 was used for soil, sediment, ground water and surface water. Decision flow charts for each media would be a reiteration of the same figure. Therefore, it is not proposed that four separate flowcharts be incorporated into the report.

In regards to the comment on Decision Rule # 2, the Navy does not agree with the recommended change. If all detected concentrations at a site are less than screening levels, further risk analysis and consideration of a CMS would not be required. The Navy contends that in this instance the risks associated with the site would be regarded as minimal ("acceptable") because the risk-based screening levels are set at conservative target risk levels (i.e., below the point of departure, where adverse effects may be observed). Additionally, the Navy contends that an additional risk analysis for those chemicals eliminated as COPCs (present at concentrations < screening levels) is not warranted. Various layers of uncertainty and conservative levels (i.e., in the estimation of exposure, land use, toxicity assessment, etc.) are built into the development of risk-based screening levels. The use of these screening levels ensures that the risk assessment focuses of those chemicals which are considered to pose a potential risk at the site. A sentence/footnote was added to Figure 4-1 to clarify that the risk-based screening levels will be based on a Hazard Quotient of 0.1, instead of 1.0, to ensure that additive risks for all chemicals will not exceed 1.0.

Comment 5:

Section 4.2.7. states that explosives are the only parameters of interest at SWMU 10. However, Section 8.4.2. and Table 8-9 identify inorganics as chemicals of interest. Additionally, Section 8.4.1 discusses the presence of SVOCs at Area H soils. Because these chemicals have been positively detected at above risk-based concentrations, they should be considered in the risk assessment of the SWMU. Also, VOCs should be included for SWMU 10 (see also Work Plan Comment 22).

Response: The analytical program for SWMU 10 was expanded. The fourth sentence in the first full paragraph on page 4-18 was changed as follows: "For SWMU 10, the historical data clearly defines the nature of the environmental problem; therefore, samples collected at this SWMU will be analyzed for a focused list of constituents (i.e., explosives and inorganics for all samples and a limited analysis for volatile and semivolatile organic compounds). " All applicable sections of the work plan were revised, accordingly. A soil sample for SVOC analysis will be collected at Area H. A certain percentage of the ground water samples to be collected at the site will be analyzed for VOCs. Pesticide and PCB analyses will not be conducted because these constituents are not expected to be site-related constituents. During historical investigations, these chemicals have been detected at the site at low concentrations attributable to nonsite-related anthropogenic sources (i.e., Basewide application of pesticides for the management of vegetation along roadsides and industrialized areas). The proposed locations for the limited VOC and SVOC analyses are presented in Attachment A of this comment response document.

Comment 6:

In the last paragraph of Section 4.2.7, clarify that the additional sampling is also being performed to further delineate the extent of contamination at the units.

Response: The first sentence of the last paragraph in Section 4.2.7 was modified to state that "Proposed sample locations were selected in areas of known contamination to verify <u>and further delineate</u> the nature <u>and extent</u> of contamination and to better quantify the level of constituents."

Comment 7:

Table 5-1 states that the depth to the water table as determined from the General Basewide Investigations (1981 - 1987) varied from 5 to 15 feet bgs. However, the second full sentence on page 5-6 states that depth to the water table varied from 3 feet bgs near Culpepper Branch Creek to approximately 10 feet bgs near the western edge of McComish Gorge. Please resolve this discrepancy.

Response: The text on page 5-6 was changed to reflect the information provided in Table 5-1.

Comment 8:

In Section 5.5.1, the maintenance worker is not assumed to be exposed to surface water and sediment. In Section 4.1.4, ground water is included in this list. Correct this discrepancy.

Response: Maintenance workers will not be evaluated for exposure to surface water, sediment, and ground water, as discussed in Section 4.1.4. Text in Sections 5.5.1 (page 5-39), 6.5.1 (page 6-37), 7.5.1 (page 7-38), and 8.5.1 (page 8-65) was modified to clarify that exposures to these media are not expected to occur for the maintenance worker.

Comment 9:

Please correct the references to the Field Sampling Plan sections in the Sample Collection Technique columns of Tables 5-5, 6-5, 7-5, and 8-5.

Response: Tables 5-5, 6-5, 7-5, and 8-5 were modified to indicate that the sample collection techniques for surface soil, subsurface soil, ground water, surface water, and sediment can be found in FSP Sections 2.4.2.1, 2.4.2.3, 2.4.1, 2.4.3, and 2.4.4, respectively.

Comment 10:

In Section 5.5.2, please explain the rationale for not sampling ground water wells 4-1-92 and 04C01 as noted in Table 5-5.

Response: The following text was added to the end of Section 5.5.2 to justify the decision to not sample 04C01: "Originally, the primary purpose of well 04C01 was to determine stratigraphy in the area. Historically, analytical results from well 04C01 were below human and ecological screening criteria (refer to Figure 5-5 and 5-6). Also, as shown on Figure 5-8, the location of this well is outside the boundary of the SWMU. Therefore, this well is not proposed to be sampled during the risk assessment field investigation. "

Historically, there has been some confusion regarding monitoring well 4-1-92. Based on information received from NSWC Crane, this well does not actually exist. As a result this well cannot be sampled. The reference to this well was removed from Table 5-5.

Comment 11:

In Section 5.5.2, Surface/Subsurface Soils (Borings), the last sentence of that subsection states that further work is needed to define the southern boundary of the site. The western boundary is apparently unknown as well (see Table 5-5 Surface Water/Sediment sample 04SW/SD04 - Location at wetland/marsh within *suspected* site boundary). Does this mean the estimated SWMU boundary on the figures is not inclusive of the newer (geophysical) data? If so, update the boundaries on the figures. The sampling plan presented in this work plan should have additional sampling for boundary delineation included so we have collected enough information to confidently delineate the SWMU boundaries before performing the risk assessment. What is the risk boundary/border for Risk Assessment as was determined for SWMU #1, Mustard Gas Burial Ground (e.g., 20 additional feet)? The work plan currently states that the data collected during this field investigation will be used to assess the potential risks for human and ecological receptors.

Response: Figure 5-8 does include the new geophysical data, which was used to establish the boundaries of the site. As illustrated by the yellow geophysical data contours on Figure 5-8, the western boundary has been delineated. Sample location 04SW/SD04, as it appears on Figure 5-8, was proposed based on historical site data available prior to completing the August 1999 geophysical survey. Location 04SW/SD04 was moved to the marsh area immediately east of HR-140 near Well 04-05 since based on the 1999 geophysical data the current proposed location is not within the boundaries of the site. The revised location, although outside the site boundaries, will be used to monitor/evaluate potential migration of contaminants from the site. The planning documents were modified accordingly.

As stated in the work plan (top of page 5-50, footnote #8 on Table 5-8, and Figure 5-8), if the results of the additional geophysical boundary delineation work indicate that the southern boundary has not been clearly delineated, additional soil sampling will be performed to ensure that adequate information is available for the risk assessment. However, proposed soil locations to address this issue were not included on Figure 5-8. If additional soil sampling is needed, proposed locations will be identified during the field event and a site map will be provided to USEPA Region 5 and IDEM for approval prior to sampling. Also, Well 04T02 will be installed at the site to evaluate the southern boundary of the site.

For all four SWMUs addressed in this work plan, there was substantial historical data to delineate the

site boundaries. The purpose of this work plan was to corroborate the previous findings and identify data gaps from historical data that would prevent the Navy from conducting of a risk assessment. The concept of a risk boundary/border for risk assessment (e.g., 20 feet outside the existing fenceline) was employed for the SWMU 1, Mustard Gas Burial Ground to 1) provide limits on the extent of sampling to be conducted by defining and exposure area and 2) identify potential boundaries of the site. Because the boundaries of SWMU 1 were not delineated and limited historical data is available for the site, the SWMU 1 planning documents described arbitrary boundaries, which will be verified based on the results of the field investigation. Since the boundaries of SWMU 4 have been delineated, with the exception of the southern boundary, the risk boundary/border concept was not used. As discussed previously, additional geophysical work will be completed to define the southern boundary at SWMU 4. If disposal extends past the existing interpretation of the southern boundary, additional soil samples will be collected within the boundary to delineate the extent of contamination at the southern boundary.

