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PITT 03-9-211

March 31, 1999

Project Number 6966

Commanding Officer
Department of the Navy
SOUTHDIVFACENGCOM
Attn: Joel Sanders (Code 1868)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order 0003

Subject: Navy Responses to Comments
Remedial Investigation Report
NIROP Fridley, Minnesota

Dear Mr. Sanders:

Enclosed please find the following U.S. Navy Southern Division (SOUTHDIV) responses to US EPA comments received February 19, 1999 and MPCA comments received January 19, 1999 regarding the subject document. The responses incorporate discussions from the February Partnering Team meeting.

It is the Navy's intent to reach consensus on these responses and corresponding document revisions prior to reissuing the revised RI Report. The Navy envisions that conference calls and partnering meetings, as the schedule allows, can be used to resolve outstanding issues.

Please contact me for any clarification on the enclosed document at (412) 921-8216.

Sincerely,

Mark Sladic, P.E.
Task Order Manager

MS/gp

Enclosure

cc: Kerry Morrow, NAVSEA
David Douglas, MPCA
Tom Bloom, USEPA-Region V
Richard Harris, RAB Co-Chair
John Koehnen
Mark Perry/File 6966
Debra Wroblewski/DER (Cover Letter Only)

NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT (NIROP) FRIDLEY
REMEDIAL INVESTIGATION FOR OPERABLE UNIT NO. 3 (OU3)
REMEDIAL INVESTIGATION REPORT
EPA COMMENT RESOLUTION SUMMARY

Regulatory Comment No.	Regulatory Comment	RI Volume and Section	Response/Action Taken
EPA General Comments, RI Report – 1	OU3, by the definition included in the first paragraph of Section 1.2.3 of the RI Report, includes any dense nonaqueous phase liquids (DNAPLs) present within the saturated zone. The evidence for DNAPLs needs to be evaluated with respect to the nature and extent of contamination and the possible fate and transport of any DNAPLs present. Any conclusions would then need to be incorporated in the FS. The investigation of OU3 included screening of the soils with an ultra-violet (UV) light source to determine if non-aqueous liquids (NAPLs) were present. The results from this screening were noted on the soil sample log sheets, but were not summarized or discussed in the text. Include a discussion of the positive results including the sample location, and depth and correlation with the analyical results for that boring. Also, add any recommendations such as the potential need to evaluate accelerated methods for remediating soil in these locations. Based on a review of the log sheets included in Appendix A, the borings showing positive UV light test results for NAPLs were at Areas of Concern (AOCs) 26, 28, and 32. The test was positive to depths of 32 feet and 16 feet below ground surface (bgs) for AOCs 32 and 26, respectively, indicating that NAPLs may exist at or beneath the water table. At AOC 26 no analytical samples were collected at a depth greater than 12 feet bgs, even though the presence of NAPLs was indicated by the UV. The lack of samples makes it difficult to assess the magnitude of contamination at these depths, however, the results of the UV light test should be incorporated into the site conceptual model. If the lack of samples at the greater depths can be explained, this should also be included in the report.	General	A summary DNAPLs discussion for the plant area beneath the footprint of the building will be incorporated into the report. Sampling was only conducted for areas beneath the NIROP building, but not for any saturated areas outside the building footprint. This approach is consistent with the approved Work Plan. Therefore, no new information on the presence of DNAPLs in the saturated zone, except for under the footprint of the main NIROP building, is available. To the extent available, information on areas outside the footprint of the building is included in the OU2 report. As agreed during the remedy selection phase (i.e., the Feasibility Study report), information from both the OU2 and OU3 reports will be evaluated for the application of a common or shared remedy. A summary and discussion of the UV screening test results will be incorporated into the Revised RI Report. Consistent with the approved workplan, analytical samples were to be collected to a maximum depth of 12 feet. Below that depth, screening samples for onsite gas chromatograph analysis were collected. Lack of samples below a 12-foot depth is easily explained by the approved Work Plan, wherein (Section 4.1) the plan identifies the study boundaries to be 'soils under the entire NIROP

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			building to a depth of 12 feet.' This statement served as the basis for the approved Field Sampling Plan. See Section 7.3 wherein the Plan states that samples for the fixed base laboratory would only be collected to 12 feet below ground surface.
EPA General Comments, RI Report – 2	The section of the report that addresses the nature and extent of contamination does not include a complete synthesis of the data collected. Data included in tables provides the range of concentrations and locations, but no discussion is included in the text regarding the locations and types of contamination and their possible relationship to the AOCs. The maps in this section do not clearly depict the locations and types of contamination that exist. Understandably, the data are limited to the locations and depths investigated for this report, however, more simplified maps might provide a clearer picture. For example, Figures 4-1 through 4-9 include the detected organic and inorganic chemicals found in the soil and groundwater samples. These maps are helpful, but it is difficult to determine the distribution of patterns in the contamination found. It might be more helpful to include one map for each constituent as well as contour maps to present the extent of contamination. Based on the types and distribution of contamination, conclusions should then be drawn about these areas and their likely fate and transport. For example, areas with volatile organic constituent (VOC) contamination might be more susceptible to biodegradation or transport by groundwater as compared to metals which tend to be less mobile. The conclusions drawn should be used to update the site conceptual model developed in the RI Work Plan. These conclusions would also aid in identifying any data gaps.	General	Figures 4-1 through 4-9 illustrate the locations and types of contamination identified. Since the original processes from where contamination likely originated are mostly discontinued or moved, there no longer exist relationships between on-site contamination and current processes. Developing 'possible' relationships between contamination and AOCs is typically considered too speculative to be of significant value. If the processes remained in their historic location and were operating, then valuable direct links could have been developed. However, this is typically not the case at this facility. Recall that the original processes and locations did serve as the basis for the approved Field Sampling Plan. Figure 4.1 alone identifies more than 30 compounds. Providing one map for each compound for each of nine classifications would not improve readability of this report. Fate and transport is discussed in Section 5.0 of the report. Specific information about the applicability of any remedy, such as natural attenuation, would be further developed in the Feasibility Study Report.
EPA General Comments, RI Report – 3	It was noted in the Final RI Work Plan and Final Field Sampling Plan that results of the OU2 RI Report and the North 40 Removal Action Report were to be incorporated into the OU3 RI Report. These items were included in the report, but were not used to provide a clear picture of the contamination and their relationship to contamination at OU3. Review the OU2 and North 40 Removal Action results and include any pertinent information in th OU3 site conceptual model.	General	The approved Work Plan said that OU2 results were to be incorporated 'by reference', which we interpret to mean that OU2 remains a stand-alone report. Results have been incorporated by reference. Although not reflected in the Work Plan, the Partnering Team has moved away from development of conceptual models for individual operating units preferring instead to

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			look at the entire site. The migration of contamination across the entire site is being addressed via a site groundwater model which is in preparation. The OU3 information is being incorporated into the site groundwater model, so this comment is being addressed.
EPA General Comments RI Report – 4	The Final RI Work Plan indicated that field change orders were to be completed in the event that conditions warrant a deviation from the work plan. The RI Report did not include any field change orders. Conditions in the field generally warrant some deviations from the work plan and these changes should be documented in the RI Report. Revise the RI Report to include any field change orders completed during the investigation and describe any deviations from the work plan in the text of the RI Report.	General	Field change orders will be incorporated into the revised RI Report.
EPA General Comments, RI Report – 5	Section 5.3.1.2 (Soils Investigation, Section 5, Page 10) of the Final RI Work Plan states that three soil samples were collected at the southeastern corner of the building in an excavation for new production assembly pit foundations. However, these results do not appear to be presented or discussed in the RI Report. Revise the report to incorporate the analytical results for these samples and discuss their significance.	Vol. I/Section 5.3.1.2	The Navy will request additional information from the site operator. The revised RI Report will include any new information.
EPA General Comments, RI Report – 6	The second paragraph on page 20 of Section 2.3 (Phase I – Soils and Shallow Groundwater Investigation) of the Final Field Sampling Plan states that spatial modeling techniques, such as Kriging would be used to evaluate the data generated during the RI. However, the RI Report does not appear to include this analysis. Revise the report to include the analysis or provide an explanation for its exclusion.	Vol. I/Section 2.3	In the next revision of the RI Report the Navy will include iso-concentration maps for TCE (shallow, intermediate, and deep sample intervals), and DCE and VC (for the shallow and intermediate sample intervals only). These iso-concentration maps will be drawn using human interpolation of the analytical results both from permanent and temporary monitoring wells at the site.
EPA Specific Comments, RI Report – 1	Section 5.4, Natural Attenuation, Pages 5-9 through 5-13: Several references are included in this section, however, they did not appear to be included in the reference list. Revise the RI Report to include these references in the reference list.	Vol. I/Section 5.4	The Navy agrees. The Reference List will be revised.
EPA Specific Comments, RI Report – 2	Table of Contents: Please add a discussion in 3.0 Physical Characteristics of the Study Area addressing Demography & Land Use and Ecology.	Vol. I/Table of Contents	The Navy agrees. The discussion will be developed.
EPA Specific Comments, RI Report – 3	Table of Contents: Please add a subsection addressing Environmental Evaluation or language to explain why an Environmental Evaluation was not scoped.	Vol. I/Table of Contents	An explanation for why no environmental evaluation was not performed will be added to the text.
EPA Specific Comments, RI Report – 4	ES-5, Human Health Risk Assessment, 4th sentence: Please explain in more detail how exposures to groundwater were evaluated in the OU1 RI. Which exposure routes were evaluated and what potential receptors were considered.	Vol. I/Executive Summary	A summary of the OU1 risk assessment will b added to the report.

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EPA Specific Comments, RI Report – 5	ES-8, Initial Screening of Possible Alternative Response Actions, 5th sentence: If DNAPLs are identified, the groundwater (DNAPL) could be considered a source. Please add a statement explaining.	Vol. I/Executive Summary	According to Minnesota State Law, contaminated groundwater itself can be considered a source of groundwater contamination. This sentence will be incorporated into the report.
EPA Specific Comments, RI Report – 6	Page 1-24, Storm Sewer: Please add a discussion regarding the scoping of AOCs and potential leaks from storm sewers. Also, I believe that investigatory work was conducted on the storm sewer collection system (telescoping sewer lines). Some lines were replaced. Please include a discussion of storm sewer collection system investigations.	Vol. I/Section 1.0	The Navy will request additional information from the site operator. The revised RI Report will include any new information.
EPA Specific Comments, RI Report – 7	Page 2-1, Scope of Environmental Investigation: Please include a discussion regarding meetings held to provide scoping efforts between U.S. Navy, U.S. EPA and MPCA.	Vol. I/Section 2.0	The Navy agrees. The subject discussion will be incorporated into the revised RI Report.
EPA Specific Comments, RI Report – 8	Page 2-8, Background Soil Sampling Procedures: Please spell out which "regulators" are being referenced here. (1. the mechanism in a watch that governs its speed, 2. an accurate clock used as a standard for timing other clocks, 3. a device for controlling the flow of gases, liquids, or electric current, 4. one that regulates)?	Vol. I/Section 2.0	Taxpayer money is wasted in address of trivial comments.
EPA Specific Comments, RI Report – 9	Page 2-17, Investigation Derived Waste: 1. Where was the PPE that was placed in trash receptacles finally disposed of? Please add a statement explaining.	Vol. I/Section 2.0	PPE placed in the plant trash receptacles would have been disposed via municipal waste disposal. Note that dirty or soiled PPE was segregated and disposed with IDW.
EPA Specific Comments, RI Report – 10	Page 4-7, 2nd paragraph: Please explain what "positive" results reported means.	Vol. I/Section 4.0	"Positive" results are those chemicals which were detected in at least one sample. The sentence will be modified to read "all detected concentrations for tetrachloroethene."
EPA Specific Comments, RI Report – 11	Page 5-8, Contaminant Fate and Transport: Please discuss the potential routes of migration for specific contaminant concentrations at NIROP.	Vol. I/Section 5.0	The discussion in Section 5.2, while containing generic titles (i.e., halogenated aliphatics), does discuss potential routes of migration for specific contaminants (i.e., trichloroethene). No revision is necessary since the information is already in the report.
EPA Specific Comments, RI Report – 12	Page 5-9, Natural Attenuation: Please explain why Natural Attenuation is the only mechanism discussed as it relates to Contaminant Fate and Transport at NIROP.	Vol. I/Section 5.0	Based on a potential for production of more-toxic daughter products, the Partnering Team has identified that natural attenuation (NA) is a mechanism requiring investigation. The MPCA specifically requested that NA be evaluated per their published guidance documents (cited in the text) on the subject.

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EPA Specific Comments, RI Report – 13	Page 7-3, Soil Concentrations Protection of Groundwater: Please explained how dilution factor parameters (K,i,d I & L) were chosen. (K = research/book or actually measured at site).	Vol. I/Section 7.0	The parameters were from the MPCA Report cited in the RI.
EPA General Comments, Risk Assess-ment – 1	Although the risk assessment for OU-3 is included as Section 6.0 of the Remedial Investigation (RI) Report, to the extent practicable, the risk assessment should be drafted as a stand-alone document to allow for the separate review by different technical specialists within the regulatory agencies.	General	The risk assessment is part of the RI report and not a stand alone document. In order to make the risk assessment a stand alone document would involve duplicating most of the information presented in the rest of the RI report.
EPA General Comments, Risk Assess-ment – 2	Proper referencing of documents, and exposure parameter values in particular, is lacking. It is very difficult to verify a particular number or course of action without proper referencing. The entire report should be reviewed and revised to add all relevant references. Lack of references for exposure parameter values and toxicity factors are particularly troublesome. Where references for the numbers do occur. These references cite documents which are not provided in the document reference list, documents which are not commonly available, or documents which are still in their developmental stages. The referencing of developmental documents is problematic. At a minimum, additional information should be provided within the text of the risk assessment to provide a foundation for the use of particular values and not just provide a general or broad-sweeping reference for a host of values. Likewise, NIROP should make an effort to reference standard terminology and guidance, such as the U.S. EPA risk range of $1x10^4$ from the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 1990).	General	The risk assessment was prepared following MPCA guidance. At the time the risk assessment was prepared, MPCA did not have formal written risk assessment guidance. All intake equations, exposure parameters, and toxicity values used in the risk assessment were obtained from spreadsheets provided by MPCA. Consequently, no formal documents could be listed as references for the risk assessment. MPCA will be contacted to see if a formal reference for the values used in the risk assessment is available. It is not clear what is meant by "NIROP should make a clear effort to reference standard terminology and guidance, such as the U.S. EPA risk range of 1×10^{-4} to 1×10^{-6}." All cancer risks presented in the risk assessment are compared to the U.S. EPA target risk range of 10^{-4} to 10^{-6} and the MPCA acceptable risk level of 10^{-5}.
EPA General Comments, Risk Assess-ment – 3	NIROP developed its list of contaminants of potential concern (COPC) based on all chemicals which were detected in soil at the facility. It used the Minnesota Pollution Control Agency (MPCA) Soil Reference Values (SRV) to refine this list and develop a list of contaminants of concern (COC) for quantitative evaluation within the risk characterization. The SRVs are predicated on a target risk of $1x10^{-5}$. In this case, it could be possible to effectively screen out a number of contaminants at levels representing risks in the 10^{-6} range, which could, assuming additivity, result in risk ranges into the 10^{-5} range. Generally, U.S. EPA conducts contaminant screening or focusing of available resources within a risk assessment on those chemicals representing risks greater than 10^{-6}. Screening	General	This comment is incorrect. In accordance with MPCA guidance all chemicals detected at the site were retained as COPCs and carried through the risk assessment. The MPCA SRVs were not used to eliminate any chemical from the risk assessment. The MPCA SRVs were used to evaluate industrial exposures to COPCs at NIROP. The 95 percent upper confidence limit (UCL) for each chemical detected at NIROP was entered into MPCA's Industrial Human