Comment 12:

In Section 6.2, first sentence, insert Gate prior to No. 4.

Response: The word "Gate" was inserted into the sentence, as requested.

Comment 13:

In Section 6.3, third paragraph, second sentence, identify the first round upgradient and downgradient wells by well numbers.

Response: The upgradient well is 05-01 and the two downgradient wells are 05-02 and 05-03. This information was added to the text.

Comment 14:

Section 6.2 states that the northern boundary of the SWMU is undetermined. How will this boundary be set for this study? The sampling plan presented in this work plan should have additional sampling for boundary delineation included so we have collected enough information to confidently delineate the SWMU boundaries before performing the risk assessment (see also Work Plan Comment 12). Include description of additional investigative work to be performed. What will be the risk boundary/border for the risk assessment as was determined for MGBG for this and the other 3 SWMUs (e.g., 20 additional feet outside the SWMU boundary)?

Response: Refer to response to Comment 11 on the general rationale for not including the risk boundary/border concept in this work plan. Since the boundaries of SWMU 5 have been delineated, with the exception of the northern boundary, the risk boundary/border concept was not used. Additional soil borings are proposed for the northern area of the site and are expected to adequately delineate the northern boundary and characterize potential risks at the site. Also, additional site reconnaissance will be performed during the initiation of the fieldwork at the SWMU. If there is visual evidence (debris, mounded material, etc.) to support that the northwestern and northeastern boundaries of the site extend further than currently believed, one or two additional soil borings will be added to the sampling program in each of these areas.

Comment 15:

Table 6-5 and Section 6.5.2 state that well 05-01 will be used along with new monitoring well 05T01 to evaluate ground water quality immediately upgradient of the site. Are these wells intended to be used to set background ground water concentrations for SWMU 5? Note that it is inappropriate to use well 05-01 for this purpose as it has been shown to contain contaminants above human heath and ecological levels. Please identify which samples will be used to determine background levels for this study and provide appropriate

supporting rationale for all four SWMUs.

Response: Data from Wells 05-01 and 05T01 will be used to establish background ground water concentrations upgradient of SWMU 5. As stated throughout the work plan text, low levels of some non-halogenated VOCs, PAHs, and pesticides/herbicides are found in upgradient wells and background soil locations at most sites. The constituents found in the existing upgradient well at SWMU 5 (05-01) are not attributable to burning/disposal activities conducted at the SWMU. Rather these constituents are considered to be residual contaminants from routine maintenance/landscaping practices conducted at the entire base. It is anticipated that these constituents will be found in the new background well to be installed at the site (05T01). These constituents will most likely be found anywhere on the base. Therefore, the presence of these constituents in the existing background well does not mean that the well can not be used to determine ground water conditions upgradient of SWMU 5. A background well should not have to be "clean" prior to use in a risk assessment. A background well must be one that is located in an area that has not been impacted by site activities.

It should also be noted that organic concentrations in the upgradient wells will be used qualitatively in the risk assessment to identify the uncertainty associated with the risk results. Organic constituents will not be eliminated as COPCS in the risk assessment if site concentrations are less than upgradient concentrations.

Comment 16:

There seems to be some uncertainty as to the direction of ground water flow at SWMU 5. How will this be further investigated and clarified in this study?

Response: As noted in the text, ground water flow is to the north-northwest. This is based on ground water elevations. Historical data indicate that the localized paleosand channel may lead to preferential movement of constituents through the channel in a westerly flow. Therefore, additional ground water monitoring wells will be installed to better delineate the movement of constituents outside the paleosand channel and those inside the channel.

Comment 17:

Footnote 9 in Table 6-5 states that surface water may not be available at all sample locations due to intermittent flow. Sediment samples should still be taken at these locations.

Response: The following sentence was added to Footnote 9 on Table 6-5: "If no surface water is available at a location(s), the proposed sediment sample(s) only will be collected."

Comment 18:

There is a typo in the first sentence of Section 7.0 (i.e., Conttol).

Response: The typo was corrected.

Comment 19:

Section 8.2 states that surface drainage from Rockeye flows west to an unnamed tributary of Furst Creek while Table 8-1 states that drainage to the west goes to Lake Greenwood. Also, the last sentence of Section 10.1.2.1 states that none of the surface water bodies (i.e., streams, creeks, tributaries, etc.) at the sites affect Lake Greenwood. Please correct the discrepancies in these locations and throughout the Work Plan, FSP, and QAPP.

Response: Table 8-1 was changed to indicate that surface drainage from the west of Rockeye goes

into Furst Creek. Similar changes were made in the FSP and QAPP.

Comment 20:

In the Table 8-1 conclusions section for the RFI Phase II Soils study, please correct the third sentence from the bottom.

Response: The sentence was modified to state that "Inorganics were detected at concentrations above background in soil samples collected from drainage ways ~~did show metals with surface soils collected from the drainage ways~~."

Comment 21:

On page 8-16 of Table 8-3, the range of detections for 1,1,1-Trichloroethane is reported at 0.011 mg/kg. This level does not exceed any regulatory levels presented in the table. Please correct the table to reflect the reason for reporting this constituent as exceeding regulatory levels.

Response: Since the reported concentration of 1,1,1-trichloroethane does not exceed regulatory levels, the value of "1" in the "Number of Results Exceeding Lowest Criteria" column was corrected to "0" in Table 8-3.

Comment 22:

Please correct the last sentence of Section 8.4.1 and explain the rationale for eliminating Appendix IX Pesticides/Herbicides, VOCs, etc. from consideration for Rockeye. Since it was historical practice to treat areas along roadways with a mixture of herbicides and waste fuel oils, it would seem reasonable to include these as parameters of interest as was done for the other three SWMUs. The rationale presented in Section 8.4.1. for eliminating VOCs from consideration at SWMU 10 because of historical Basewide management practices directly contradicts the rationale presented for the other three SWMUs (i.e., even though the chemicals may not be site-related constituents, they have been conservatively identified as detected chemicals of interest). Reflect any changes made to the work plan in the FSP and elsewhere throughout the document as needed.

Response: The rationale used to exclude Appendix IX pesticide and PCBs from the sampling program for SWMU 10 was included in Section 8.4.1. Based on the wide distribution of these specific parameters, it is hypothesized that the low concentrations of pesticides and PCBs detected in the historical investigation for the site are present due to Basewide practices and not to the specific activities performed at SWMU 10. However, as noted in the response to Comment 5, the analytical program for SWMU 10 was expanded to include Appendix IX VOC and SVOC analyses for a limited number of samples, as defined in Attachment A to this comment response memorandum. Changes to the Work Plan, FSP, and QAPP were made to reflect the addition of these parameters to the analytical program.

Because historical site activities at SWMU 10 are well known, the exclusion of Appendix IX pesticides and PCBs from the sampling and analysis program is considered to be appropriate. The rationale for doing so is not considered to be inconsistent with the other SWMUs included in this work plan. Pesticides are a potential contaminant of concern based on site operations at SWMU 9. Since site operations (disposal activities) at SWMUs 4 and 5 are not as well documented as site operations for SWMU 10, the Navy is willing to conduct pesticide/PCB analyses to confirm that these chemicals were not components of waste disposed at these sites.

Comment 23:

On page 8-65, the proposed study of ecological receptors considers ingestion of contaminated prey items as

a pathway for terrestrial and aquatic receptors. Explain why this pathway is not included in the ecological receptors studies at the other three SWMUs. Also clarify that the air pathway will be considered for maintenance workers as indicated in Figure 8-9.