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	of chemicals on the 10^{-6} basis makes it extremely unlikely to negate chemical concentrations which could effect an order of magnitude change such that final total estimates of risk or hazard are unlikely to exceed the 10^{-4} threshold. Although it is recognized that the generally low chemical concentrations and exposures associated with soil at NIROP would tend to indicate that this screening basis of 10^{-5} is not likely to result in a significant underestimation of total risks or hazards associated with facility-derived contamination it is recommended that screening based on a target risk range of 10^{-6} be conducted to account for additivity.		Health-Based Soil Reference Values spreadsheet. The MPCA spreadsheet estimates cancer risks comparing the ratio of the concentration of a chemical to its SRV.
EPA General Comments, Risk Assess-ment – 4	Based on prior agreement with MPCA, NIROP has been allowed to develop a COC list predicated on a screening process using industrial/-based exposure criteria, rather than residentially-based criteria. U.S. standard methodology is to advance a health-based screening process predicated on residential exposures even at industrial facilities, to maintain a conservative approach and maintain the suite of chemicals which could contribute to additive health effects. Although the facility is controlled by the U.S. Navy, future use of the property is "expected" and not "known" as is stated repeatedly within the document. Future residential development of OU-2 was considered in previous reports and preliminary risk assessment results from OU-2 indicated unacceptable residential risks associated with inhalation of contaminants volatilizing from impacted soil. It should be noted that this inhalation considered only contaminants arising from soil, and not from heavily impacted shallow groundwater. Although future development of the property for other than industrial use is unlikely, there exists no institutional control such as a restrictive covenant on the deed of the facility to preclude either future commercial or residential development of the property. This sort of binding agreement is necessary to advance definitive statements regarding the future use of the property, as well as to determine a defensible and transparent basis for the risk assessment strategy and remedial action, if necessary. At the discretion of the U.S. EPA Region 5, screening based on industrial health-based criteria may be applicable at NIROP, however steps need to be taken to ensure the implementation of a State of Minnesota Deed Notification to preclude future commercial or residential development. U.S. EPA Region 5 should be included in the review of the language associated within Deed Notification to ensure it is an appropriately binding agreement.	General	As discussed in the response to comment #3, no screening process for COPCs was used at the NIROP site, all chemicals detected at least once in soil and groundwater were evaluated in the risk assessment. The risk assessment in the RI Report was completed in compliance with decision statements developed by the NIROP Fridley Partnering Team using the Data Quality Objectives method. The derivation of the decision statements is explained in detail in the approved Work Plan and approved Field Sampling Plan. The Partnering Team consists of Navy representatives, US EPA, and MPCA, with other parties' involvement as appropriate. Contrary to the comment, it is not necessary to have in it is not necessary to have in place a restrictive covenant ahead of making assumptions about future property use. While the Navy owns the property, they can enforce restrictive property use, without a restrictive covenant. When the Navy transfers property out of government ownership, restrictive covenants, as necessary, are incorporated into the transfer deed. These restrictive covenants are based on ensuring only acceptable-risk activities for future land use. If this means that only non-residential land use is allowable for a property because residential risk has not been evaluated, then this is a position the Navy has

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			shown a willingness to accept in subsequent real estate negotiations at many sites. As the comment concludes that 'At the discretion of US EPA Revision V, screening based on ....industrial criteria may be applicable...', Navy suggests the commentor revisit the approved Work Plan and approved Field Sampling Plan to ascertain that this is exactly what EPA has agreed to.
EPA General Comments, Risk Assess-ment – 5	NIROP has not provided a discussion of appropriately sensitive detection limits or sample quantitation limits associated with risk assessment data. NIROP developed its list of COCs based on whichever contaminants were detected in soils at the facility. Phenomena such as matrix interference can significantly elevate contaminant detection limits. In addition, other phenomena can affect the sample-specific sample quantitation limit (SQL) which can often be an order of magnitude greater than the reported method or instrument detection limit. In cases where a given contaminant was not detected but where the contaminant and sample-associated detection limit or SQL exceeded the most appropriate screening criterion (in this case the industrial SRV), the contaminant at issue should be retained as a facility COPC and addressed qualitatively within the uncertainty section of the risk assessment.	General	A discussion of samples with elevated detection limits and their effect on the risk assessment will be added to the uncertainty analysis.
EPA General Comments, Risk Assess-ment – 6	Based on statements in Section 1.2.3 of the RI Report, OU-3 is defined to include all sources in the unsaturated and saturated zones (assumed to be inclusive of OU-2). However, throughout the document, OU-3 is defined as the soil within and underlying the footprint of the NIROP building. Revise the RI Report to clarify which environmental media are included in a risk assessment of exposures associated with OU-3.	General	The definition of OU3 will be clarified as requested.
EPA General Comments, Risk Assess-ment – 7	Although on-site or adjacent residential development of the property is unlikely, recreational use does take place at the Anoka County Riverfront Regional Park to the west of the NIROP property. Recreational users of this park could potentially be impacted by operations or contaminated environmental media (inhalation of volatilizing contaminants or contaminants entrained on suspended dust particules) associated with the NIROP facility. Given a review of the relatively low risk associated with receptor populations on-site, it is highly unlikely that recreational users with substantially less potential contact could be adversely impacted by releases from the site. However, this potential exposure should be addressed within the risk assessment, given the fragmented nature of the risk assessment process as applied at NIROP, specifically in reference to the separation of potentially additive risks or hazards associated with OUs –1, -2, and –3.	General	The building currently covering the soil at OU3 will prevent any migration of COPCs from soil to air. Consequently, at present, there are no potential exposures to off-site receptors in Anoka County Park. Exposures to industrial workers in the risk assessment assume that the building was removed and industrial workers would be exposed to COPCs in soil via incidental ingestion, dermal contact, and inhalation of fugitive dust and volatiles. Potential risks to industrial workers were within EPA and MPCA acceptable levels. If there are

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			no risks to an industrial worker who is at the site every day of the year and exposed to COPCs in soil via incidental ingestion, dermal contact, and inhalation, then there will be no risks to an individual who visits Anoka County Park several days a year and exposed only through inhalation.
EPA General Comments, Risk Assessment – 8	Although a review of groundwater contamination (OU-1) is beyond the scope of this review, it is notable to mention that this risk assessment, limited as it is to a single impacted medium, is incapable of estimating total aggregate cancer risk or noncancer hazards associated with worker exposures at the NIROP facility. No discussion is provided within this document to address potential groundwater exposures associated with potential future intrusive operations at the facility. A discussion of this potential exposure should be added to the risk assessment. In addition, such a discussion should present actions associated with the predicted depth of future intrusive operations [mentioned elsewhere in the document as 8 feet below ground surface (bgs)] and how this relates to depth to groundwater. Based on a review of other sections of the RI Report, depth to groundwater is assumed to be deeper than 8 feet bgs, precluding direct contact concerns, but not eliminating inhalation exposures stemming from the release of VOCs from impacted groundwater. A discussion of these additional pathways should be presented, at a minimum within the uncertainty section of the RI Report and a discussion should be provided regarding how these pathways potentially affect the aggregate estimates of risk and hazard.	General	Currently, there are no exposures to groundwater at the site. Groundwater is not used as a potable drinking water supply. As discussed in the report, based on interviews with NIROP personal, the depth of major excavations is typically 8 feet. Groundwater at the facility is typically encountered at a depth of approximately 20 feet except in the vicinity of the former east plating shop where depth to groundwater is approximately 15 feet. Consequently, there are no direct contact exposures to groundwater.
EPA General Comments, Risk Assessment – 9	Although the facility is reportedly fenced and guarded, no discussion of these institutional controls is provided within the risk assessment. A discussion of these controls and their efficacy in eliminating the need to address additional receptor populations, such as a trespasser should be added to the risk assessment.	General	The text will be revised as suggested.
EPA General Comments, Risk Assessment – 10	Generally, there is insufficient discussion of localized contaminant levels potentially representative of hotspot contamination. Where contaminant levels are deemed particularly elevated (usually orders of magnitude above the most relevant health-based screening criterion) the potential for acute effects and the necessity of a potential interim measure should be addressed. Given the generally low contaminant concentrations in soils at NIROP, hotspot contamination does not appear to be a significant concern. Still, this issue should be addressed in a discussion of the data review and evaluation.	General	This comment defines "hotspot contamination" as contaminant levels "usually order of magnitude above the most relevant health-based criteria." Detected concentrations of COPCs in unsaturated soil were below the MPCA SRV's with the exception of lead in one sample. Consequently, based on the provided definition, there are no hotspots at NIROP. The text in Section 4, Nature and Extent, will be revised to discuss that the concentrations of CPOCs, with the exc ption of lead, in one sample were below MPCA SRVs.

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EPA General Comments, Risk Assess-ment – 11	Although NIROP is following MPCA guidance, it is U.S. EPA's current position that the route-to-route extrapolation of toxicity criteria from the oral to dermal exposure route is inappropriate for chemicals which demonstrate a direct toxic effect in the skin. An example of this is the development of a dermal cancer slope factor for the carcinogenic polynuclear aromatic hydrocarbons (PAH) from an oral cancer slope factor. Therefore, resulting estimates of dermal risk due to contact with the carcinogenic PAHs should be viewed with skepticism. It is preferable to address dermal risk associated with this suite of chemicals qualitatively within the risk characterization and again within the uncertainty section of the risk assessment.	General	The methodology used to evaluate dermal exposures to PAHs is consistent with the approached recommended by EPA Region V for other sites within Region V. A discussion of the uncertainties associated with this approach will be added to the uncertainty section.
EPA General Comments, Risk Assess-ment – 12	Section 6.0, Human Health Risk Assessment Procedures, lacks an effective summary or conclusionary statements regarding the risks and hazards associated with site-related contamination. Section 8.3, Human Health Risk assessment, does a cursory job of summarizing the results of the risk assessment, but then progresses to a discussion of remedial options. The report fails to address what the results of the risk assessment mean in a risk management context. For example, the report should address what a hazard index of 2.9 means to theoretical major infrequent construction worker exposures based on the maximum of site-wide detections.	General	Risk management issues are to be addressed in the Feasibility Study and not the RI Report. The risk assessment summary for the major frequent construction worker will be expanded to discuss that the hazard index of 2.9 is based on maximum detected concentrations, that the hazard index exceeds the acceptable level of 1.0 at only a few locations, and that overall noncarcinogenic exposures are within acceptable levels.
EPA Specific Comments, Risk Assess-ment – 1	Section 6.1, Data Evaluation, Page 6-2: This section does not provide a discussion of detection limits, SQLs or the necessity of targeting specific potential breakdown products from known compounds with appropriately sensitive detection limits. Contaminants reported as nondetect for all samples must have appropriately sensitive detection limits or SQLs. In cases where an elevated detection limit or SQL resulted for a contaminant which was otherwise not detected, the contaminant at issue should be retained as a COPC and addressed within the uncertainty section of the report and perhaps qualitatively evaluated within the risk characterization. Contaminants in this situation can be reviewed to determine whether their presence at the facility is likely or not. This can be accomplished through a review of the facility records to determine whether the contaminant was ever used or stored on-site or whether the contaminant is a potential or likely breakdown product of a contaminant known to be present at the facility. In this manner, the facility-specific COPC list can be refined.	Vol. I/Section 6.1	A discussion of the uncertainty associated with elevated detection limits will be added to the uncertainty section.
EPA Specific Comments, Risk Assess-ment – 2	Section 6.1, Data Evaluation, Page 6-2: This section references background concentrations as being presented in Table 2-x. It has been assumed for the purposes of this review that this is a typographical error and the referenced table is Table 2-6. Revise the RI Report to correct these discrepancies.	Vol. I/Section 6.1	Table 2-x will be revised to Table 2-6.

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EPA Specific Comments, Risk Assess-ment – 3	Section 6.2, Toxicity Assessment, Page 6-4: U.S. EPA no longer uses the weight-of-evidence classifications for carcinogenic toxicity of A through E. Please see U.S. EPA's Proposed Guidelines for Carcinogen Risk Assessment (1996). A discussion of these classifications is warranted since toxicity values used in this risk assessment are taken from U.S. EPA's Integrated Risk Information System (IRIS) which has not been fully updated and still presents the outdated carcinogen classifications.	Vol. I/Section 6.2	The "Proposed Guidelines for Carcinogenic Risk Assessment" have not yet been finalized. In addition, the toxicity information present in IRIS still follows the existing weight-of-evidence classification system. Until EPA finalizes the new system and updates the IRIS database, it is inappropriate to be discussing proposed guidelines in the risk assessment.
EPA Specific Comments, Risk Assess-ment – 4	Section 6.2.1, Carcinogenic Effects, Page 6-5: For contaminants where a route-to-route extrapolation is not contraindicated by the available toxicological evidence, it may be appropriate to adjust the oral slope factor for dermal absorption efficiency and adjust the oral intake equation to account for an absorbed rather than an administered dose. U.S. EPA does not currently support a definitive position on this methodology, but does allow for these adjustments in its Risk Assessment Guidance for Superfund (RAGS) (1989). Currently, U.S. EPA's dermal workgroup is addressing these issues, specifically. A definitive guidance document addressing dermal exposure is expected from U.S. EPA in early 1999. In this case, NIROP has applied the ABS (or dermal absorption efficiency) value appropriately, however, NIROP's application of the gastrointestinal absorption factor does not appear in concert with standard U.S. EPA positions. Use of estimated dermal absorbed doses and oral toxicity factors estimates potential for systemic effects based on dermal absorption. The resulting risk estimate does not take into account potential for toxicity at the skin surface. No quantitative toxicity values for these effects have been developed by U.S. EPA. For chemicals which have these effects at the skin surface, lack of information to describe this risk quantitatively may result in underestimation of risk. There is, in fact, a significant body of evidence in the literature to generate a dose-response relationship for PAHs effects as a result of dermal application of PAHs to the skin surface. It is important to realize that the lack of dermal toxicity values may significantly underestimate the risk of exposure to PAHs in soil. The adjustment of an oral slope factor reference dose (RfD) should be performed when the following conditions are met: 1) the critical study upon which the toxicity value is based employed an administered dose in the study design, and 2) a scientifically defensible database exists and demonstrates that the gastrointestinal (GI) absorption of the chemical in question, from a medium, similar to the one employed in the critical study, is significantly less than 100 percent. A cutoff of 50 percent GI absorption is recommended to reflect the intrinsic variability in the analysis of absorption studies. Thus, this cutoff obviates the need to make	Vol. I/Section 6.2.1	As discussed in the risk assessment, the evaluation of dermal exposures was performed following MPCA risk assessment guidelines. The Navy disagrees that the methodology used to evaluate dermal exposures to PAHs may significantly underestimate the risk of exposures to PAHs in soil. The MPCA dermal toxicity values for PAHs are more conservative than those proposed by EPA in their forthcoming revised dermal guidance and those typically used by EPA Region V. In general, the MPCA approach is more conservative than the approach contained in the forthcoming revised dermal guidance. A discussion of the uncertainties associated with dermal exposures will be added to the uncertainty section of the risk assessment.

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	comparatively small adjustments in the toxicity value that would otherwise impart on the process a level of accuracy that is not existent. In the event that these criteria are not met, it is recommended that a default value of 100 percent oral absorption be assumed, thereby eliminating the need for oral toxicity value adjustments. This application should be addressed in the uncertainty section of the risk assessment. Quantitative toxicity reference values for use in quantifying dermal exposures have not been developed by U.S. EPA. Therefore, U.S. EPA has advocated the use of oral reference doses and oral cancer potency factors to assess dermal exposures. Compared to oral exposures to chemicals, dermal routes of exposure may result in different patterns of distribution, metabolism, and excretion. Uncertainty in the risk assessment is introduced because the differences are not taken into account. Use of oral toxicity factors may result in over- or underestimation of risk, depending on the chemical at issue. In the absence of information on GI absorption, risk characterization for dermal pathways has used unadjusted reference doses and slope factors. This may result in an underestimation of risk. Following the MPCA guidance, NIROP has assumed a default GI absorption factor of 0.9, instead. This practice will generally lead to a more conservative estimate for the dermal cancer potency factor. U.S. EPA, however, currently does not suggest an adjustment of the oral slope factor for most (e.g., PAHs, TCDD, PCBs, pentachlorophenol, DDT, 2,4-D, chlordane or arsenic) chemicals and only recommends absorption currently for cadmium, or other compounds with gastrointestinal absorption rates of 5 percent or less.		
EPA Specific Comments, Risk Assess-ment – 5	Section 6.2.2, Noncarcinogenic Effects, Page 6-6: The wholesale route-to-route extrapolation from oral to dermal routes of exposure in the development of a dermal RfD cannot be supported for chemicals which have demonstrated a direct toxic effect in the skin. Such a determination must be made by a professional toxicologist. No mention of such a review being conducted was presented.	Vol. I/Section 6.2.2	As previously noted, toxicity values used in the risk assessment were supplied by MPCA.
EPA Specific Comments, Risk Assess-ment – 6	Section 6.3, Exposure Assessment, Page 6-6: There appears to be a typographical error in this section of the report, or a section of the report is missing, or the next subsection, Conceptual Site Model should be numbered as Section 6.3.1, rather than 6.3.2.	Vol. I/Section 6.3	The subsections in Section 6.3 are incorrectly numbered and will be corrected.
EPA Specific Comments, Risk Assess-ment – 7	Section 6.3.1, Contaminant Release and Migration Mechanisms, Page 6-8: Since OU-2 sources have been incorporated within the investigation of OU-3, it is appropriate to consider overland runoff to the facility stormwater system as a possible release mechanism of contaminants absorbed onto suspended surficial soil particles. This release mechanism has not been discussed within the RI Report.	Vol. I/Section 6.3.1	Surface water runoff is only a potential migration pathway for OU2 since the building covers all of OU3. The text will be revised accordingly.

Regulatory C mment N .	Regulatory Comment	RI Volume and Section	Response/Action Taken
EPA Specific Comments, Risk Assess-ment – 8	Section 6.3.1, Air, Page 6-8: Although contaminated groundwater is beyond the scope of this evaluation, it should be noted that volatile contaminants could be contributed to ambient air from shallow impacted groundwater which could in turn effect estimates of risk to exposed populations via inhalation exposures.	Vol. I/Section 6.3.1	Volatilization of COPCs from groundwater to outdoor or ambient air will not occur since the building covers all of OU3. Volatilization of COPCs from groundwater to indoor air is possible but it is not expected to be a significant exposure pathway. Shallow groundwater at the site is approximately 20 feet below ground surface, with the exception of the former east plating shop where shallow groundwater is approximately 15 feet below ground surface. The foundation of the building at NIROP is typically nine to 12 inches thick but can be as thick as 82 inches in some areas. Significant migration of COPCs from groundwater through 15 to 20 feet of soil and nine to 82 inches of concrete is not expected to occur. A qualitative discussion of this pathway will be added to the risk assessment.
EPA Specific Comments, Risk Assess-ment – 9	Section 6.3.1, The Typical Industrial Worker, Page 6-9: Because soils associated with OU-2 are now included within the evaluation of OU-3, exposure of an on-site typical industrial worker are not hypothetical (future potential), but are assumed to currently exist. In addition, workers within the building could be exposed to inhalation of volatile contaminants arising from impacted soils beneath the building. Please see the American Society for Testing and Materials (ASTM) E-1739-95, Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, for a representative methodology to evaluate the compromise of foundation structures and the intrusion of volatile vapors into overlying containing structures.	Vol. I/Section 6.3.1	The MPCA SRVs consider volatilization from soil. As discussed in the response to General Comment 10, there are no areas of "hot spot" contamination at NIROP, with the exception of lead in one sample. Concentrations of all COPCs were below the MPCA SRVs, indicating that exposure through volatilization of COPCs from soil is not a significant exposure pathway at NIROP.
EPA Specific Comments, Risk Assess-ment – 10	Section 6.3.2, last paragraph, Item 4, Page 6-10: The Navy is required, under the OU-1 Record of Decision, to provide alternate water sources or treatment in the event there is development of the groundwater in the off-site contaminant groundwater plume. However, it should be noted that this addresses only direct contact pathways and does not address the potential for volatile intrusion into homes or other structures and associated inhalation exposures. Revise the RI Report to include the additional pathway(s) and the resulting actions, if applicable.	Vol. I/Section 6.3.2	See response to comment 8.
EPA Specific Comments, Risk Assess-ment – 11	Section 6.3.4, Quantification of Exposure, Page 6-13: This section is extremely difficult to understand. Exposure parameters are poorly referenced. This section references Table 6-3, but values do not correspond. Moreover, this section, except for specific cases like the exposure frequencies, references MPCA	Vol. I/Section 6.3.4	The text and tables will be revised so that the presented values correspond with each other. Also see response to General Comment #2.

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	document 1998, but the 1998 document referenced in the text is not presented in the Reference Section of the RI Report. Table 6-3 merely references the MPCA and not a specific document. This is important because many of the values cannot be definitively back-checked. For example, the noncancer subchronic averaging time (AT) is given as 91 days in the text, however the value presented in draft guidance from a personal communication with the MPCA is 60 days. Since subchronic exposures, or all exposures less than a year in duration are in fact averaged over the course of one year, the subchronic exposure duration (ED) should be 1.0 (or left out of the equation, as the MPCA appears to do in their draft risk assessment documents). Instead, NIROP's effective subchronic ED is presented in Table 6-3 as 0.25 year and references the MPCA. Where definitive values are presented, they are lacking in supporting documentation in the text and tables mostly evidenced, for example, by the EF's presented for all intake pathways considered within Table 6-3. Revise the risk assessment to provide accurate referencing.		MPCA uses an exposure duration of 91 days because the exposure frequency of 60 days a year is assumed to occur over 91 days and not over the course of a year. This approach is used by EPA Region V on other sites in the region.
EPA Specific Comments, Risk Assessment – 12	Section 6.3.4, Incidental Ingestion of Soil, last paragraph, Page 6-15: NIROP has applied a climate adjustment factor of 0.75 to the intake equations designed to account for an industrial on-site worker. This factor adjusts for the assumption that industrial workers are exposed one-half of the time during the winter months (5 months) and days with precipitation (1 day a week), and all day during the rest of the year. Although this is not U.S. EPA standard application, it does in fact excise additional conservative uncertainty and is not wholly unacceptable. NIROP should provide additional justification for the application of this number, such as precipitation days over 0.25 inches per day as defining a 'precipitation day' and relate this number to local meteorological data. If NIROP references these values as part of MPCA applied guidance, provide more specific citations to this guidance.	Vol. I/Section 6.3.4	As stated in the text, the climate adjustment factor is an MPCA recommended value. Also see response to General Comment 2.
EPA Specific Comments, Risk Assessment – 13	Section 6.4.3, Groundwater, first bulleted item, Page 6-19: It is not readily apparent where in the document the acronyms UBV or HRV were defined. Define these risk-assessment related terms within Section 6.0 of the document.	Vol. I/Section 6.4.3	HBV (Health Based Values) will be defined in the text. HRV will be changed to HRL (Health Risk Limit).
EPA Specific Comments, Risk Assessment – 14	Section 6.4.5, Major Infrequent Construction Workers, Page 6-20: It is the position of the MPCA (personal communication with Helen Goeden, MPCA) to regard subchronic exposures associated with risks in excess of $1x10^{6}$ as significant. Total cancer risk for contact with soil for the major infrequent construction worker was presented as $2.1x10^{-6}$ and reported as below the MPCA acceptable level of $1x10^{-5}$, however this is not entirely correct. This should not	Vol. I/Section 6.4.5	TtNUS and the Navy disagree with the concept of subchronic excess lifetime cancer risk. Albeit the exposure duration may be classified as "subchronic," the l vel of acceptable risk cannot be adjusted to correspond to the exposure duration. Cancer risk is not evaluated as if it is

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	negate the understanding that these exposure evaluations are relatively conservative in nature. Subchronic exposures should be retained for evaluation when they exceed a level equivalent to one-tenth those associated with chronic exposures, or $1x10^{-6}$, based on the chronic cutoff of $1x10^{-5}$.		a threshold effect. Cancer risk is a probability of developing cancer over a lifetime. Although, TtNUS and the Navy disagree with the concept of subchronic excess lifetime cancer risk, estimated cancer risks for the construction worker will be compared to a 1×10^{-6} level.
EPA Specific Comments, Risk Assess-ment – 15	Section 6.4.6, Exposures to Lead, last sentence, Page 6-22: Given that the exposure point concentration for lead in soil is less than the MPCA industrial SRV of 700 mg/kg, and given the fact that lead was only detected in one sample at a concentration in excess of the SRV and that lead was only detected in two samples in excess of the U.S. EPA's Soil Screening Levels (SSL) Guidance (1996), U.S. EPA suggests the last sentence be revised to read, "Consequently, exposures to lead in soil by the minor frequent construction worker are [*not*] expected to result in adverse health effects". That is unless, NIROP has an indication of potential lead hotspot contamination. This statement would likely hold true for any and all industrial worker exposures, but it not protective of future potential residential exposures, given the fact that detections exceeded the U.S.A. EPA's SSI, value of 400 mg/kg, due to the presence of sensitive subpopulations (children).	Vol. I/Section 6.4.6	The text will be revised as suggested.
EPA Specific Comments, Risk Assess-ment – 16	Section 6.6.1, Uncertainty in the Field Screening Data, Page 6-23: The fourth sentence of the first paragraph is ambiguous. It is unclear how a degree of correlation "is" qualitative or quantitative, rather than how it can be "described" or "evaluated" qualitatively or quantitatively. Provide additional information on how NIROP evaluated the degree of correlation between linearity and coelution of COPCs.	Vol. I/Section 6.6.1	The text will be revised as requested.
EPA Specific Comments, Risk Assess-ment – 17	Section 6.6.2, Uncertainty in Selection of Chemicals of Concern, Page 6-24: The statement which comprises this section is not accurate. Significant uncertainty is associated with the development of the COPC list, since detection limits and SQLs are not discussed, in addition to other phenomena such as VOC loss during sampling. Also see General Comment No. 5.	Vol. I/Section 6.6.2	The Navy disagrees. Since all chemicals detected at the site were retained as COPCs, there is no uncertainty associated with the selection of COPCs. Detection limits were above SRV's in a few samples, but the vast majority of detection limits were below the SRVs. As noted above, a discussion of the uncertainties associated with the elevated detection limits will be added to the risk assessment.
EPA Specific Comments, Risk Assess-ment – 18	Section 6.6.3, Determination of Land Use, Page 6-24: The statement which comprises this section is not accurate. Significant uncertainty is associated with "known" versus "anticipated" or "potential" future use of the property. Also see General Comment No. 4.	Vol. I/Section 6.6.3	The text will be revised to change "known" site use to "expected" site use.

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EPA Specific Comments, Risk Assess-ment – 19	Section 6.6.3, Exposure Routes and Receptor Identification, Page 6-24: The statements included in this section are not entirely accurate. Significant uncertainty is associated with "known" versus "anticipated" or "potential" future use of the property. Also see General Comment No. 4.	Vol. I/Section 6.6.3	See response to General Comment 2.
EPA Specific Comments, Risk Assess-ment – 20	Tables 6-1 and 6-2: Footnotes: MPCA, 1998, is not presented within the RI Report Reference Section.	Vol. I/Section 6.0	The reference will be added to the RI Reference Section.
EPA Specific Comments, Risk Assess-ment – 21	Table 6-3: Exposure duration of less than one year should be recorded as averaged over an entire year and should not be represented by fractions of one year. Also see Specific Comment No. 11.	Vol. I/Section 6.0	See response to specific comment 11.
EPA Specific Comments, Risk Assess-ment –22	Table 6-4: The lognormal UCL for phenol in soil is given as 208 ug/kg, which exceeds the maximum detected concentration of 54 ug/kg, yet 208 ug/kg was presented as the exposure point concentration. Explain the usage of this value or designate this entry as a typographical error.	Vol. I/Section 6.0	The exposure point concentration for phenol will be changed to 54 µg/kg.
EPA Specific Comments, Risk Assess-ment – 23	Figure 6-1: No discussion is presented for surface run-off of stormwater to a stormwater sewer as a release mechanism. It remains unclear whether this transport pathway is relevant. Revise the RI Report to clarify this issue.	Vol. I/Section 6.0	All of OU3 is located underneath the building at NIROP. Consequently, surface water runoff is not a potential migration pathway at the site. The text will be revised to clarify this issue.
EPA Specific Comments, Risk Assess-ment – 24	Section 8-3, Human Health Risk Assessment, Page 8-6: The first sentence of the first bulleted item on this page should read, "Noncarcinogenic risk estimates for the major [in]frequent construction worker exceeded 1.0." Revise the RI Report to correct this discrepancy.	Vol. I/Section 8.0	The text will be revised as requested.

NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT (NIROP) FRIDLEY
OPERABLE UNIT NO. 3 (OU3)
REMEDIAL INVESTIGATION REPORT
MPCA COMMENT RESOLUTION SUMMARY

Regulatory Comment No.	Regulatory Comment	RI Volume and Section	Response/Action Taken
MPCA I.1	Executive Summary, Summary of Field Investigations. In the second paragraph of this section, the Navy states that soil sampling in Phase I was performed to: (1) identify Contaminants of Potential Concern (COPCs); (2) determine the concentration and general location of the COPCs; (3) evaluate the potential human risk; (4) quantify the potential for migration of the COPC to groundwater; and (5) identify conditions which are indicative of the presence of free-product source areas. The staff cannot find a table in the report that identifies the COPCs for OU3. The staff requests that the Navy identify the COPCs for OU3 in a single table. Without knowing what the Navy considers to be COPCs, it is not possible for the staff to evaluate whether or not we agree that the Navy has fully met any of the other four items cited above. The staff has not been able to determine where in the report the Navy has discussed the last two items. The staff requests that the Navy explain what it has done to meet the Navy's objectives cited above. If the Navy has not met the objectives above, the Minnesota Pollution Control Agency (MPCA) staff requests that the Navy complete this work.	RI, Vol. I, Executive Summary	All analytical data are contained in Appendix E of the report. Throughout the text, only positive detections are presented. In accordance with MCPA guidance the initial list of COPCs included any chemical that was detected at least once. Essential human nutrients (iron, magnesium, potassium, calcium, and sodium) present at relatively low concentrations were eliminated from the initial list of COPCs. A table will be added to the Executive Summary and in Section 6 indicating which chemicals are COPCs.
MPCA I.2	Executive Summary, Nature and Extent of Contamination In the report, the Navy has summarized the data based on the depths at which the contaminants were found without any discussion about the seven groups of facility operations, or the three mechanisms which could have resulted in releases of chemicals from the Areas of Concern (AOCS) to the environment. The absence of this evaluation appears to be inconsistent with (1) the discussion about potential sources of contamination in the main Naval Industrial Reserve Ordnance Plant (NIROP) building found in Section 3.1.1 of the "Final Work Plan for Operable Unit 3," dated June 30, 1997; (2) the objective of finding sources of contamination as cited in Section 1.1 of the report; and (3) the statement made in the first paragraph of the report in the section entitled, "Initial Screening of	RI, Vol. I, Executive Summary	The AOCs were divided into seven groups of facility operations to ensure that representatives of each group were incorporated into the investigation. The three mechanisms which could have resulted in releases were similarly developed as justification for identifying that an individual AOC required further investigation, i.e., with no release mechanism, it is unlikely that an AOC would have been considered for further investigation. Especially with most of these processes discontinued or moved, the former operating characteristics have little relevance

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	Possible Alternative Response Actions:" "Response actions for the site will likely focus on the localized areas of contamination." The staff requests that the Navy evaluate the nature and extent of contamination based on the seven main groups of potential sources and the three mechanisms that could have resulted in releases of chemicals from the AOCs to the environment inside the main industrial plant building as discussed in Section 3.1.1 of the "Final Work Plan For Operable Unit 3 Remedial (RI) Investigation/Feasibility Study (FS)," June 30, 1998. This request is also consistent with the "Guidance for Conducting RI and FS Under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Interim Final," United States Environmental Protection Agency (U.S. EPA)/540/G-89/004, dated October 31, 1988. Section 3.2.3 of this document states that: "Source characterization involves the collection of data describing (1) facility characteristics that help to identify the source location, potential releases, and engineering characteristics that are important in the evaluation of remedial actions..."		beyond the Work Plan analysis to determine if a release was likely or possible. In any case, there was no mention in the FSP of collecting additional facility characteristics information. The Navy does not feel that the RI Report is inconsistent with any of the three items cited by MPCA. Based on the outcomes of the RI Report, and the rationale developed above, the Navy feels that an evaluation based on the seven groups or three release mechanisms will not substantially increase the understanding of the distribution of contamination beneath the NIROP building, or aid in remedy selection at this time. Since the former industrial processes are no longer relevant after consideration in the Work Plan and FSP, sources of contamination as they pertain to OU3 are the contaminated media. Adequate facility characteristics information is available in the RI Report and Work Plans to initiate remedy selection. This includes soil physical characteristics, consideration of the concrete floor, and access availability. The Navy does not propose to revise the RI Report to address this comment.
MPCA I.3	Executive Summary, Human Health Risk Assessment, page ES-6, fourth, fifth, and sixth bullets The text indicates that the Navy conducted a "cursory review of ground water." Attachment A, Task B.1 of the Federal Facilities Agreement (FFA) requires that the Navy conduct a **complete review** of the magnitude and extent of hazardous substances, pollutants and contaminants in all media investigated. It is not clear what the Navy means by "cursory review of ground water." The staff requests that the Navy explain what this phrase means and what is left out of the OU3 RI Report had a complete review been conducted. The staff requests that the Navy conduct a complete review of ground water hazardous substances, pollutants and contaminants pursuant to the FFA, and	RI Vol. I, Executive Summary	Groundwater was evaluated in the human health risk assessment following methodology presented in the Draft Final Work Plan for Operable Unit 3 and from discussions with Helen Goeden of MCPA during several telephone calls on May 8, 1998 and June 3, 1998. As discussed in Section 6.5, the cursory evaluation used a spreadsheet provided by MCPA to evaluate residential use of groundwater. The spreadsheet was used to evaluated exposures to groundwater by comparing the maximum detected concentration of a chemical in unfiltered groundwater samples to MPCA HRLs, MPCA

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	revise the RI Report accordingly; conduct an updated Risk Assessment of OU1 for all new contaminants of concern including evaluating the additive effect of multiple contaminants in ground water; and reevaluate formerly identified contaminants of concern using revised Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considereds, e.g., Health Risk Limits, pursuant to the process described in "Re-Opening and Modification," Section XIV, Subsection 14.10 of "Consultation with U.S. EPA and MPCA" (also see page 3 of Attachment A, Section IV, "Remedial Investigations.")		HRVs, EPA MCLs, Unit Risk Values, or Lifetime Health Advisory Values. The evaluation was performed for the upper portion of the unconfined aquifer, lower portion of the unconfined aquifer, and deep aquifer. Copies of the spreadsheets were include in Appendices G.4, G.5, and G.6.
MPCA I.4	Executive Summary, OU2 RI Conclusions, page ES-7 As the Navy knows, OU3 now contains the saturated zone outside the main NIROP building (see Table 1 of the Site Management Plan, dated January, 1998) so the contamination in this area needs to be evaluated concurrent with the new information about the contamination in the saturated and unsaturated zones under the main NIROP building. The staff requests that the Navy modify the OU3 Risk Assessment using the worker scenarios and processes identified for OU3 for the saturated zone of what was formerly known as OU2 as required by "Re-Opening and Modification," Section XIV, Subsection 14.10 of "Consultation with U.S. EPA and MPCA." Otherwise, the exposure scenarios for the old OU2 and the new OU3 are different and any remedial alternatives selected for both operable units may be different. The Navy, U.S. EPA, and MPCA need to agree upon the contaminants of concern that are relevant for the new OU2 Risk Assessment before the Navy begins this work.	RI, Vol. I, Executive Summary	The three agreed risk assessment scenarios are not applicable to saturated sources outside the main building because the saturated soils are at a depth below ground surface (bgs) greater than the 12 ft bgs maximum depth considered for worker exposure. Consistent with this assumption, it seems inappropriate to modify the OU3 risk assessment. The fact that OU2 and OU3 exposure scenarios may be different does not impact an implicit requirement that remedy selection be sensitive to reducing the risks from all agreed scenarios to acceptable levels. Remedial alternatives for both operable units may well be different due to consideration of the roof, concrete floor and access availability. The reference to reopening OU2, apparently from the 1991 FFA, does not seem relevant to completion of the OU3 investigation. The Navy does not propose to revise the RI Report to address this comment.
MPCA I.5	Executive Summary, Initial Screening of Possible Alternative Response Actions, page ES-8, first paragraph The text states that " ...the remediation activities at OU3 must be focused on the soil rather than the ground water beneath it ["it" is presumed to be the main NIROP building]." The staff requests that the Navy modify this text and the OU3 RI Report to reflect that OU3 is defined as the saturated and unsaturated subsurface source areas under the main NIROP building and that contaminated ground water itself is considered a saturated source of ground water contamination in Minnesota.	RI, Vol. I, Executive Summary	#5a – It was the Navy's attempt to concentrate the remedial efforts associated with OU3 and the soils because OU1 is already addressing the groundwater. Even though the OU1 groundwater is not specifically located beneath the building, the remedial efforts already in-place will effect this media. The text has been modified to reflect this and provide a clearer definition of OU3.

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	In Minnesota, contaminated media in the saturated zone are considered a source of ground water contamination pursuant to Minn. R. 7060.0500, Nondegradation Policy, subp. 3, Control Measures, that reads as follows: > Treatment, safeguards, or other control measures shall be provided by the person responsible for any sewage, industrial waste, or other waste, or other pollutants ... which have been discharged to the zone of saturation, to the extent necessary to ensure that the same will not constitute or continue to be a source of the underground waters or impair the natural quality thereof. This request is also consistent with the "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final," U.S. EPA/540/G-89/004, dated October 31, 1988. Section 3.2.3 of this document states that: > In a practical sense, heavily contaminated media (such as soils) may also be considered sources of contamination, especially if the original source (such as a leaking tank) is no longer present on the site or is no longer releasing contaminants. The next sentence of this paragraph in this section of the OU3 RI Report states that ground water improvement is not a requirement of an alternative response action for OU3. The staff requests that the Navy delete this sentence. Any OU3 remedy evaluated or implemented must address contamination in all media contaminated by sources in OU3, or affected by the remedy. For instance, we must consider the impact of air emissions in the Phase II upgrade of the OU1 remedy. Also the Navy is reminded of the "decision statement" cited in Section 4.2 of the OU3 RI/FS Work Plan, dated May 31, 1998: > If COPC sources exist in the unsaturated or saturated zone beneath the building at concentrations that could result in exceedances of ground water standards, then [the Navy must] evaluate alternatives for source control/removal that would result in a cost-beneficial reduction in the overall time for ground water restoration. The second paragraph indicates that "additional sampling will probably be needed" before implementing a remedy. Pursuant to the Federal Facility Agreement (FFA), Attachment A, Part IV, Task B, subp. 2, "Initial Screening of		#5b – The samples taken for the RI evaluation have identified and delineated the contaminants adequately. However, it was the intent of this paragraph to state that additional sampling may be required to completely (both vertically and spatially) identify the contaminated area once a remedy has been chosen. These samples would be used for cost estimating, equipment sizing, and to provide an accurate schedule for the remediation. The text has been modified to reflect this.

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	Possible Alternative Response Actions," the staff requests that the Navy make a definite determination as to whether or not more sampling is necessary to evaluaute each possible response action.		
MPCA I.6	Section 1.1 Purpose of Report, page 1-2, last paragraph This will likely be the last RI at the site, but this cannot be determined with certainty at this time. Please change the text accordingly.	RI, Vol. I, Section 1	The Navy agrees. The text has been modified accordingly.
MPCA I.7	Section 1.2.2, Facility History, pages 1-5 & 1-6 The discussion of the discovery and removal of barrels buried at the NIROP Site does not include discussion of the barrels discovered and removed during the OU2 Soil Remedial Investigation. The text should be modified to correct the record that the barrels were discovered during the advancement of soil borings for the Soil Remedial Investigation and not as a result of a geophysical survey. Also, the report mentions a milling waste loading area in the present location of the existing hazardous materials storage building, but does not mention the soil removal action that occurred to facilitate the building of the hazardous materials storage building. The text should be revised to include a description of the removal action.	RI, Vol. I, Section 1	The Navy will request additional information on these items from the site operator. The revised RI Report will include any new information.
MPCA I.8	Section 1.2.4, Areas of Concern at OU3, Sanitary Sewer and Storm Sewer, pages 1-24 and 1-25 In Brown & Root Environmental's letter of November 6, 1996, the Navy documented agreements made between the Navy and the MPCA staff with regard to an MPCA staff request to investigate NIROP's sewer lines (see Attachment III, Item MPCA I.34). The Navy's response was as follows: "Annual inspections do not indicate exfiltration issues with sewer systems. The sampling strategy is designed to provide a real coverage of the building to characterize any contamination. The need for additional sampling will be evaluated after the results of Phase I are received. The MPCA agreed." On page 1-24 of the OU3 RI Report the Navy states that "the condition of the clay pipes that make up the sanitary sewer system for the plant is unknown. TCE discharged to the sanitary sewer system could have leaked to the soil if there were cracks in the pipe." On page 1-25, the Navy states that "the condition of the storm sewer system is unknown. Contaminants which entered the storm sewer could have leaked to the soil if there were cracks in the sewer pipe." These	RI, Vol. I, Section 1	Key Assumption No. 7 from the FSP (Section 2.2) states that "**Identifying likely locations of leaks in sewer lines is impractical, given the significant network of sanitary and storm sewers in the NIROP building.**" The assumption states that high levels of shallow contamination unable to be linked to an AOC could be a result of a leak in the nearest sewer system. Placement of sampling points not linked to any particular AOC was done to provide spatial coverage. The revised RI Report will state that consistent with this assumption, no localized highly contaminated shallow area was identified, and therefore the investigation is complete. Since the assumption is satisfied, the recommendation on resolution of the matter is for no further action.

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	narratives identify unresolved issues about both the sanitary and storm sewers. However, the OU3 RI Report does not indicate that the Navy gained any understanding of possible exfiltration from the sewers. Also, from its own analysis of the sampling data, the MPCA staff cannot determine whether or not there has been exfiltration from the sewers. The OU3 RI Report makes no recommendations on how to resolve this matter. No further work to resolve this matter is indicated in the report. Therefore, the MPCA staff requests that the Navy develop a plan for resolving this matter, including, at a minimum, the televising of the 15-inch sanitary sewer line to determine the condition of the clay pipes under the main NIROP building, and to determine whether or not hazardous wastes, e.g. metal sludge, are present in the sewer lines. Also, see sewer system risk assessment issues raised in Attachment III and sewer system questions raised in Attachment IV.		
MPCA I.9	Section 2.3.3.1 Soil Sampling and Screening Procedures for Direct-Push Borings The Navy refers the reader to Appendix A.1 regarding the UV fluorescence test results. There do not appear to be any results indicating the presence of Dense, Non-Aqueous Phase Liquid (DNAPL). Has the Navy concluded that it found no evidence of DNAPL? If no positive test results were found, what tests were done to make sure that the UV fluorescence test was being conducted properly? How well does the UV fluorescence test data compare to the laboratory data?	RI, Vol. I, Section 2.3.3.1	Data shown in Appendix A.1 revealed that positive ultraviolet (UV) light fluorescence test results were encountered at three locations (borings located at Areas of Concern 26, 28, and 32) during the OU-3 RI. The UV field screening test is a visual test to determine if Non-Aqueous Phase Liquids (NAPLs) may be present in the soil. Although the UV test results indicated that NAPLs may be present at these locations, the analytical results did not indicate that the detected contaminants exceeded benchmark criteria (defined in the RI report). As a result, definitive conclusions cannot be determined if NAPLs exist. However, based upon the analytical results, it is unlikely that NAPLs are present at these locations. Among several visual methods, the UV test has proven to be one of the most effective means for direct visual identification of NAPLs (Cohen et al., 1992, and Cohen et al., 1993). However, due to the qualitative nature of the test, it is important to note that the UV light test should be used as a screening tool only. As Cohen et al. (1992)

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			noted, one false positive in 22 blank tests and 3 false negatives in 45 samples were encountered during the UV light test evaluation. The effectiveness of the UV field screening tool was verified in the field by adding a small amount of oil to a sample aliquot of soil and placing it under the UV light. The sample fluoresced (with a milky-white color) indicating that the field test was effective. The results of this field evaluation test and samples from field borings (AOCs 26, 28, 32, and others which did not illuminate under the UV light) were shown to the USEPA oversight contractor (i.e., Black & Veatch) in the field. The oversight contractor agreed with the findings.
MPCA I.10	Section 2.3.3.2, Soil Sampling and Procedures for Well Borings Test is missing from the first paragraph, leading to page 2-8. Please fill in missing text.	RI, Vol. I, Section 2.3.3.2	The Navy agrees. The text has been modified accordingly.
MPCA I.11	Figure 2-1 What was the basis for selecting these background locations? Why weren't background samples taken off-site?	RI, Vol. I, Section 2	Background samples were collected as part of the OU2 investigation conducted by RMT, Inc. as described in the *Remedial Investigation Report for the Soils Operable Unit* (1993). The report states that "The background area was not affected by site activities and is considered representative of the background chemical nature of soils in and around the NIROP Fridley." All background samples were collected off-site. Since hexavalent chromium samples were not collected as part of RMT's investigation, TetraTech NUS, Inc. collected soil samples for hexavalent chromium analysis from the same sampling locations. Section 2.6, Determination of Background Concentrations, will be revised to discuss the OU2 background sampling.