Response: The evaluation of the ingestion of contaminated prey items is proposed for all four SWMUs, not just SWMU 10. Text in Sections 5.5.1 (page 5-43), 6.5.1 (page 6-41), and 7.5.1 (page 7-41) was modified to clarify that this evaluation will be conducted. In addition, text of page 8-65 was modified to clarify that maintenance workers may also be exposed to air, as well as surface soil.

Comment 24:

Include further contaminant extent/boundary delineation as a primary objective of the sampling and analysis field investigations for those SWMUs at which extent of contamination is not fully known (i.e., McComish, Old Burn Pit).

Response: As discussed in the response to Comments 11 and 14, sampling is proposed to delineate those site boundaries in question (i.e., the southern boundary at SWMU 4 and the northern boundary at SWMU 5).

Comment 25:

Table 8-9 states that soil field samples will be monitored with HNu readings while the text in Section 8.5.2 states that a PID will be utilized. Please correct this discrepancy. For the laboratory target constituents, include those chemical categories listed in Table 1-2 of the QAPP (i.e., metals, cyanide, TSS, hardness, etc.). Why is there an "NA" listed under Limit of Detection for both the field samples and the CEC, pH, and COC laboratory samples? This is inconsistent with the same sections in previous tables in the work plan.

Response: Table 8-9 was modified to indicate that a PID, not an HNu, would be used to monitor the soil samples. A few laboratory target constituents were mistakenly omitted from Table 8-9; nitrate/nitrite, cyanide, miscellaneous inorganics, hardness, and TSS were added to the table. Also, the "NA"'s listed under the "Limit of Detection" column was replaced with the information presented in other similar tables included in the work plan.

Comment 26:

Table 8-9 states that surface water/sediment sample 10SW/SD08 is located east of the site outside the site boundaries in a tributary while in Figure 8-10, this sample appears north of the site. Please correct this discrepancy.

Response: The proposed location 10SW/SD08 is located in a tributary north of the site. Table 8-9 of the Work Plan, Tables 3-16 and 3-19 of the FSP, and text in Section 3.3.3 of the FSP was modified, accordingly.

Comment 27:

Referring to Section 9.1.2, it is stated that sample nomenclature is established in Section 2.12.2 of the Field Sampling Plan (FSP). This reference is incorrect. Furthermore, the Table of Contents for the FSP does not accurately reflect the actual contents of the plan.

Response: Section 9.1.2 was modified to indicate that sample nomenclature is addressed in Section 2.6 of the FSP (CTO 10 SOP 10). The Table of Contents for the FSP was revised to reflect the contents of the plan.

Comment 28:

There is a typo in the first sentence of Section 10.0.

Response: The typo was corrected.

Comment 29:

Referring to Section 11.0, page 11-1, first paragraph, no discussion on risk management or development of risk goals were provided. Text provided below is recommended for a new second paragraph. Also, please modify Figure 11-1, Summary of Ecological Risk Assessment Process, on page 11-3 after the rectangle labeled "Chemicals Identified as COPCs" insert rectangle labeled "Establish Risk Management Goals."

> *The risk assessor and risk manager will work together in the problem formulation phase to develop theories about possible relationships between undesirable ecological effects and observable stressors. The key role of the risk manager will be to identify the goals of the risk assessment and ensure the risk assessment provides decision-making information relevant to those goals. To that end, the risk manager will describe why the risk assessment is needed, what decisions it will support, and what information is required of the risk assessor. The risk assessor will interpret the goals identified by the risk manager into ecological values that can be evaluated in the risk assessment. The risk assessor will ensure that science is effectively used to address ecological concerns.*

Response: The suggested paragraph was added to Section 11.0, as requested. Figure 11-1, Summary of Ecological Risk Assessment Process, was modified, as requested. Also note that additional changes were made to the text on Page 11-1 and to Figure 11-1 to better define the 8-step ecological risk assessment process, as adopted by the Navy and USEPA.

Comment 30:

On page 11-3, Figure 11-1, the word "identify" is misspelled in the rectangle labeled "Identify Toxicity Values" (see fourth polygon up from the bottom on left). Check entire document for spelling errors.

Response: The type was corrected, and the entire document was spell-checked.

Comment 31:

On page 11-6, Section 11.1.2, first paragraph, second sentence, the verb tense is incorrect. Replace with the verb "were". Check entire document for grammatical errors.

Response: The verb tense was changed from "was" to "were", as requested. The entire document was checked for grammatical errors.

Comment 32:

On page 11-6, Section 11.1.2, third paragraph, last two sentences, the assumptions of contaminant transport, no exposure, actual soil zones utilized by ecological receptors are not described prior to making this conclusion that exposure to contaminated subsoils is unlikely. This needs to be revised by stating which ecological receptors will be used for the assessment endpoints and identify their expected soil exposure in terms of maximum soil depth. Explain if this maximum soil depth will exclude subsoil zones within the contaminated site.

Response: The third paragraph in Section 11.1.2 was modified to read as follows:

"Several of the SWMUs involve potential releases of contaminants to surface soils through spills or as byproducts of routine operations. The ecological receptors using these areas could be exposed to released chemicals through direct contact, incidental ingestion, grooming activities, and

consumption of soil organisms and/or vegetation, which may have taken up the chemicals. Chemicals released to surface soils could infiltrate to subsurface soils; however, it is unlikely that there would be significant contact between ecological receptors and contaminants in the subsurface soil. The avian receptors chosen for the sites (bobwhite quail and American woodcock) do not burrow in the subsurface soil. The small mammal receptors chosen for the sites (meadow vole and the short-tail shrew) may burrow in the soil, but rarely exceed 50 cm, eliminating exposure through direct contact and grooming activities (USEPA, 1993a). Because most, if not all, of the food consumed by these birds and mammals (i.e., plants, soil invertebrates) will primarily be exposed to contaminants in the surface soil (0 to 2 feet), ecological receptors will not be exposed to chemicals in the subsurface soil through incidental ingestion or consumption of organisms and/or vegetation. Thus, exposure to subsurface soils will be qualitatively evaluated in the ecological risk assessment."

Comment 33:

On page 11-8, Section 11.1.4, list of assessment endpoints, the selection of mortality for all the assessment endpoints is not acceptable and needs to be revised. In general, an assessment endpoint is related to the expected ecological use of the site. If the site has the potential or provides both habitat for reproduction and a food supply, the endpoint would be reproductive success and growth of [name of ecological receptor] not mortality. Review discussion on Defining Assessment Endpoints in Section 3.3.2 in the Guidelines for Ecological Risk Assessment, U.S. EPA 1998 (EPA/630/R-95/002F).

Response: The section on assessment endpoints will revised, as follows:

11.1.4 <u>Assessment Endpoints</u>

Assessment endpoints are an explicit expression of the environmental value that is to be protected (EPA 1997a). The selection of these endpoints is based on the habitats present, the migration pathways of probable contaminants, and the routes that contaminants may take to enter receptors.

The habitat at and adjacent to the sites consist of forested areas, open fields with grasses, and aquatic habitats. For this SERA, the assessment endpoints are for the protection of the following groups of receptors from adverse effects of contaminants on their growth, survival, and reproduction:

- **Soil invertebrates**
- **Terrestrial Vegetation**
- **Herbivorous mammals**
- **Herbivorous birds**
- **Carnivorous birds**
- **Carnivorous mammals**
- **Omnivorous mammals**
- **Omnivorous birds**
- **Benthic invertebrates**
- **Fish**

The above receptors will be selected for each site based on habitat. For example, sites that do not contain aquatic habitats will not be evaluated for benthic invertebrates and fish.

Many receptors in the soil and aquatic environments are adequately described in general categories such as soil invertebrates, vegetation, and sediment-dwelling (benthic) invertebrates. This is due to the nature of the threshold values, effects values, or water quality criteria that are

typically used to characterize risk for such organisms. For vertebrate receptors, selection of particular species may be required so that intake through eating, drinking, and other routes can be estimated.

Receptor identification is influenced by the contaminants, their likely mode of transport, ultimate fate, and toxicity. For example, most metals (with notable exceptions of cadmium and mercury) typically do not bioaccumulate. For contaminants that bioaccumulate, such as mercury compounds and chlorinated pesticides, effects on upper trophic level receptors will be assessed. For contaminants that do not bioaccumulate, organisms that are in direct contact with soil/sediment (i.e., sediment- and soil-dwelling organisms and plants) and animals that may incidentally ingest soil particles are selected as receptors for metals, if exposure pathways are complete. Sensitivity to particular contaminants is also considered. For example, birds and mammals may have different sensitivities to organic compounds, so each group or the most sensitive group for a particular contaminant will be assessed.

As previously mentioned, for most receptor species, ingestion is the primary route of exposure. Indicator species are selected for their preferred habitat, body size, sensitivity, home range, abundance, commercial or sport utilization, legal status, and functional role (e.g., predators). For conservativeness, indicator species may be small and have small home ranges. Species known to be sensitive to particular contaminants may be selected or toxicity values for those species may be used. For example, mink are sensitive to PCBs for reproductive endpoints and therefore mink Terrestrial Reference Values (TRVs) would be selected for a scenario involving exposure to PCBs from an aquatic or sedimentary source. The availability of exposure parameters, such as body mass, feeding rate, and drinking rate, may also be a factor in selecting indicator species. The following indicator species will be used for the food chain modeling (discussed later):

- **Herbivorous mammals: Meadow Vole**
- **Herbivorous birds: Bobwhite Quail**
- **Carnivorous birds: American Woodcock**
- **Carnivorous mammals: Short-Tail Shrew**

Comment 34:

On page 11-8, Section 11.1.5, to be consistent with Comment 33 above, replace the phrase "...increase in mortality" with "...decrease in survival." Likewise, revise the text on page 11-20, Section 11.4.1, endpoints that address robin mortality.

Response: The requested changes were made.

Comment 35:

On page 11-9, Section 11.1.6, first paragraph, to be consistent with Comment 33 above, replace the term "mortality" with "survival" in the measure of effect statement.

Response: The requested changes were made.

Comment 36:

On page 11-11, Section 11.2.1, subsection on Surface Water and Sediment, add the following item #3:

> *Organic contaminants in sediment that exceed the additive sediment guideline unit for narcotics will be retained as COPCs even if they are lower than the individual EDQLs.*

A document on the development and application of this additive sediment guideline unit for narcotics will be

provided by Dan Mazur of EPA, Region 5.

Response: The requested change was made. The guidelines were used in a "lines-of-evidence" approach to evaluate the sediment data.

Comment 37:

On page 11-11, Section 11.2.1, subsection on Surface Soil for..., modify item #2 as follows:

> *Inorganic contaminants that exceed EDQLs and the site specific background concentrations will not be retained as COPCs.*

Add the following item #3:

> *The inorganic contaminants that exceed EDQLs, but do not exceed background concentrations (i.e., unaffected by site operations) will be retained for discussion in the risk characterization section.*

Response: Clarification on concerns associated with this comment is needed. If inorganic contaminants exceed EDQLs and site-specific background concentrations, these chemicals should be identified and retained as COPCs. If inorganic contaminants exceed EDQLs, but do not exceed background concentrations, these chemicals should be eliminated as COPCs because they are not site-related contaminants. The following modification to item #2 under "Surface Soil for Invertebrates, Plants, and Terrestrial Wildlife" is recommended: "Inorganic contaminants that <u>exceed EDQLs, but</u> do not exceed site-specific background concentrations will not be retained as COPC. However, these chemicals, which are not considered to be site-related constituents, will be addressed in the uncertainty section of the risk assessment."

Comment 38:

On page 11-11, Section 11.2.1, last paragraph, replace the term "weight-of-evidence" with "lines of evidence." Review discussion on Lines of Evidence in Section 5.2.1 in the Guidelines for Ecological Risk Assessment, U.S. EPA 1998 (EPA/630/R-95/002F).

Response: The requested change was made.

Comment 39:

On page 11-12, Section 11.2.2, defining terms in equation for exposure, in order to apply more realistic assumptions, the description for term "H" will be revised as follows: *percent of food intake from the contaminated area.* Review discussion on Describe Contact or Co-Occurrence in Section 5.2.1 (fourth paragraph and text box 4-10) in the Guidelines for Ecological Risk Assessment, U.S. EPA 1998 (EPA/630/R-95/002F).

Response: The requested change was made.

Comment 40:

On page 11-13 through 11-14, Target Values - Soil Quality Standards, this section will be revised to use the Hazardous Concentration 95 (HC95), i.e., 95% protection, rather than the Hazardous Concentration 50 which does not provide protection for half of the species. This section will be revised based on either the 1997 WasteTECH Symposium report (revised text May 1997) by Frank Swartjes entitled "Assessment of Soil and Ground water Quality in the Netherlands: Criteria and Remediation Priority or current revision. See related information at: http://www.contaminatedland.co.uk/std-guid/dutch-l.htm

Response: Further clarification on the requested change is needed. The cited document does not

include HC95 values and information necessary to calculate the HC95 values.

Comment 41:

On page 11-14, first paragraph, both the Intervention and Target (HC50) values are intended to flag serious soil contamination and do not provide protection for many species as stated in Comment 40. The second to last sentence of this paragraph will be deleted and a replacement sentence can be added that discusses that the Negligible Risk level is assumed to be 1% of the Maximum Permissible Risk Level for ecosystems, which is defined as the HC95. The last sentence will be revised as follows: *The target value is calculated as 1% of HC95 and will be used to determine ecological effects.* The following equation: *Criteria = (Intervention Value + Target Value)/2*, will be deleted.

Response: The requested changes were made.

Comment 42:

On page 11-14, Canadian Soil Quality Guidelines, will be revised to incorporate revisions in the CCME 1999 document. See http://www.ec.gc.ca/ceqg-rcqe/soil.htm

Response: The 1999 CCME values will be used. However, note that only the screening values related to ecological receptors will be used in the SERA. Several of the values listed on the cited web site are based on human health effects.

Comment 43:

On page 11-16, Section 11.2.3.3, last paragraph, replace the term "weight-of-evidence" with "lines of evidence" as discussed in Comment 38. Repeat replacement of these same terms on page 11-18, last sentence of section 11.2.3.4.

Response: The requested changes were made.

Comment 44:

On page 11-17, Section 11.2.3.4, last paragraph, add the following sentence that reads, "The Region III BTAG screening levels will be used if no other data are available.":

> *Additive sediment toxicity for narcotics will be evaluated using additive sediment guideline unit for narcotics.*

A document on the development and application of this additive sediment guideline unit for narcotics will be provided by Dan Mazur of EPA, Region 5.

Response: The requested change was made. The guidelines will be used in a "lines-of-evidence" approach to evaluate the sediment data.

Comment 45:

On page 11-19, Section 11.3, last paragraph, there is no discussion of how risk description, the narrative explanation and significance, will be addressed. The following paragraph will be inserted at the end of this section:

> *The risk description is the technical narrative supporting the risk estimates. The risk description will provide a description of the risk estimates in terms of the extent, magnitude, and potential ecological significance. Specifically, the risk description portion of the risk characterization will describe the location and areal extent of existing contamination where the hazard quotient of 1 is exceeded for a*

chemical(s). This information will provide an area of the bounds of impact above the threshold for adverse effects. Other relevant information related to the risk estimate that will be provided in the ecological risk assessment includes the expected half-life (qualitative or quantitative) in the environment for those site-related contaminants which exceed the hazard quotient of 1 as well as a qualitative discussion of the uncertainties associated with the ecological risk assessment.