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MPCA I.12	Tables 4-1, 4-2, and 4-3 The staff requests that the Navy memorialize for the record the rationale for using the background levels and appear in these tables.	RI, Vol. I, Section 4	The background soil concentrations from the OU2 RI Report were used in the OU3 RI Report because the data were collected from an area off-site that was not impacted by site activities and to be consistent with the OU2 RI report. Helen Goeden of MPCA approved the use of the OU2 background data during a conference call between MCPA and Tetra Tech on May 5, 1998, and in a follow-up e-mail message the same day.
MPCA I.13	Figures 4-7, 4-8, and 4-9 What are the "benchmarks?" This term is not a standard term in state or federal Superfund. The staff requests that the Navy identify the "benchmark" used for each chemical that appears in these figures as well as all chemicals found in the RI. The staff requests that the bench mark be shown next to each chemical identified on these figures or be included in a separate table.	RI, Vol. I, Section 4	The benchmarks presented on Figures 4-7, 4-8, and 4-9 are human health based criteria which were obtained from MPCA and consist of MPCA HRLs, HRVs, and MCLs for groundwater. The benchmarks were used to identify areas of elevated chemical concentrations in groundwater. The benchmarks are presented in Table 6-6. A definition of the benchmarks will be added to the text in Section 4 and Table 6-6 will be referenced.
MPCA I.14	Section 4.2, Groundwater, Cross-Sections The latest groundwater data for all site wells, including data from the new OU3 nested wells, should be plotted on the cross sections in the OU3 RI Report and iso-concentration maps should be constructed for the major contaminants. Well data should be the most recent concurrent data. A graphical look at contaminant distribution will be helpful in understanding geological controls on contaminant distribution and in evaluating OU1 remedy effectiveness. An evaluation of this data could be used to identify potential ground water source areas. For example, it seems apparent that in the area beneath the East Plating Shop there are levels of Trichlorethene (TCE) that indicate potential DNAPL in that area. Source areas were to be identified in the OU3 RI Report and their impact on ground water contamination evaluated. A discussion of the East Plating Room as a potential source area should be included in the report. In addition, potential remedial alternatives for source areas should be developed to be evaluated in the FS.	RI, Vol. I, Section 4	**Paragraph #1:** The Navy agrees. Isopleth lines for the major contaminant of concern at the site (i.e., trichloroethylene, TCE) will be included on all existing cross-sections (A-A', B-B', C-C', D-D', and E-E'). Iso-concentration maps, in plan view, will also be created. Individual iso-concentration maps (plan view) will be created for three contaminants, TCE, 1,1-Dichloroethane (DCE), and vinyl chloride (VC). TCE iso-concentration maps will be created for the shallow, intermediate, and deep sample intervals. DCE and VC iso-concentration maps will be created for the shallow and intermediate sample intervals only. No exceedences of groundwater screening levels were encountered in the deep sample interval for these contaminants (see Table 6-8 in the RI). All groundwater analytical data from both temporary and permanent wells from the OU-3,

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			East Plating Shop, and AMR investigations will be included in each of the respective maps. Because there is not one complete "synoptic" round of data for all of these wells/sampling events the iso-concentration maps will include data collected over several sampling rounds. The analytical data used for these figures will include temporary wells (sampled from 7/97 to 9/97) and permanent wells (sampled from 2/98 to 3/98), temporary wells in the East Plating Shop (sampled in 4/95), and the AMR results [from the first quarter 1998 4/30/98)]. It is also noted that each of these wells was installed differently (e.g., temporary wells having no filter pack or well development process versus permanent wells with filter pack and well development) and sampled using different sampling techniques (e.g., low flow sampling for OU-3 wells versus traditional methods for temporary wells and AMR sample rounds). These differences may significantly affect the natural distribution of contaminants illustrated on these figures. Thus, each of these inconsistencies will be noted on the figures. **Paragraph #2:** All of the potential source areas within OU-3 were identified in Section 1.2.4 of the OU-3 report. The East Plating Shop was identified within this section as Areas of Concern (AOCs) 43, 44, 51, and 52. AOCs 43 and 51 were the vapor degreaser pits formerly located on the western end of the plating shop and AOCs 44 and 52 were the sump pits formerly located in the center and east end of the East Plating Shop (also shown on Figures 1-4 and 2-2 in the RI). The text will be changed in the appropriate subsections in Section 1.2.4 to specifically reference the East Plating Shop. The Navy mentioned potential remedial alternatives in Section 8.5 of the RI report.

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			Evaluation of these remedial alternatives will be addressed further in a future Feasibility Study. Please refer to comment/response #31 for additional information regarding potential remedial alternatives.
MPCA I.15	Figure 3-7, Cross-Section D-D' The cross-section D-D' does not accurately portray the St. Peter Sandstone in the southwestern portion of the section. It is likely that the St. Peter is not present in this area due to erosion of the unit (as in Section E-E'), and there are no geologic logs to indicate its presence southwest of well AT-3A. The cross-section should be modified to indicate the uncertainty of the interpretation that the St. Peter is present in this area. Also, monitoring wells MS-311 and MS-31D are both screened in silty clay. Both wells indicate very low or no detection of contaminants. The use of these wells to monitor aquifer conditions under the building will be very limited because the wells are screened in fine grained and not aquifer materials. This should be noted in the report and considered when evaluating ground water data in the report and in future annual monitoring reports.	RI, Vol. I, Section 3	The Navy agrees. Cross-section D-D' incorrectly portrays the presence of the St. Peter Sandstone southwest of monitoring well cluster MS-32. After reviewing boring logs from AT-3A and 8-D the Prairie Du Chein dolomite was encountered at the base of these borings (i.e., no sandstone was encountered in these borings). The cross-sections will be adjusted accordingly. According to the lithologic description from well boring MS-31I (written in the field logbooks), a large portion of MS-31I was screened in high-permeability aquifer material [i.e., fine to medium grained sand) from 91.5 to 93.4 and in fine grained deposits (i.e., clay with sand) from 93.4 to 96.6; five foot screen was used]. Due to the slight offset of MS-31I from MS-31D, there was a slight difference in the lithologic materials encountered at MS-31I. Because the MS-31I screen was installed at the lower portion of the aquifer or at the top of the lower clay unit, the Navy feels that groundwater sampled from this well is representative of the groundwater (and any contamination) present at this location. Thus, any results from this well should be used without reservation. The Navy acknowledges that MS-31D was screened in fine-grained deposits at the base of the unconsolidated aquifer. However, the Navy feels that groundwater collected from this well is representative of the aquifer medium in this location (due to the large amount of fine-grain d deposits present in this general location). The fine-grained nature of the aquifer materials at this

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			location will be considered in future data evaluation activities. This will be noted in the OU-3 report.
MPCA.I.16	Tables 4-7 and 4-8, Summary of Groundwater Analytical Results – Filtered and Unfiltered The Health Risk Limits (HRLs) and Maximum Concentration Limits (MCLs) should be listed in the tables and a column developed that indicates compounds that exceed HRLs or MCLs. A list of ground water Contaminant of Concerns (COCs) should be developed from this evaluation.	RI, Vol. I, Section 4	A comparison of groundwater results to health based criteria is presented in Section 6, Human Health Risk Assessment. Specifically, a comparison of groundwater results to MPCA HRLs, MPCA HRVs, and EPA MCL was performed using spreadsheets provided by MPCA. The results of the comparison were discussed in Section 6.5 and summarized in Table 6-8. Copies of the MPCA spreadsheets were presented in Appendices G.4, G.5, and G.6.
MPCA I.17	Section 5.1.5, Organic Partition Coefficient, page 5-3, paragraph 1 Clarify that the amount of organic carbon in the soil is also critical to the mobility of contaminants in the soil.	RI, Vol. I, Section 5	The text has been modified accordingly.
MPCA I.18	Section 5.2.1, Ketones, page 5-4 The sentence ending in ". . .such as. . ." is incomplete. Please complete sentence.	RI, Vol. I, Section 5	The text has been completed.
MPCA I.19	Section 5.2.2, Monocyclic Aromatics, page 5-5 The discussion of literature-derived biodegradation rates must include a brief statement that these rates are very much site specific. Please include such a statement in the report.	RI, Vol. I, Section 5	The Navy agrees. The text has been modified accordingly.
MPCA I.20	Section 5.2.3, Halogenated Aliphatics, page 5-6 Omit the phrase " . . . which degrades slowly" in reference to vinyl chloride. Vinyl chloride can degrade rapidly under favorable conditions.	RI, Vol. I, Section 5	The Navy agrees. The text has been modified accordingly
MPCA I.21	Section 5.2.4, Polycyclic Aromatic Hydrocarbons (PAHs), page 5-6 Add the molecular weight of the PAH as a factor influencing the rate of biodegradation, with higher molecular weight PAH being more resistant to biodegradation.	RI, Vol. I, Section 5	The Navy agrees. The text has been modified accordingly.

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MPCA I.22	Section 5.3, Contaminant Fate and Transport, including Subsections 5.3.1, 5.3.2, and 5.3.3 The following narrative can be found in Section 3.4.1.4, Contaminant Fate and Transport, of the "Guidance for Conducting RI and FS Under CERCLA, Interim Final," U.S. EPA/540/G-89/004, dated October 31, 1988: Results of the site physical characteristics, source characteristics, and the extent of contamination analyses [from the RI] are combined in the analyses of contaminant fate and transport... Contaminant fate and transport may also be estimated on the basis of site physical characteristics and source characteristics [if information on the contaminant release is not available]. The discussion in the above-cited report sections do not discuss site physical characteristics or source characteristics. There is no discussion about AOCs or AOC groups or release mechanisms. The staff requests that the Navy expand the discussion to address this problem.	RI, Vol. I, Section 5	As the MPCA stated in comment MPCA I.5, and as the Navy agreed in the response, "[soils] may also be considered sources of contamination, especially if the original source (such as a leaking tank) is no longer present on site or is no longer releasing contaminants." In this context, site characteristics, source characteristics, and extent of contamination are generally known and are adequately developed in the subject discussion. Therefore, while the AOC groups and release mechanisms were necessary in developing the sampling plan, they are not relevant in this discussion. The Navy does not propose to revise the RI Report to address this comment.
MPCA I.23	Section 5.4, Natural Attenuation The MPCA staff agrees with the Navy's overall conclusion that natural attenuation is not an effective remedy for the ground water contamination migrating toward the river. The following detailed modifications/questions/comments are intended only to strengthen the presentation of the evaluation of natural attenuation in the report: a) Page 5-10, paragraph 5 Delete the statement, "Tricholoroethene is not as mobile as the majority of volatile contaminants." Mobility is primarily determined by Koc values. The Koc for TCE is 150 mg/g, whereas the Koc for benzene and toluene is 100 and 247 mg/g, respectively. In addition, the water solubility for TCE is similar to that of benzene. b) Page 5-10, paragraph 5 Clarify the statement "During this process, iron III is reduced to iron II so that iron II concentrations may be used as an indicator of anaerobic degradation *of organic carbon*" to indicate that the presence of iron II does not automatically indicate the biodegradation of chlorinated solvents.	RI, Vol. I, Section 5	#23a - The Navy agrees. The text has been modified accordingly. #23b - The Navy agrees. The text has been clarified. #23c - The natural attenuation evaluation concentrated only on chlorinated solvents. The text mentions halogenated hydrocarbons which includes chlorinated solvents. The text has been modified to specifically mention chlorinated solvents. #23d – Background chloride values were not available. The text has been clarified. #23e - The Navy agrees. The text has been changed to Table 5-3. #23f – The samples collected were not mixed. As noted under sampling times on the

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	c) Page 5-10, last paragraph Were natural attenuation parameters studied at the site to evaluate the potential for the bioremediation of petroleum hydrocarbons? Our understanding is that the evaluation was for chlorinated solvents. d) Page 5-11, paragraph 3 Although chloride concentrations might be used to verify similar groundwater systems, the intent in natural attenuation studies is to indicate whether chlorinated solvents are dehalogenating. Thus, background concentrations of chloride are needed to compare with the contaminated plume concentrations. e) Page 5-11, paragraph 4 Table 5-1 refers to the physical data for contaminants and is not consistent with the context of the paragraph. Perhaps the reference is to Table 5-3. Please clarify this. f) Page 5-12, last paragraph The dissolved oxygen readings seem high and are inconsistent with the presence of reduced iron, reduced manganese, and negative Eh readings. For example, in sample number 003 MS-28S-01, oxygen is reported at 1.7 ppm while reduced iron is reported as 2.3 ppm. Either the water was mixed upon sampling, or the oxygen readings are suspect. The report should point out this inconsistency and re-evaluate the potential for biodegradation assuming oxygen readings were high. g) Analysis of nitrate, sulfate, and chloride are difficult without upgradient background samples for comparison. Were background groundwater samples collected for this purpose? h) Describe how methane samples were collected and preserved.		Groundwater Sample Log Sheets in Appendix A.2, each well is first completed before a different well is started. Every effort was made to determine dissolved oxygen accurately (i.e. immediate analysis upon collection using high resolution, low range modified Winkler titration test kit), although this can be a difficult parameter to analyze in the field. The potential for biodegradation was reevaluated assuming the dissolved oxygen results were inconsistent. This reevaluation had no impact on the overall evaluation. No changes to the text have been made. #23g – Nitrate and Sulfate parameters were measured and evaluated according to the MPCA Natural Attenuation Guidance, Working Draft, 12/12/97 and the Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, EPA, 9/98, which do not incorporate background concentration into the evaluation of these two parameters. Background chloride values were not available, thus this parameter was not evaluated. #23h – Section 7.5.3 and Table 4-1 of the approved Final Field Sampling Plan for Operable Unit 3 Remedial Investigation/Feasibility Study, NIROP Fridley, June 1997 describes the collection and preservation of the samples collected for Dissolved Methane. #23i - The Navy agrees. The text has been modified accordingly for items i through iii.