Response: The requested change was made.

Comment 46:

On page 11-21, Section 11.4.2, last paragraph, last sentence, the reference to "home range" will be replaced with "*percent of food intake from the contaminated area.*"

Response: The requested changes were made.

FIELD SAMPLING PLAN

Comment 1:

Referring to Table 2-1, for VOCs entries, note that if sodium bisulfate can't be used, then the empty vial technique could be used, applying a 7-day holding time.

Response: Freezing of soil samples complies with TtNUS standard operating procedure. TtNUS will use the freezing preservation method with a holding time of 48 hours from sampling to preservation.

Comment 2:

On page 2-14, Section 2.4.2.1., how can a 0' to 1' soil depth be "representative" of a 0' to 2' soil depth? Should this section be rephrased? What is the rationale for this proposal?

Response: The sixth sentence of section 2.4.2.1 was deleted. The fifth sentence was changed to reflect that samples of non-volatile organic and inorganic parameters would be taken from the 0' to 2' depth.

Comment 3:

Note that the assumption expressed near the bottom of page 2-14, Section 2.4.2.2 may not be valid.

Response: The sixth sentence in Section 2.4.2.2 was deleted.

Comment 4:

On page 2-24, Section 2.11.2, is it truly necessary to use isopropanol and nitric acid in the decontamination procedure? If possible, use of these reagents in decontamination steps should be omitted.

Response: TtNUS will use pre-cleaned and/or dedicated sampling equipment. Nitric acid and isopropanol rinses will not be used as part of decontamination procedures. The planning documents were revised accordingly. However, an organic solvent rinse will be used, when required (i.e., when oily solid sample matrices are encountered) to eliminate potential contamination of organic samples.

Comment 5:

In Section 3.1, page 3-1, referring to the second bullet, it should be clarified specifically how a "release" to an "off-SWMU" surface water body and sediment deposit is defined. Ground water should also be included. This should be reflected in the objectives for the remaining 3 SWMUs in the FSP, QAPP, and Work Plan as well.

Response: The second bullet was changed, as follows:

- **To determine if ground water, surface water and sediment at locations outside the site boundaries have been impacted by site activities.**

The following sentence was added to the end of Section 3.1.3: "If constituents detected at the SWMU or known to have been released to on-SWMU media are detected in monitoring wells located outside the SWMU boundaries, it will concluded that this medium is impacted by releases at the SWMU."

The following sentence was added to the end of Section 3.1.4: "If constituents detected at the SWMU or known to have been released to on-SWMU media are found at surface water and sediment locations outside of the site boundaries, it will concluded that these media are impacted by releases at the SWMU."

Similar changes were made in the FSP for each SWMU. Sections 4.2.4.2 and 4.2.4.3 of the work plan discuss these objectives.

Comment 6:

Referring to Table 3-2, page 3-4, will an extra set of soil, sediment, and aqueous VOCs samples be taken for Method 8015B (independently of Method 8260)?

Response: Two sets of samples will be collected for VOC analysis; one for Method 8015B and one of Method 8260. Table 3-2 was updated by placing SW-846 Method 8015B on its own line separate from Method 8260B. Tables 3-5, 3-7, 3-10, 3-12, and 3-15 will also be updated, accordingly.

Comment 7:

The rationale for surface soil depth sample collection appearing on page 3-5, Section 3.1.1, should be clarified. See the first bullet on page 3-5 as well as all analogous sections appearing in the context of the other 3 SWMUs under investigation through this plan. In particular, which DQOs (i.e., decision rules) do the proposed sampling depths correspond to, with respect to organic vs. inorganic contaminants?

Response: The first bullet was changed to read as follows:

- **At the ground surface (0 to 2 feet bgs). Samples for volatile organic analyses will be collected from 1- to 2-foot interval and samples for non-volatile organic and inorganic analyses will be collected from 0- to 2- foot interval.**

This change was made to each section.

Comment 8:

Referring to Table 3-4 and other analogous tables in the work plan, in the case of metals, the rationale for not taking both filtered and unfiltered ground water samples should be explained. Note that both filtered and unfiltered surface waters samples will be taken.

Response: As identified in the "Proposed Sampling and Analysis" sections of the work plan, filtered ground water samples will not be collected for metals analysis unless it is not possible to collect ground water samples with a turbidity less that 10 NTUs. In that case filtered samples will be collected. A footnote was added to Tables 3-4, 3-9, 3-14, and 3-19 of the FSP to clarify this issue.

Comment 9:

Table 3-15, page 3-31, shows 6 surface water samples to be collected while Section 3.3.4 states that 5 surface water/sediment samples will be collected. Please correct this discrepancy.

Response: Collocted surface water and sediment samples are proposed to be collected from five locations, rather than six locations. Table 3-15 is in error and was modified, accordingly. No changes to the text of the FSP are required.

Comment 10:

Referring to Table 3-17, it appears from reading other portions of Section 3.4 that 20 soil samples will be taken for metals and explosives, not 24.

Response: Twenty soil samples (10 surface and 10 subsurface samples) are proposed to be collected from the site. Table 3-17 is in error and was modified, accordingly. No changes to the text of the FSP are required.

Comment 11:

Table 3-20, page 3-41, shows 6 surface water samples to be collected for explosives while Section 3.3.3. states that 12 surface water/sediment samples will be collected. Please correct this discrepancy.

Response: Collocated surface water and sediment samples are proposed to be collected from 12 locations at the site. Table 3-20 is in error and was modified, accordingly. No changes to the text of the FSP are required.

Comment 12:

In SOP - CTO10, *SOP for Sample Preservation, Packaging, and Shipping*, the addresses of the two respective laboratories, which will be receiving shipments of samples, should be stated here, and in an appropriate QAPP section.

Response: The address of Laucks Testing Laboratories, Inc. was included in this SOP. The dioxin samples will be shipped to Laucks and forwarded by the laboratory to their subcontractor laboratory, Triangle Laboratories, Inc.; therefore, only Laucks address was provided. However, the name and address of both labs are provided in Section 7.0 of the QAPP.

HEALTH AND SAFETY PLAN

Comment 1:

Provide an updated page 1-3 when the "TBD/TBA" issues are resolved.

Response: An updated version of page 1-3 was provided in the revised document.

Comment 2:

Figure 2-2, Hospital Route Map, is missing.

Response: A map delineating the route to the nearest hospital (Figure 2-2) was included in the revised document.

QUALITY ASSURUANCE PROJECT PLAN

Comment 1:

Referring to Tables 1-1, 3-1, and 3-2, should other explosive "breakdown" products identified for other project phases be added to this target list? Do these lists apply to all 4 SWMUs? If not, then the list of parameters should be itemized by SWMU.

Response: No changes to the text are proposed. Based on historical analytical data and historical usage and general information for the four SWMUs, explosives are thought to be present only at SWMU 10. The list of explosive parameters for SWMU 10 are based on the historical data. Analytes included for other sites at the Base such as nitrocellulose are not applicable for this site.

Tables 1-1, 3-1 and 3-2 is a total list of all constituents to be including the sampling program. Not all constituents are included for each SWMU. As noted in Section 1.5.1 of the QAPP, Tables 5-5, 6-5, 7-5, and 8-7 specify the analytical program for each SWMU. Also, Table 1-2 in the QAPP is a summary of analyses per media and SWMU.

Comment 2:

If the data is to be used for risk assessment purposes, then data should be collected for hexavalent chromium. Note that there are many reporting limit "exceedances" for the intended matrices. If the project is approved, how will these discrepancies bear on risk assessment evaluation? Will the data for soil metals perhaps also be compared to levels in background locations once that database is compiled? If background levels exceed low risk founded levels, how will such data be assessed?