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	i) Table 5-3 Revise the table with these statements: i) Dissolved chloride increases due to the anaerobic dehalogenation of chlorinated solvents. ii) Dissolved manganese increases due to anaerobic manganese reduction when microorganisms use Mn(IV) as an electron acceptor. iii) The reference to hydrogen sulfide is confusing. While it is true that it will decrease under iron reducing processes, it will also decrease under nitrate reduction or aerobic conditions. It is perhaps better to state that hydrogen sulfide may increase under sulfate reducing conditions.		
MPCA I.24	Section 6.0, Human Health Risk Assessment Procedures In the first paragraph the Navy states, "[e]xposures to groundwater were evaluated in the OU1 Remedial Investigation Report (RMT, Inc., July 1988). Soil criteria for the protection of groundwater is addressed by the SESOIL model presented in Section 7.0." As the Navy knows, OU3 is defined to include sources in the saturated and unsaturated zones under the main NIROP building, and the unsaturated zone sources in OU3 and OU2 are different qualitatively and quantitatively as are the contaminants found in the saturated zones of these operable units. For these reasons, the OU1 Risk Assessment is not appropriate for the saturated zone of OU3. For the same reasons, it is not appropriate to limit the soil leaching model to the contaminants of concern identified for OU3 as was done in Section 7.0. The MPCA staff requests that the Navy re-write the OU3 Risk Assessment to focus on the COPCs found in all of what is know known as OU3.	RI, Vol. I, Section 6	See response to comment 4.
MPCA I.25	Table 6-8 The staff requests that the Navy identify in this table the screening value used to place the chemical on the table.	RI, Vol. I, Section 6	As discussed in Section 6.5, the screening criteria used to identify the chemicals in Table 6-8 are MPCA HRLs, HRVs, and MCLs. A footnote will be added to the table.
MPCA I.26	Chapter 6, General Modification The OU3 RI Report does not identify a set of ground water COCs even though the report (Table 8-1) lists possible OU 3 remedial alternatives. Also, there is no clear	RI, Vol. I, Section 6	A comparison of groundwater data to MPCA HRLs and MCLs is presented in Section 6.5. COCs are identified in Table 6-8. Figures 4-7, 4-8, and 4-9 show where concentrations of

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	indication where any of these remedial alternatives would be applied for ground water contamination (or for soil contamination). To begin to rectify this problem, using MCLs and HRLs, the Navy should screen the ground water data to determine a list of ground water COCs. The COCs are those chemicals that exceed MCLs and HRLs. Once a list of ground water COCs is determined, the Navy should produce maps that show where ground water contamination exceeds HRLs and MCLs. The maps should be superimposed on existing OU3 RI Report maps that locate the AOCs so that any association between ground water contamination and disposal at AOCs can be established. These maps should clearly indicate the areas where remedial measures may be required. Identification of areas that require remedial action is an essential outcome of the RI and risk assessment that need to be completed as soon as possible but before the FS begins. Until this work is completed, the FS should not proceed.		chemicals in groundwater exceed the MPCA HRLs and MCLs.
MPCA I.27	Section 6.4.3 Identification of Other Human Health-Based Criteria In the first paragraph, the Navy states that TBCs are not enforceable. In Minnesota, TBCs can be as important as ARARs in making decisions about protecting public health and the environment under the state Superfund law. Please change the text accordingly.	RI, Vol. I, Section 6	The Navy will consider TBCs to the full extent required by state Superfund Law. The report will be revised to include this statement.
MPCA I.28	Section 6.6.2, Uncertainty In Selection of Chemicals of Concern It is the staff's understanding that Table 6-1 is the list of all chemicals detected in OU3; however it is still not clear what the Navy considers a OU3 COPC since metals such as calcium were eliminated previously but appear on Table 6-1. Please include a table that identified the OU3 COPCs.	RI, Vol. I, Section 6	A comparison of groundwater data to MPCA HRLs and MCLs is presented in Section 6.5. COCs are identified in Table 6-8. Figures 4-7, 4-8, and 4-9 show where concentrations of chemicals in groundwater exceed the MPCA HRLs and MCLs.
MPCA I.29	Section 7.0, SESOIL Modeling Results and Section 8.4, SESOIL Modeling The main NIROP building forms a cap over the underlying soils, thereby eliminating infiltration and recharge due to precipitation. Without infiltration, contaminants cannot leach through the soil profile, and soil leaching models are inappropriate for evaluating the risk contaminants pose to ground water. Therefore, eliminate from the report the evaluation of risk to ground water by SESOIL modeling in Sections 7.0 and 8.4 (However, please note that leaching should be reconsidered if the main building floor is removed or if it is found that the sanitary sewer system is leaking). This discussion should be replaced by discussion that includes reasons for not assuming leaching to ground water. In addition, the report should discuss the more likely mechanism of transport of contaminants to ground water: the gravitational mass transfer of free product through the soil from dry wells and	RI, Vol. I, Section 7	The SESOIL discussions will be eliminated from Sections 7.0 and 8.4. The discussion of the lack of infiltration through the unsaturated soil will be added to the general discussion of bulk fluid transport in Section 5.3.1. The concentrations of contaminants in the unsaturated soil have already been discussed in the risk assessment. However, while the contaminants that remain in the unsaturated soil may still represent a threat to groundwater, no additional risk can be calculated for the contaminants because there is no pathway to the groundwater under the current conditions.

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	sumps. The evaluation of risk should then include those areas of concern that contain very high concentrations of contaminants that can still pose a threat to ground water by non-leaching transport (for example, soils under the East Plating Room area), while other areas that contain very low concentrations of Volatile Organic Compounds (VOCs) can be eliminated as a potential source of ground water contamination.		
MPCA I.30	Section 7.1, Introduction In Section 6.6.2, the Navy states that "[a]ll chemicals that were detected at the site were retained as COPCs." Therefore, for the record, what was the Navy's rationale for only SESOIL remodeling the OU2 contaminants of concern for the OU3 leaching:	RI, Vol. I, Section 7	Since the SESOIL modeling and discussion are being eliminated from the RI report, this subject is no longer applicable. However, the rationale for modeling only the OU2 contaminants was agreed upon at the Partnering Team Meeting of February 11 to 13, 1997. Refer to page 38 of 70 in Attachment 12 of the minutes of the meeting.
MPCA I.31	Table 8-1, Preliminary Technology Screening Matrix a) The Navy should include co-metabolic in situ bioremediation in the list of alternatives. This does not require infiltration of water to the soil, but can be accomplished by air venting and pulsing methane at low concentrations through the soil. b) The Navy should include barometric soil vapor extraction (SVE) pumping as an alternative. This is an effective technology for low level VOC contamination and does not require high maintenance or operating costs. c) In situ biodegradation was eliminated from the technology list because it is stated that it requires circulation of liquid through the soil. Technologies are available that do not circulate liquids, but instead circulate gas to promote insitu biodegradation. The Navy should retain in situ biodegradation for evaluation. d) The Navy should include mass removal/pumpout technology as an alternative for the saturated zone. e) The Navy should add removal of hazardous wastes in the sewers if these are present as a result of televising the sewers (see Item 8 above).	RI, Vol. I, Section 8	a. This technology will be added to Table 8-1. b. SVE is part of Table 8-1 and was retained. Specific options within the alternative can be considered during the FS. c. The use of gas circulation is included in vapor extraction and the addition of co-metabolic in situ bioremediation in item (a), above. d. The existing pump and treat system was assumed to be sufficient for addressing groundwater treatment. If needed, the existing system could be expanded. For this reason, pump and treat technology for groundwater treatment was not originally included in Table 8-1. Pump and treat technology will be added to Table 8-1 in this revision. e. At this time, there is no evidence of any hazardous material in the sewers. Thus, sewer cleaning was not included in Table 8-

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			1. If later investigations show the presence of contaminated material in the sewers, they will be addressed at that time. This will not be added to Table 8-1.
MPCA II.1	Executive Summary, Nature and Extent of Contamination Vinyl chloride was not included in the sampling data reported. Vinyl chloride would be expected to be present and is a very toxic contaminant. The absence of quantitative data results in an underestimation of risk. The presence or absence of vinyl chloride should be verified. The greatest levels of contamination appear to be associated with the intermediate wells. The documentation of the risk evaluation of ground water is lacking in the report. See Response 14 of this attachment. Appendix G contains only a copy of the deep aquifer evaluation. The evaluations for the upper and lower portions of the unconfined aquifer seem to be missing from the report. The evaluation for the upper and lower portions of the unconfined aquifer should be provided.	RI, Vol. I, Executive Summary	1a. Quantitative data for vinyl chloride is presented in the RI report. Vinyl chloride was not detected in any surface or subsurface soil samples. As shown in Table 4-7, vinyl chloride was detected in 13 of 57 groundwater samples from the shallow wells and 4 of 6 samples from the intermediate wells. Vinyl Chloride was not detected in groundwater samples from the deep wells. A copy of the analytical database for OU3 which includes the vinyl chloride sampling results is provided in Appendix E. 1b. The evaluation of groundwater from the upper portion of the unconfined aquifer, lower portion of the unconfined aquifer, and the deep aquifer is discussed in Section 6.5. A copy of the MPCA spreadsheets used in the evaluation of the groundwater are presented in Appendices G.4, G.5, and G.6.
MPCA II.2	Executive Summary, Human Health Risk Assessment Although the level of contamination in most areas does not exceed the human health target risk levels, there are localized areas of contamination. This should be clearly stated in the Executive Summary.	RI, Vol. I, Executive Summary	The localized areas of contamination are discussed in the Nature and Extent section of the Executive Summary.
MPCA II.3	Executive Summary, OU2 RI Conclusions OU2 has been incorporated into OU3. The data from OU2 should be evaluated utilizing the same risk characterization methodology as applied to OU3, e.g., industrial soil ref rence value evaluation.	RI, Vol. I, Executive Summary	Consistent with the Site Management Plan, OU2 and OU3 remedy selection will be addressed concurrently (if practicable). In the context of executing the FSP for OU3, the Navy does not believe that the agreement to evaluate remedies concurrently constitutes OU2 having been 'incorporated' into OU3. Therefore, the Navy

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			does not propose to reevaluate the data from OU2.
MPCA II.4	Section 1.2.4, Areas of Concern at OU3 The discussion regarding the sanitary sewer and the storm sewer is inadequate. Since these are identified as areas of concern, the report should discuss how these areas will be evaluated for impact, e.g., determination of condition, residual contamination, etc. The East Plating Shop is not mentioned in this section although it is known to be a localized area of contamination. A narrative discussing the East Plating Shop as an AOC should be included in this part of the report.	RI, Vol. I, Section 1	a. The intent of Section 1.2.4, Areas of Concern at OU3, is to list the AOCs that have been identified for OU3 and to provide the basis for their designation as AOCs. Section 1.2.4 does not discuss how the AOCs will be evaluated. A discussion of how the AOCs would be evaluated is provided in the *Draft Final Field Sampling Plan for Operable Unit 3*, Brown & Root Environmental, April 1997. The Field Sampling Plan states in regards to the sewer lines: "**Identifying likely locations of leaks in sewer lines is impractical, given the significant network of sanitary and storm sewers in the NIROP building.** Chemicals entering a sewer line could travel various distances before exiting a leak in the sewer system. Minor leaks are suspected to exist in the sewer systems, and releases to soil and groundwater through this mechanism are considered likely. It is assumed that potential chemical releases through leaks in sewer systems can be identified by tracking shallow soil and shallow groundwater plumes. High chemical concentrations in areas of the shallow groundwater not associated with an identified AOC could be a result of a leak in the nearest sewer line. To test this assumption, it is necessary to have spatial

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			distribution of sample points throughout the NIROP building. Samples will be collected from the nearest floor drains of selected AOCs not associated with a drywell or sump/pit. Supplementary sampling points not associated with any known AOC will also provide spatial coverage inside the building." b. AOCs 43, 44, 51, and 52, which are located in the Former East Plating Shop, are discussed in Section 1.2.4. The text will be revised to indicate that these AOCs were located in the Former East Plating Shop.
MPCA II.5	Section 2.6 Determination of Background Concentrations For future reference, the 95% UCL of the mean should not be utilized as the background value. The 95% UCL of the mean is utilized as a conservative, i.e., upper-end, estimate of the average exposure concentration. Utilizing an upper-end value for background is not conservative. Background levels may be overestimated, particularly if the number of samples is small and variability is high. For example, the calculated background value for calcium presented in Table 2-6 is 1.5 times higher than the maximum concentration detected. The values reported in Table 2-6 do not affect the conclusions of the risk evaluation since the concentrations are below levels of concern. However, note that the 95% UCL value presented may not be representative of background concentrations. (This is mainly a comment since the method the Navy used to calculate background does not influence the conclusions. If the Navy needs to calculate background at a future date, the Navy should not utilize the 95% UCL methodology).	RI, Vol. I, Section 2	The background values used in this report were obtained from the *Remedial Investigation Report for the Soils Operable Unit at the Naval Industrial Reserve Ordnance Plant* (RMT, 1993). Helen Goeden of MPCA approved the use of the OU2 background data during a conference call between MCPA and Tetra Tech on May 5, 1998, and in a follow up e-mail message the same day.
MPCA II.6	Section 4, Nature and Extent of Contamination The list of volatiles appears to be limited. For example, vinyl chloride, a highly toxic degradation product, is not listed. Rationale for why analysis was limited to the listed volatiles should be presented.	RI, Vol. I, Section 4	a. The list of volatiles is not limited. As shown in Tables 2-2 and 2-3, all samples were analyzed for TCL VOCs. Section 4.0 discusses only those chemicals that were detected at the site. Vinyl chloride is not listed in the soil positive detection tables presented in Section 4.0 because vinyl

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	The text should also identify samples for which the detection limits exceeded the levels of concern (e.g., detection limits for sample AOC28, AOC46, etc.). Possible reasons for the high detection limits should be presented (e.g., matrix interference).		chloride was not detected in any surface or subsurface soil sample. Analytical results for all samples are presented in Appendix E. b. The high detection limits associated with samples AOC 28 and AOC 48 were due to the presence of high hydrocarbon concentrations in these samples. The text in Section 4 will be modified accordingly.
MPCA II.7	Section 6.3.3 Estimation of Exposure Concentrations Rationale and documentation should be presented for why data was not subdivided into areas of concern for estimating potential exposure concentrations (e.g., no pattern of nature and magnitude of contamination versus area of concern or historical activities). The size of the potential exposure area represented by the sampling points should also be discussed. For example, if a high concentration exists at a particular sampling point, it is important to note whether that point potentially represents a 20 foot square area or a 200 foot square area. Depths greater than 4 feet should also be evaluated for the future industrial and minor-construction worker scenarios. This evaluation assists in whether controls are required to limit accessing soils beyond 4 feet. Some of the maximum values presented in Table 6-4 do not correspond with the maximum values presented in Table 4-6. An explanation for these inconsistencies should be presented. If Table 6-4 is in error, it should be corrected.	RI, Vol. I, Section 6	a. The exposure areas used in the estimation of exposure point concentrations was determined by Helen Goeden of MPCA. Tetra Tech supplied MPCA with maps (Figures 4-1 to 4-5 of the RI report) showing the concentrations of chemicals in surface soil and subsurface soil at the site. After reviewing the maps, MPCA determined that the exposures areas should be as follows (e-mail message on July 9, 1998 from Helen Goeden of MPCA to Tetra Tech): "Minor construction worker – since work would be scattered throughout the building and no distinct pattern of contamination is apparent (i.e., contamination appears to be scattered throughout the building) it is reasonable to treat the entire footprint of the building as an exposure area. A conservative estimate of the mean concentration (i.e., 95% upper confidence limit of the mean) should be utilized as the exposure concentration." "Major construction worker – since it is assumed that this individual will only be exposed to a portion of the building it is