Response: No changes to the text are proposed. Based on historical data, hexavalent chromium was not a constituent of concern for these sites; therefore, this parameter is not proposed for the analytical program.

There are some reporting limits that are greater than the screening criteria. As noted in Section 1.4.3 of the QAPP, work was completed to optimize the analytical methods to attain, to the greatest extent possible, laboratory reporting limits at concentrations less than or equal to the risk-based target levels. Five pages of detailed explanations for the use of data for each medium and constituents within the medium that have a reporting limit greater than the risk-based target level are provided in Section 1.4.3.

If these constituents are not detected at the reporting limit, it will be concluded that they are not present at the site. The difference between the reporting limit and screening criteria will be addressed qualitatively in the uncertainty associated with the risk assessment.

A background soil study is being conducted for NSWC Crane. As discussed in Sections 10.1.2 and 11.2.1 of the Work Plan, inorganic background concentrations for soil will be used in the human health and ecological risk assessment to identify COPCs (i.e., to screen out those chemicals not related to site activities). Chemicals present at concentrations less than background concentrations will be eliminated as COPCs and will not be evaluated in the risk assessment. If the background concentration for a particular chemical is higher than the associated screening levels, this occurrence will be noted in the uncertainty analysis in the risk assessment.

Comment 3:

Referring to footnote #11 in Table 1-1, when will the "TBD" issues be resolved for the soil matrix?

Response: The "TBD" issues will be resolved for the final QAPP. The most current IDLs/MDLs and

reporting limits for Laucks will be included for all compounds listed on Table 1-1.

Comment 4:

Pentachlorophenol is included in the SVOC list in Table 1-1, when a better analysis would result from adding it to the Method 8151A target list.

Response: Pentachlorophenol was removed from the SVOC list and added to the 8151A list.

Comment 5:

In Section 1.2.7, and in other analogous places in the QAPP, the Indiana Bat is referred to as a bird, when it is really a mammal. Also, the peregrine falcon is no longer on the Endangered Species list. Please correct.

Response: The requested changes were made.

Comment 6:

The list of specific objectives described on page 1-20, section 1.4.4. has omitted the purpose of determining the detection of releases in surface water and sediment, which is inconsistent with what has been stated in the Field Sampling Plan (See also FSP Comment 5.) Also, here it is mentioned that an ecological risk assessment will be performed, which isn't stated in the FSP. What is the purpose of collecting chemical environmental data for surface water and soil matrices? In this regard, also see Section 1.4.2. of the QAPP and all analogous sections. Is the purpose of comparing surface water and sediment data to values stated in Table 1-1 to do some sort of screening risk assessment, or instead, to detect releases?

Response: No changes to the text are proposed. The objectives listed in Section 1.4.1, page 1-20 of the QAPP include the evaluation of both human and ecological receptors in all media (all media include surface water and sediment). This evaluation is a risk assessment as stated throughout the work plan, FSP and QAPP and in the title of the report. The conduct of an ecological risk assessment is listed in Section 3.1, 3.2, 3.3, and 3.4 of the FSP. The first bullet under the objectives in these sections is to determine human health and ecological risks.

In summary, both a human health and ecological risk assessment will be performed. The purpose for sampling surface water, sediment and soil is to assess risk to both human and ecological receptors. A comparison of the reporting limits to the risk-based screening criteria is to ensure that appropriate conclusions will be drawn from the analysis performed for the project.

Comment 7:

The sentence at the top of page 1-23 implies that ground water values might be compared to ecological data quality levels simply because an EDQL could be the lowest and most conservative value. However, such values would not apply to ground water. Are there cases where EDQLs are being inappropriately applied to matrices?

Response: EDQLs are not being applied inappropriately; therefore, no changes to the planning documents are required. For the purposes of the QAPP (Table 1-1), EDQLs for surface water are included for comparison to laboratory limits for the aqueous sample matrix because surface water and ground water samples will be collected for all four SWMUs. For conservative purposes, in the "Hazardous Identification" sections of the Work Plan, EDQLs for surface water were compared to historical ground water concentrations for the site because 1) limited/no surface water data were collected during historical site investigations and 2) ground water at the site is expected to discharge to nearby surface water bodies. Although this comparison is conservative, it is not considered to be inappropriate in light of the fact that limited/no surface water data are available.

Comment 8:

In Section 1.4.3, how do soil metals background concentrations factor in to the final project assessment?

Response: As discussed in Sections 10.1.2 and 11.2.1 of the Work Plan, inorganic background concentrations for soil will be used in the human health and ecological risk assessment to identify COPCs (i.e., to screen out those chemicals not related to site activities). Inorganic background concentrations for various soil types are currently being developed for NSWC Crane. Background concentrations were not included in Section 1.4.3 (Table 1-1) of the QAPP because the values were not available at the time the draft QAPP was prepared. The Draft Background Report for NSWC Crane was submitted to the Navy, NSWC Crane, and regulatory agencies on July 12, 2000. Additional QA samples are scheduled to be taken in October 2000. Therefore, finalized background concentrations will not be available prior to the submittal of the final QAPP for SWMUs 4, 5, 9, and 10.

Comment 9:

Referring to page 7-2, 3rd paragraph from the top, note that the soil samples should be frozen within 2 days of collection.

Response: The text was amended, as follows: "Preservation must occur within 48 hours of sample collection."

Comment 10:

In Section 9.1.2, last paragraph, 5th line from the end, change the word "determine" to "confirm". A determination can still be made.

Response: The requested change was made.

Comment 11:

In Section 9.2.2, page 9-4, last paragraph, can it be clarified why the "Z" qualifier will not be used in lieu of the "JN" flag?

Response: The "Z" qualifier is defined by CLP SOW OLM04.2 as a qualifier that may be added to the data by the laboratory. The "JN" flag is defined by CLP SOW OLM04.2 as a qualifier that is added during the data validation process to compounds which are "tentatively identified at an estimated concentration". In this particular case the "Z" qualifier will be added by the laboratory to flag target compound results that are present on the primary column but which co-elute on the confirmation column. The "JN" flag will be used by TtNUS during the data validation process.

Comment 12:

In Section 9.3.2., page 9-5, whose task is it to perform independent validation for both field and laboratory generated data? This should be stated correctly and consistently with information presented in the Project Management & Responsibility Section.

Response: Section 9.3 was modified to clarify the following:

1) **Validation of field measurements will be conducted in the field by the Field Geologists/Technicians;**

2) **TtNUS Data Management/EGIS Leads will ensure that field measurements are transferred**

correctly from the sample logsheets to the electronic database;

3) **Validation of laboratory data will be completed by TtNUS chemists; and**

4) **The TtNUS Data Validation Coordinator will be responsible for organizing data validation activities, reviewing data validation memoranda, and ensuring that validation qualifiers are correctly transferred to the electronic database.**

This information will also be added to Section 2.1, page 2-7 of the Work Plan.

Comment 13:

Referring to Section 10.1.1.3, page 10-2, the February 1997 field audit checklist should be immediately updated to incorporate procedures to be used for collection of soil VOCs.

Response: The field audit checklist will be updated to incorporate procedures for collection of soil VOCs.

Comment 14:

Lauck's Method 8015B lab SOP (LTL-8019) should be revised to reflect a low level procedure that can be accommodated with the Method 5035 sampling technique. This procedure will not produce accurate data for soils. Also, it is an earlier version than the one EPA approved previously (Revision 3 - 12/9/1998). It is unclear why the earlier version was submitted in support of this QAPP. Similarly, the LTL-8151 SOP contained in Volume 3 is an earlier version than was previously approved (Revision 2 - 12/7/98). Also, please submit the following missing SOPs: LTL-7012 (Revision 1 - 8/21/98) and LTL-7015 (Revision 0 - 1/18/99).

Response: The revised, updated Laucks SOPs were submitted with the final QAPP.

ATTACHMENT A

VOC ANALYSIS
SWMU 10 – ROCKEYE
NSWC CRANE, INDIANA

The following table presents a summary of the monitoring wells at Solid Waste Management Unit (SWMU) 10 – Rockeye that will be sampled for volatile organic compound (VOC) analysis. The representative list of wells was selected based on historical data, known site operations, etc. The information contained in this table will be incorporated into the Final Planning Documents for SWMUs 4, 5, 9, and 10.

Well	Aquifer	Location/Rationale
10C26	Lower Penn	Downgradient of area (Building 2726C) at site where a solvent tank used to be located; south of central active portion of site.
10C26P3	Upper/Mid Penn	Downgradient of area (Building 2726C) at site where a solvent tank used to be located; south of central active portion of site.
10C31	Lower Penn	Central in active area; Lower Penn aquifer.
10C31P3	Upper/Mid Penn	Central in active area; Upper/Mid Penn aquifer.
10C55	Lower Penn	Immediately downgradient, northeast of site for Lower Penn aquifer.
10C55P2	Unconsolidated	Immediately downgradient northeast of site for unconsolidated aquifer.
10C52	Lower Penn	Upgradient location for Lower Penn aquifer; near southeast portion of site.
10-03	Upper/Mid Penn	Upgradient location for Upper/Mid Penn aquifer; near southeast portion of site.
10C41	Lower Penn	Upgradient location for Lower Penn aquifer; near southwest portion of site.
10C41P3	Upper/Mid Penn	Upgradient location for Upper/Mid Penn aquifer; near southwest portion of site.

ATTACHMENT 2

RESPONSES TO EPA COMMENTS
DATED SEPTEMBER 14, 2000

RESPONSES TO
US EPA REGION 5 COMMENTS RECEIVED DURING SEPTEMBER 2000
ON
WORKPLAN FOR SWMUS 4, 5, 9, AND 10

First e-mail
Comment 1:
On Table 2-1, please correct my phone number to (312) 886-7890. Change the IDEM contact to Doug Griffin. Provide FOC information when determined.

Response: The telephone number was changed and the IDEM contact was changed to Doug Griffin. Also, the field team leader was identified as Keith Simpson.

Comment 2:
In Table 4-1, remove the Current Scenario Occupational Worker from consideration as noted in the response to comment 3.

Response: As stated in Section 4 page 7 of 19, the occupation worker is considered to be a potential receptor for SWMU 10 because this is an active area. The response to comment was changed as follows to further clarify the current occupational receptors.

Table 4-1 will be changed to indicate that 1) occupational workers are not considered for current land use for SWMU 9 and 2) maintenance and occupational workers are potential receptors for the future scenario for SWMUs 9 and 10.

Comment 3:
Referring to Response to Comment 21, the table has not been corrected.

Response: The frequency of detection for 1,1,1-trichloroethane in Table 8-3 has been changed from 1 to 0.

Comment 4:
Referring to Responses to Comments 41 & 42, the changes have not been made.

Response: The last two sentences of the last paragraph in Section 11 page 14 have been changed as follows:

The negligible risk level is assumed to be 1% of the maximum permissible risk level for ecosystems, which is defined as HC95. The target value is calculated as 1% of the HC95 and will be used to determine ecological effects.

The formula presented at the bottom of page 11-14 has been deleted.

The second bullet on page 11-14 has been changed to include the reference to CCME, 1999.

Second e-mail

Comment 1:
In FSP comment #6, although the response proposed in July is appropriate, the proposed change was apparently not made. (i.e. this referenced portion of the table is still confusing)

Response: Tables 3-2, 3-5, 3-7, 3-10, 3-12, 3-15 and 3-20 were updated by placing SW-846 Method 8015B on its own line separate from Method 8260B

Comment 2:
Referring to FSP comment # 8, the issue concerning use of low flow pumping in lieu of filtering has been conflated. The guidance document in which these concepts were published, "Ground Water issue: Low-Flow (Minimal Drawdown) Ground-water Sampling Procedures", by Robert Puls and Michael Barcelona, April 1996, EPA/540/S-95/504, p. 7, indicates that filtering of groundwater samples can still take place in order to fulfill stated objectives. If there is an objective to compare the least conservative case (i.e. unfiltered samples) to a more conservative risk scenario (i.e. represented through filtered groundwater samples), then both filtered and unfiltered groundwater samples should be collected. The sampling flow rate & pumping means should be identical for both.

Response:
Ground water sampling techniques are designed to collect ground water samples which are representative of the formation water. Unfiltered ground water samples are to be collected and analyzed for total metals to allow evaluation of a conservative risk scenario where unfiltered ground water is used for drinking water. Therefore, collection of filtered samples is not necessary. Collection of ground water samples using high flow sampling techniques could result in the collection of ground water samples containing a greater amount of particulate, which are not representative of formation water. Low flow sampling techniques will be used to minimize an artificial increase of suspended particulate, which could artificially increase the metals concentrations. Ground water samples for metals will be collected only after turbidity has been reduced to 10 NTUs or less. If the goal of 10 NTUs cannot be reached a filtered ground water sample will be collected in addition to the non-filtered ground water sample in order to determine the contribution of particulate to the metals concentrations. This information would be used in the assessing the uncertainty of the calculated risks.

The following changes have been made to the Field Sampling Plan in response to this comment.

1) The sentence (Section 3.1.3 on page 3-6, Section 3.2.3 on page 3-21, Section 3.3.3 on page 3-33, and Section 3.4.2 reading "Filtered ground water samples will not be collected for metals analysis because low-flow sampling techniques will be used to eliminate turbidity concerns" has been modified to read as follows.

Filtered ground water samples will be collected for metals analysis only if a turbidity of less than 10 NTUs cannot be achieved during stabilization.

2) Footnote on FSP Tables 3-4 (No. 3), 3-9 (No. 3), 3-14 (No. 3), and 3-19 (No. 2) have been modified to read as follows.

Filtered ground water samples will be collected only if a reading of less than 10 NTUs is not achieved during stabilization.

3) CTO 10 SOP 4 has been modified to include additional steps for filtering of ground water samples where filtered samples must be collected.

Comment 3:
Referring to FSP comment # 12, Table 2-1 should be changed to reflect a maximum holding time for frozen & processed VOCs samples of 5 additional calendar days, up to 7 days from time of sample collection. The 14-day holding time for soil VOCs is unacceptable. This guidance is derived from p.12 of 65 of Indiana Modified Method 5035: Modified Method for the Sampling, handling and Storage of Soils and Wastes to be Analyzed for Volatile Organics, IDEM - 10/28/99. Section 7.2, p. 7-2 of the QAPP must also be changed (as well as any other sections of the workplan or SOPs where this 14-day holding time reference appears).

Response: FSP comment 12 does not relate to this issue. No FSP or QAPP comments addressed this issue. Table 2-1 in the FSP will be updated to show that low concentration method samples that are frozen must be analyzed within 7 days from sample collection. Additionally, page 7-2 of the QAPP was changed to reflect the 7-day holding time for frozen samples.

Comment 4:
Referring to QAPP comment # 9, the reference to 14 days should be modified per item # 3, above.

Response: Page 7-2 in the QAPP has been changed to reflect a 7-day hold time for frozen samples.

Comment 5:
Referring to QAPP comment # 14, for Method 8015, there should be an understanding that the means for processing the soil VOCs samples should be a closed system technique, similar to that being used for SOP LTL-8265, section 4.11.1. (i.e. The soil VOCs samples intended for 8015 analysis should not be opened for weighing in the lab & should be placed into an appropriate autosampler following the tared weighing of each vial. The 8015 analysis should be analogous to the 8260 analysis, with respect to soil VOCs.)

Response: Attached to this response to comments are the updated Laucks Testing Laboratory's SOPs. The updated SOP for method 8015 (i.e., LTL-8019) addresses the concerns of this comment.