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			not reasonable to average across then entire footprint. We do not know what section(s) of the building this individual may access. Therefore, utilize the maximum contaminant levels as a "screening" assessment in the absence of knowledge of location of exposure." Exposure point concentrations for the industrial worker was selected using the same rationale as that used for the minor construction worker. The rationale for determination of exposure points concentrations will be added to the human health risk assessment in Section 6.3.3. b. A typical industrial worker will only be exposed to surface soil on a daily basis. It is unrealistic to assume that an industrial worker would be exposed to subsurface soil on a frequent basis. As discussed in Section 6.3, based on interviews with NIROP personnel, exposures to subsurface soils do occur on an infrequent basis (5 to 8 times a year) and were addressed with the minor construction worker. According to NIROP personnel, the typical depth of excavation for a minor construction worker is around 2-4 feet. Excavations of soil deeper than 4 feet were addressed with the major construction worker. In addition it should be noted that the depths of exposure for each receptor were presented in the Work Plan and approved by Helen Goeden of MPCA during a conference call between MPCA and Tetra Tech on July 17,1998. c. The maximum concentrations presented in Table 6-4 differ from those presented in

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			Table 4-6 due to the way the duplicate samples are handled in each table. In Table 4-6 the results of duplicate samples are reported separately. In Table 6-4 the results of duplicate samples are averaged and the average result is reported.
MPCA II.8	Section 6.4.4 Risks to Industrial Workers Utilizing the exposure point concentrations in Table 6-4, the MPCA staff was able to duplicate the risk estimates presented in the report. (Note, due to time constraints the MPCA staff did not verify the exposure point concentrations presented in Table 6-4). The exposure point concentrations in Table 6-4 were based on calculating a conservative mean across all sampling locations within the 0 – 4 foot depth. Since we do not know if workers activities will result in a more localized exposure scenario, the MPCA staff also conducted a screening risk characterization utilizing the maximum concentrations detected in the 0 – 4 foot range and the October 1998 Industrial Soil Reference Value working draft spreadsheet. The screening evaluation for the 0 – 4 foot depth indicated that the risk was within the acceptable range even though maximum concentration values were utilized. Also, since the MPCA staff do not know whether deeper soils will be excavated at a later date, a screening risk characterization utilizing the maximum concentrations detected in the 0 – 12 foot range was conducted. This screening evaluation indicated that the risk exceeded the acceptable range due to the high chromium concentration in the former East Plating Shop. We do not know what fraction of the total chromium level is present as hexavalent chromium. Hexavalent chromium would be expected based on the historic use in this location, i.e., metal plating. In the absence of speciatin data, all of the chromium was assumed to be in the hexavalent form. Speciation of the chromium in the former East Plating Shop should be conducted. If that is not possible, at a minimum, a discussion of the impact of the lack of information for these areas should be included in the report. This discussion should include the size of the area, type of contaminants suspected to be present, the impact on the risk estimate, etc. Note that since the detection limits significantly exceeded levels of concern for samples AOC28 and AOC46, the potential risk at these locations could not be	RI, Vol. I, Section 6	a. It should be noted that all risks present in the report were calculated with spreadsheets provided by MPCA and a copy of the spreadsheets are included in Appendix G. b. It should be noted that all risks present in the report were calculated with spreadsheets provided by MPCA and a copy of the spreadsheets are included in Appendix G. c. The maximum concentration of total chromium in subsurface soil at the East Plating Shop occurred at a depth of 6 – 8 feet. Although the high total chromium concentration in subsurface soil at the East Platting Shop is a concern for the major construction worker, it is not a concern for the industrial worker since the industrial worker is not exposed to subsurface soil. The maximum detected concentrations of total chromium in surface soil at the East Plating Shop was 20 mg/kg (0–1 feet) and 73.6 mg/kg (2-4 feet) which are below the MPCA criterion of 155 mg/kg for hexavalent chromium. d. A discussion of the impact of the elevated detection limits for samples AOC 28 and AOC 46 will be added to the uncertainty analysis.

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	evaluated. Samples for these areas should be reevaluated. If that is not possible, at a minimum, a discussion of the impact of the lack of information for these areas should be included in the report. This discussion should include the size of the area, type of contaminants suspected to be present, the impact on the risk estimate, etc.		
MPCA II.9	Section 6.4.5 Major Infrequent Construction Worker For future reference it should be noted that since the methodology was agreed upon for the risk assessment of OU3, a decision to utilize a target lifetime cancer risk level of 1E-6 and a hazard quotient and hazard index of 1 for subchronic exposure has been made. The effect (carcinogenic and noncarcinogenic) of a contaminant depends on the dose and the rate at which the dose is administered. A specific dose given in a short-period of time may not produce the same effect when given over a longer period of time. The lifetime average daily dose utilized in the evaluation of cancer risk is calculated by taking the total intake during the exposure period and normalizing it to a lifetime. The actual exposure may occur for only a small portion of the lifetime. The factors that may influence cancer risk are the existence of critical periods of susceptibility during a lifetime and the intensity of the exposure. If the exposure duration is significantly less than a lifetime, the acceptable subchronic excess lifetime cancer risk should be no more than 10 percent of the total chronic acceptable excess lifetime cancer risk (i.e., 1E-6). This decision does not significantly impact the conclusions of the current evaluation. The maximum contaminant concentration from the 0 – 12 foot range was utilized for this evaluation. As in the above evaluation, all of the chromium was assumed to be in the hexavalent form. The evaluation indicated that the lifetime cancer risk exceeded the subchronic cancer target risk due to the high chromium concentration utilized (see above discussion in Response 8). If hexavalent chromium is eliminated from the evaluation, the estimated cancer risk is within the acceptable subchronic risk range. The noncancer hazard quotient target risk was also exceeded for hexavalent chromium. Given the potential significance of the chromium contamination, speciation of the chromium in the former East Plating Shop should be conducted. If that is not possible, at a minimum, a discussion of the impact of the lack of information for these areas should be included in the report. This discussion should include the size of the area, type of contaminants suspected to be present, the impact on the risk estimate, etc.	RI, Vol. I, Section 6	a. The comment discusses the existence of an "acceptable subchronic excess lifetime cancer risk." According to the comment, this subchronic risk corresponds to exposure durations that are significantly less than a lifetime. The comment also goes on to say that the acceptable subchronic risk "should be no more than 10 percent of the total chronic acceptable excess lifetime cancer risk (i.e., 1E-6). TtNUS and the Navy disagree with the concept of "acceptable subchronic excess lifetime cancer risk." Albeit the exposure duration may be classified as "subchronic," the level of acceptable risk cannot be adjusted to correspond to the exposure duration. Risk is a probability of developing cancer over a lifetime. It is evident that with low exposure duration there will be low intake and consequently low risk. Cancer risk is not evaluated as if it is a threshold effect. b. A discussion of potential chromium contamination will be added to the nature and extent discussion in Section 4 and the current discussion of chromium in the risk assessment will be expanded. b. The text will be revised accordingly.

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	Note that since the detection limits significantly exceeded levels of concern for samples AOC28 and AOC46, the potential risk at these locations could not be evaluated. Samples for these areas should be re-evaluated. If that is not possible, at a minimum, a discussion of the impact of the lack of information for these areas should be included in the report. This discussion should include the size of the area, type of contaminants suspected to be present, the impact on the risk estimate, etc.		
MPCA II.10	Section 6.4.5 Major Infrequent Construction Worker, page 6-20 last bullet The last sentence appears to have a typographical error. "Consequently, exposures to arsenic in soil by the major infrequent construction worker are not expected to result in adverse health effects." The text should be changed accordingly.	RI, Vol. I, Section 6	The text will be revised accordingly.
MPCA II.11	Section 6.4.5 Major Infrequent Construction Worker, page 6-21, Exposures to Lead The last sentence appears to have a typographical error. "Consequently, exposures to lead in soil by the major infrequent construction worker are not expected to result in adverse health effects." The text should be changed accordingly.	RI, Vol. I, Section 6	The text will be revised accordingly.
MPCA II.12	Section 6.4.6 Minor Frequent Construction Worker Utilizing the exposure point concentrations in Table 6-4, the MPCA staff was able to duplicate the risk estimates presented in the report. (Note, that due to time constraints the MPCA staff did not verify the exposure point concentrations presented in Table 6-4). The exposure point concentrations in Table 6-4 were based on calculating a conservative mean across all sampling locations within the 0 – 4 foot depth. Since we do not know if workers activities will result in a more localized exposure scenario, the MPCA staff also conducted a screening risk characterization utilizing the maximum concentrations detected in the 0 – 4 foot range and the October 1998 Industrial Soil Reference Value working draft spreadsheet. The screening evaluation for the 0 – 4 foot depth indicated that the risk exceeded target risk levels by less than a factor of 2. The main contributors to this risk were arsenic and carcinogenic PAHs. The maximum concentrations of these contaminants are not located within the same area and elevated concentrations of arsenic and	RI, Vol. I, Section 6	a. No response required. b. No response required. c. As previously discussed, based on interviews with NIROP personnel, the typical depth of excavation for a minor construction worker is around 2 - 4 feet. The maximum concentration of total chromium in subsurface soil at the East Plating Shop occurred at a depth of 6–8 feet. Consequently, the high total chromium concentration in subsurface soil at the East Platting Shop it is not a concern for the minor construction worker. d. See response to 8d.

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	cPAHs occur at only very limited locations. Based on the available data, the conservative exposure concentration utilized, i.e., maximums, and the limited level of exceedence, it is not likely that the contamination will pose an unacceptable risk. Since the MPCA staff also do not know whether deeper soils will be excavated at a later date, a screening risk characterization utilizing the maximum concentrations detected in the 4 – 12 foot range was also conducted. This screening evaluation gave virtually identical results as the 0 – 4 foot screening evaluation with the exception of an additional significant contribution from hexavalent chromium. The cumulative risk, including the contribution by hexavalent chromium, also exceeded the target risk level by less than a factor of 2. Given the potential significance of the chromium contamination, speciation of the chromium in the former East Plating Shop should be conducted. Note that since the detection limits significantly exceeded levels of concern for samples AOC28 and AOC 46, the potential risk at these locations could not be evaluated. Samples for these areas should be reevaluated. If that is not possible, at a minimum, a discussion of the impact of the lack of information for these areas should be included in the report. This discussion should include the size of the area, type of contaminants suspected to be rpesent, the impact on the risk estimate, etc.		
MPCA II.13	Section 6.4.6 Minor Frequent Construction Worker, page 6-22, Exposures to Lead. The last sentence appears to have a typographical error. "Consequently, exposures to lead in soil by the minor frequent construction worker are not expected to result in adverse health effects." The text should be changed accordingly.	RI, Vol. I, Section 6	The text will be revised accordingly.
MPCA II.14	Section 6.5 Analysis of Groundwater Appendix G contains only a copy of the deep aquifer evaluation. The evaluations for the upper and lower portions of the unconfined aquifer seem to be missing from the report. The evaluation for the upper and lower portions of the unconfined aquifer should be provided.	RI, Vol. I, Section 6	Copies of the groundwater evaluation for the shallow portion of the unconfined aquifer and the lower portion of the unconfined aquifer are included in Appendices G.4 and G.5, respectively.

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MPCA II.15	Section 6.6.2 Uncertainty in Selection of Chemical of Concern The list of VOCs may not be complete. Rationale for why analysis was limited to the listed volatiles should be presented. For example, vinyl chloride would be expected to be present and is a very toxic contaminant. Vinyl chloride was not included in the soil data tables. The absence of quantitative data results in an underestimation of risk and this should be clearly stated in the report.	RI, Vol. I, Section 6	See response to Comment 1a.
MPCA II.16	Section 6.6.4 Uncertainty in the Toxicological Evaluation There were numerous contaminants detected at the site for which toxicity values do not exist. The risk from these contaminants can not be quantified and therefore the estimated risk is underestimated. This section of the uncertainty discussion should list the contaminants which did not have complete toxicity values available and the consequences of this stated in the report.	RI, Vol. I, Section 6	The text will be revised as requested.
MPCA II.17	Section 8.1 Conclusions from the OU2 Report The previous risk evaluation of OU2 utilized a residential exposure scenario. The data from OU2 should be evaluated utilizing the same risk characterization methodology as applied to OU3, e.g., industrial soil reference value evaluation. Please note that carcinogenic PAHs were identified as a COC at OU2 based on the residential-based evaluation.	RI, Vol. I, Section 8	See response to comment 3.
MPCA III.1	Volume I, Section 5.1.5. Mobility of some compounds are affected by the presence of other compounds. This was not taken into account in the discussion. The Navy needs to discuss whether or not other chemicals present increased the mobility of compounds that are noted as not being mobile, e.g., polychlorinated biphenyls, polyaromatic hydrocarbons, and phthalates.	RI, Vol I, Section 5	The Navy disagrees. The mobility of some compounds may be affect by the presence of other compounds. However, at Fridley NIROP, no evidence of this is present based on the historical data and modeling completed to date. No revisions to the text have been made.
MPCA III.2	Volume III, Section F, page F-9 A blank action level is referenced. The Navy needs to indicate whether or not this is the reporting limit.	RI, Vol. IV, Section F	The blank action level is the level at which action is taken during data validation based on comparison of sample results to concentrations of analytes detected in associated field and laboratory blanks. The blank action level is calculated based upon U.S. EPA National and Region V data validation guidelines, generally by multiplying the maximum concentration of an analyte detected in associated quality control blanks by a factor of five or ten. The data validator then compares the sample results with