In summary, soil samples will be analyzed via the high level requirements of method 5035 for the 8015 analysis of acetonitrile, isobutyl alcohol, propionitrile and 1,4-dioxane. This is described in SOP LTL-8019.

Currently, the laboratory does not employ a low-level procedure of method 5035 for analysis by 8015. The laboratory's practice to perform low level analysis by method 5035/8015, if required, would be to transfer the EnCore content to a soil sample vial. This would be done within 48 hours of collection (or as soon as possible after receipt). Then, at the same time the EnCores are transferred to the soil vials, water and surrogate will be added, thereby, maintaining a closed system.

ATTACHMENT 3

CHANGE PAGES/TABLES TO WORK PLAN
FOR RISK ASSESSMENT AT SWMUs 4, 5, 9, AND 10
VOLUMES I AND II

ATTACHMENT 3 INSTRUCTIONS
FOR REPLACING PAGE CHANGES TO THE WORK PLAN
FOR RISK ASSESSMENT AT SWMUs 4, 5, 9, AND 10
NAVAL SURFACE WARFARE CENTER, CRANE DIVISION

VOLUME I – WORK PLAN

Section 2

- Replace the current Pages 2-1 through 2-4 with the enclosed Pages 2-1 through 2-4.

Section 4.0

- Replace the current Pages 4-9 and 4-10 with the enclosed Pages 4-9 and 4-10.

Section 8.0

- Replace current Pages 8-15 and 8-16 with the enclosed Pages 8-15 and 8-16.

Section 11.0

- Replace Pages current Pages 11-13 and 11-14 with the enclosed Pages 11-13 and 11-14.

VOLUME II – APPENDICES

Appendix A – Field Sampling Plan

Section 2.0

- Replace current Pages 2-7 and 2-8 with the enclosed Pages 2-7 and 2-8.

Section 3.0

- Replace current Pages 3-3 through 3-6 with the enclosed Pages 3-3 through 3-6.
- Replace current Pages 3-9 through 3-12 with the enclosed Pages 3-9 through 3-12
- Replace current Pages 3-15 and 3-16 with the enclosed Pages 3-15 and 3-16
- Replace current Pages 3-19 through 3-22 with the enclosed Pages 3-19 through 3-22.
- Replace current Pages 3-27 and 3-28 with the enclosed Pages 3-27 and 3-28
- Replace current Pages 3-31 through 3-36 with the enclosed Pages 3-31 through 3-36.
- Replace current Pages 3-41 through 3-44 with the enclosed Pages 3-41 through 3-44.

Appendix A, Attachment B – Standard Operating Procedures

- Replace all pages of current SOP 4 with the enclosed full copy of SOP 4
- Replace all pages of current SOP 10 with the enclosed full copy of SOP 10
- Replace all pages of current SOP 12 with the enclosed full copy of SOP 12

Appendix C - Quality Assurance Project Plan

Section 7.0

- Replace current Pages 7-1 and 7-2 with enclosed Pages 7-1 and 7-2.

VOLUME III – LABORATORY SOPs

All laboratory SOPs are in Volume III. Please make the following changes to Volume III of the Work Plan.

- Remove From Volume III Appendix B Table of Contents pages 1 and 2 and replace with Volume III of III Table of Contents pages 1 and 2.
- Remove and replace standard operating procedure (SOP) LTL-1002 Revision 3 with LTL-1002 Revision 4.
- Remove and replace SOP LTL-1004 Revision 3 with LTL-1004 Revision 4.
- Remove and replace SOP LTL-1005 Revision 4 with LTL-1005 Revision 5.
- Remove and replace SOP LTL-1006 Revision 2 with LTL-1006 Revision 3.
- Insert SOP LTL-3001 Revision 3 immediately before SOP LTL-3011.
- Remove and replace SOP LTL-3011 Revision 0 with LTL-3011 Revision 1.
- Remove and replace SOP LTL-3077 Revision 3 with LTL-3077 Revision 4.
- Remove and replace SOP LTL-3161 Revision 3 with LTL-3161 Revision 4.
- Remove and replace SOP LTL-3202 Revision 1 with LTL-3202 Revision 2.
- Remove and replace SOP LTL-3302 Revision 1 with LTL-3302 Revision 2.
- Remove and replace SOP LTL-3510 Revision 6 with LTL-3510 Revision 7.
- Insert SOP LTL-3450 Revision 1 immediately before SOP LTL-3510.
- Remove and replace SOP LTL-7015 Revision 0 with LTL-7015 Revision 1.
- Insert SOP LTL-7101 Revision 3 immediately before SOP LTL-7105.
- Remove and replace SOP LTL-7105 Revision 0 with LTL-7105 Revision 1.
- Remove and replace SOP LTL-8084 Revision 1 with LTL-8084 Revision 3.
- Remove and replace SOP LTL-8265 Revision 1 with LTL-8265 Revision 2.
- Remove and replace SOP LTL-8276 Revision 1 with LTL-8276 Revision 2.
- Remove and replace SOP LTL-8330 Revision 9 with LTL-8330 Revision 10.
- Remove and replace SOP 5.01 Revision 5 with SOP 5.01 Revision 8.

ATTACHMENT 4

WORK PLAN FOR RISK ASSESSMENT
AT SWMUs 4, 5, 9, AND 10
UPDATES TO ANALYTICAL SOPs
VOLUME III

September 2000

To: Holders of Work Plan for Risk Assessment at SWMUs 4, 5, 9, and 10 Naval Surface Warfare Center, Crane Division

Please make the following changes to Volume III of the Work Plan. If you have any questions please contact Linda Karsonovich (412) 921-8729.

1. Remove Appendix B Table of Contents pages 1 and 2 and replace with Volume III of III Table of Contents pages 1 and 2.
2. Remove and replace standard operating procedure (SOP) LTL-1002 Revision 3 with LTL-1002 Revision 4.
3. Remove and replace SOP LTL-1004 Revision 3 with LTL-1004 Revision 4.
4. Remove and replace SOP LTL-1005 Revision 4 with LTL-1005 Revision 5.
5. Remove and replace SOP LTL-1006 Revision 2 with LTL-1006 Revision 3.
6. Insert SOP LTL-3001 Revision 3 immediately before SOP LTL-3011.
7. Remove and replace SOP LTL-3011 Revision 0 with LTL-3011 Revision 1.
8. Remove and replace SOP LTL-3077 Revision 3 with LTL-3077 Revision 4.
9. Remove and replace SOP LTL-3161 Revision 3 with LTL-3161 Revision 4.
10. Remove and replace SOP LTL-3202 Revision 1 with LTL-3202 Revision 2.
11. Remove and replace SOP LTL-3302 Revision 1 with LTL-3302 Revision 2.
12. Remove and replace SOP LTL-3510 Revision 6 with LTL-3510 Revision 7.
13. Insert SOP LTL-3450 Revision 1 immediately before SOP LTL-4002.
14. Remove and replace SOP LTL-7015 Revision 0 with LTL-7015 Revision 1.
15. Insert SOP LTL-7101 Revision 3 immediately before SOP LTL-7105.
16. Remove and replace SOP LTL-7105 Revision 0 with LTL-7105 Revision 1.
17. Remove and replace SOP LTL-8084 Revision 1 with LTL-8084 Revision 3.
18. Remove and replace SOP LTL-8265 Revision 1 with LTL-8265 Revision 2.
19. Remove and replace SOP LTL-8276 Revision 1 with LTL-8276 Revision 2.
20. Remove and replace SOP LTL-8330 Revision 9 with LTL-8330 Revision 10.
21. Remove and replace SOP 5.01 Revision 5 with SOP 5.01 Revision 8.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James Hunsicker

SIGNATURE

Environmental Protection Department Manager 10/2/00

TITLE DATE