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			the calculated blank action levels and qualifies the sample results, if necessary, based upon data validation guidelines. The data validation reports included in Appendix F present the calculated blank action levels and describe the actions taken for each sample delivery group.
MPCA III.3	Data Reports (audit reports) in the appendices of the report The recovery limits used for some of the metals data appear to be too wide. Seventy to one hundred thirty percent is a wide window for metals. The text references a 30% recovery level which is much too low. If recoveries are consistently low, then the metal concentrations must be suppressed in the matrix and the reported concentrations are questionable (Flagged J). The Navy needs to flag data with a recoveries outside of the 80-120% recovery window as J for all metals except mercury. Mercury has a window of 70-130%. Data with less than a 50% recovery or over 150% recovery for metals should be flagged R.	RI, Vol. IV, Section F	The Matrix Spike recovery limits for metals as defined in the NIROP Fridley Quality Assurance Project Plan and the referenced analytical method, ILM04.0, are 75% – 125%. These limits apply to both aqueous and solid samples. Data review of matrix spike recoveries was conducted in accordance with the U.S. EPA National Functional Guidelines for Inorganic Data Review (2/94). The matrix spike recovery limits, as defined by the National Functional Guidelines, are 75% - 125%. In cases where the recovery of a matrix spike analyte falls below the 75% limit but above 30%, the analyte is qualified in accordance with the National Functional Guidelines. In cases where the matrix spike recovery falls below the 30% limit, positive results are qualified and nondetected results are rejected as per the National Functional Guidelines.
MPCA III.4	Missing Discussion Precision, accuracy reproducibility, completeness, and comparability of the data needs to be discussed are required by the Quality Project Plan (QAPP).	RI, Vol. IV, Section F	The last sentence in Section 9 of the QAPP states that "a summary of the validation results (actions taken and completeness, precision, and accuracy) will be provided in the RI Report." The next-to-last sentence in Section 12.3 of the QAPP states that "The results of the data validation process and the completeness assessment will be summarized in Section 4.0 of the RI Report". As required in the aforementioned sections of the QAPP, the second paragraph of Section 4.0 of the RI Report includes a sentence which states

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			that "an overall data validation summary as well as data validation memoranda summarizing the results of the data validation of each individual sample delivery group (SDG) are presented in Appendix F" of the RI Report. The data validation memoranda describe in detail the assessment of precision and accuracy for sample data, and the data validation summary summarizes this information for the project. The data validation summary also addresses completeness by discussing results that were rejected during data validation and the impact of the rejected results on the data as a whole. Additional text will be added to the data validation summary to provide quantitative values for percent completeness. A specific reference stating that representativeness (assuming this term was meant by the comment writer instead of reproducibility) and comparability of the data would be discussed in the RI Report could not be located in the QAPP. These parameters are qualitative measures as opposed to precision, accuracy, and completeness, which are quantitative measures. As discussed in Sections 3.4 and 3.5 of the QAPP, representativeness and comparability are dependent upon the proper design of the sampling and analytical program. Representativeness and comparability of the data were obtained by following the sampling and analytical requirements of the Field Sampling Plan (FSP) and QAPP.
MPCA III.5	Missing Discussion The Navy needs to discuss the data with respect to the Data Quality Objectives (DQOs) as required by the QAPP.	RI, Vol. IV, Section F	No reference to the QAPP section(s) requiring discussion of data relative to DQOs is cited. Without a reference to a specific QAPP section in which the requirement to review data against DQOs is cited, it is difficult to understand the nature of this question or concern.

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			The Work Plan (WP) is incorporated in the QAPP by reference. In the WP (Section 4.0), the outputs of the DQO process (i.e., the DQOs) and associated rationale are presented. The DQOs, which were developed according to US EPA DQO guidance, require evaluation of health risks to various worker types. This has been done and is documented in detail in Section 6.0 of the RI report for each of the plausible receptors identified during DQO planning. Analyses were conducted for the contaminants of concern identified in the WP and the QAPP, and the sampling and analysis methodologies identified in those documents have been implemented. Results have been documented and discussed throughout the RI report. Modeling of the contaminant transport (RI Section 7.0) has been accomplished and preliminary evaluation of natural attenuation as a potential remedial action (RI report Section 5.0) has been addressed. All of these activities and summaries have been conducted in accordance with the requirements and in the spirit of the QAPP/DQOs.
MPCA III.6	Data Tables Is all of the VOC data reported? A limited list of VOCs was reported. The MPCA staff assumed that those reported are the only detections.	RI, Vol. IV, Section F	All analytical data are contained in Appendix E of the report. Throughout the text only positive detections are presented.
MPCA III.7	Mobile Laboratory (Comment) The mobile laboratory data was questionable for quantitative use. The Navy used this data only as screening data for laboratory analysis; therefore, the Navy used this data appropriately.	RI, Vol. IV, Section F	The data met the Navy's intended usability goals.
MPCA IV I.1	Operable Unit 3 Remedial Investigation Report Section 1.2.3, page 1-8, the first paragraph The Initial Assessment Study (IAS) prepared by Envirodyne Engineers, Inc., dated June, 1983 contains the most comprehensive assessment of waste generation and disposal in the early years of operation of the NIROP, and it is important to know more about this history.		The MPCA agreed to remove the linkage of the IAS Report from the OU3 report, provided the Navy agree to continue pursuing the information requests specified herein. This agreement was reached at the February 1999 Partnering Team Meeting.

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	The IAS indicates that the locations of buried wastes were not recorded, but identified disposal areas as Sites 1 and 2 on Figure 3-1. The findings of the IAS should be more fully articulated in the report.		
MPCA IV I.2	Section 1.2.3, IAS References to Waste Generation and Disposal at NIROP Investigations at NIROP to date have focused almost exclusively on the contamination of soil and ground water from the NIROP facility and, to some extent, the ground water contamination in the Anoka County Riverfront Park. However, recent MPCA staff discussions concerning the amounts of chlorinated solvents used at NIROP have raised questions concerning the fate of the very large amount of solvents and other chemicals used at the facility. As stated in the executive summary of the IAS, the purpose of the IAS was to "... identify and assess sites posing a potential threat to human health or the environment due to contamination from past hazardous materials operations." The IAS contains important information about waste generation and disposal activities at NIROP. It is important to determine more about the waste generation and disposal activities identified in the IAS because: a. the IAS and all subsequent NIROP studies do not identify any off-site disposal areas (Off-site disposal areas could include what is now considered the FMC Superfund Site and/or the dump in the southern part of Anoka County Riverfront Park); b. as cited in paragraphs 2 and 3 of Section 2.2.2 of "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final U.S.EPA/540/G-89/004, OSWER directive 9355.3-01, October 1988, "[d] at relating to the varieties and quantities of hazardous wastes disposed of at the site should be compiled.... [and]...[r]ecords of disposal practices and operating procedures at the site, including historical photographs, can be reviewed to identify locations of waste materials onsite, waste haulers, and waste generators;" c. as cited in Section 1.3.1.2 of OSWER Directive 9355.3-01, if there were disposal rules in effect when the disposal activities took place, it is important to determine whether waste was disposed of properly, etc. d. it could help identify off-site disposal areas that may ne d investigation and possible remediation; and		See response to MPCA IV.1

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	e. determining what was taken off-site helps the MPCA staff determine what volumes of waste the MPCA staff expects to find on-site and when the MPCA staff might expect the site to be cleaned-up.		
MPCA IV Part II	Initial Assessment Study The following citations from the IAS starting with Section 5.2.1 highlight where the Navy identified that materials that were possibly hazardous substances or wastes were either disposed of on NIROP (e.g., in sewers) and/or were transported off NIROP Fridley. If the estimates of waste disposed of in the sewers or transported off-site are yearly averages from 1941 to 1983 – the IAS was written in 1983 – each section below identifies the estimated volumes of waste disposed. Unless otherwise noted, the estimates cited below are for the 42 year period between 1941 and 1983. Please note that Section 5.1 of the IAS contains the following statement. Since no major functional changes have occurred in these operations since plant construction, most of the departments continued to generate wastes similar to those produced initially. Therefore, the information obtained during the on-site survey concerning recent operations was judged to be representative of the past waste generation.		See response to MPCA IV.1
MPCA IV Part II.1	Section 5.2.1, Machine Shop In the third paragraph, the IAS states that "[a] majority of spent cooling solutions [water soluble organic machine coolants] were discharged to the sanitary sewer. The quantity of discharged coolant ranged from 50,000 to 150,000 gallons per year." In the last paragraph, the IAS indicates that waste lubricating and hydraulic oils were periodically disposed of off Navy property and "approximately eight barrels of unburnable oil sludge were disposed of off Navy property annually." Estimated volume of coolant disposed of in the sanitary sewer system: 2,100,000 to 6,300,000 gallons. Estimated volume of unburnable oil sludge disposed of off-site: 336 barrels.		See response to MPCA IV.1

Regulatory Comment No.	Regulatory Comment	RI Volume and Section	Response/Action Taken
MPCA IV Part II.2	Section 5.2.2, Metal Plating In the fourth paragraph, the IAS states that "[b]efore the treatment system [for plating wastes] were installed in 1973, all liquid plating wastes were discharged directly into the sewer system or disposed of off Navy property." In the last paragraph, the IAS states that "[p]lating tank sludges were disposed of off Navy property in a hazardous waste landfill or treated by the plating department treatment system for the past few years. Prior to 1973, these waste sludges were disposed of both on and off Navy property." Estimated volume of metal plating wastes disposed of in the sanitary sewer system from 1941 to 1973: 1.168 trillion gallons. Estimated volume "untreatable" sludge disposed of (on-and) off-site from 1941 to 1973: 160 barrels.		See response to MPCA IV.1
MPCA IV Part II.3	Section 5.2.3, Degreasing and Solvent Cleaning The IAS states that "[t]hese [open-top degreasing] units were cleaned about every third month and generated a total of approximately forty 55-gallon drums per year of waste solvent." The narrative in this section is poorly worded. The staff requests that the Navy clarify the volumes of waste generated. Estimated volume of waste solvent disposed of in the sanitary sewer system: none identified. Estimated volume of waste solvent disposed of off-site: (1) nine 200 gallon open-top degreasing units: 6,720 barrels; (2) 1,1,1,-trichloroethane and/or Stoddard Solvent waste from six 75-gallon tanks: 504 barrels.		See response to MPCA IV.1
MPCA IV Part II.4	Section 5.2.4, Paint Shop In the first paragraph, the IAS states that "[a]n estimated 2 to 3 barrels of material were removed from the tank during each cleaning operation. Some of this painting sludge was presumably disposed of in the scrap yard, trenches, and pits north of the NIROP building, but the majority of this material was allegedly hauled to a landfill off Navy property." In the second paragraph, the IAS states that "[s]pent filters were compressed into 55-gallon drums for disposal off Navy property."		See response to MPCA IV.1

Regulatory C mment N .	Regulatory Comment	RI Volume and Section	Response/Action Taken
	In the last paragraph, the IAS states that "[t]he cleaning operations [for painting equipment] generated as much as 20 gallons of waste solvent and paint per day, which was disposed of off Navy property as a hazardous waste. **This operation was by far the largest generator of liquid wastes disposed of at the facility** [emphasis added]." Estimated volume of paint wastes (spent cleaner and phosphatizer solution) disposed of in the sanitary sewer system; unknown. Estimated volume of disposed of off-site: (1) paint sludge: 168 to 252 barrels and (2) cleaning solvents, e.g., MEK, toluene, naphtha: 306,000 gallons (or 5,575 fifty-five gallon barrels.		
MPCA IV Part II.5	Section 5.2.5, Assembly The IAS states that "[a]pproximately one barrel of waste chlorinated solvent was disposed off of Navy property each month." Estimated volume of chlorinated solvent or rinse water disposed of in the sanitary sewer system: unknown. Estimated volume of chlorinated solvent disposed of off-site: 504 barrels.		See response to MPCA IV.1
MPCA IV Part II.6	Section 5.2.6, Foundry The IAS states that "[u]ntil approximately 1970, core butts were generally disposed of Navy property, but a limited amount of waste sand was reportedly disposed of on Navy property at the north end of the NIROP. After 1970, this material was disposed of by contract hauler to a landfill certified of this type of waste. An average of approximately 10,000 tons of waste sand was generated and disposed of annually." Estimated volume of washing liquid disposed of in the sanitary sewer system: none identified. Estimated volume of core butts disposed of off-site: unknown.		See response to MPCA IV.1
MPCA IV Part II.7	Section 5.2.7, Heat Treating The IAS states that "[t]he low and high temperature salts were disposed of off Navy property at a hazardous waste landfill because of their reactive nature.		See response to MPCA IV.1

Regulatory Comment No.	Regulatory Comment	RI Volume and Section	Response/Action Taken
	Grit/blast wastes were considered non-hazardous and were disposed of with foundry sand off Navy property." Estimated volume of heat treating wastes disposed of in the sanitary sewer system: none identified. Estimated volume of heat treating wastes disposed of off-site: unknown.		
MPCA IV Part II.8	Section 5.2.8, Photo Shop The IAS states that "[t]he operation discharged approximately 300,000 gallons of rinsewater annually." Estimated volume of processing wastes, including silver, disposed of in the sanitary sewer system: 12,400,000 gallons. Estimated volume of processing wastes disposed of off-site: none identified.		See response to MPCA IV.1
MPCA IV Part II.9	Section 5.2.9, Welding Department The IAS refers to the generation of soil wastes, carbide, and waste sludge. Estimated volume disposed of in the sanitary sewer system: none identified. Estimated volume disposed of off-site: none identified. In summary, based on these assumptions cited earlier in the second paragraph of Part II, the IAS documents an estimated 13,801 55-gallon barrels (or 55-gallon barrel equivalents) of waste taken offsite and an estimated 1.186 trillion gallons discharged into the NIROP sanitary sewer system.		See response to MPCA IV.1
MPCA IV Part II.10	Specific IAS References to Disposal of Hazardous Wastes Off Navy Property The IAS contains numerous entries that indicate that substantial amounts of hazardous waste was disposed off Navy property prior to 1973. These citations from the IAS refer to this activity. a. Page 5-3, Section 5.2.1 Lubricating and cutting oils drained from the machines was periodically pumped from the reservoirs to barrels for disposal off Navy property.		See response to MPCA IV.1

Regulatory Comment No.	Regulatory Comment	RI Volume and Section	Response/Action Taken
	b. Page 5-3, Section 5.2.2 Before on-site treatment systems were in place, all liquid plating wastes were either discharged to the sanitary sewer or disposed of off Navy property. Sludge from plating tanks were likely disposed of off Navy property prior to 1973. c. Page 5-4, Section 5.2.3 About 1 drum per month of solvent was generated in cleaning large degreasing units which was disposed off Navy property. d. Page 5-4, Section 5.2.4 Painting sludge was hauled to a landfill off Navy property.		
	e. Page 5-5, Section 5.2.4 The cleanup of painting equipment generated as much as 20 gallons per day of solvents, which was disposed of off Navy property as hazardous waste. f. Page 6-3, Section 6.2.4 PCB was placed in 55-gallon drums, which in turn were placed into an 800-gallon concrete vault. The three sealed vaults were located outside the northeast corner of the building. Apparently, these were awaiting proper disposal. Prior to implementation of this procedure, it is likely that PCB was mixed with other waste oils and disposed of off Navy property. g. Page 7-1, Section 7.2 "Between the 1940s and the early 1970s, small burnable material was processed in the NIROP incinerator. Incinerator ash was, in turn, hauled to a disposal area off Navy property." "Hazardous wastes were placed in 55-gallon drums for disposal off Navy property by a contractor. On the average, approximately 30 drums per month were disposed of since the early 1970s. Before 1973, industrial		See response to MPCA IV.1 See response to MPCA IV.1 See response to MPCA IV.1

Regulatory Comment N .	Regulatory Comment	RI Volume and Section	Response/Action Taken
	wastes such as painting sludge and chlorinated solvents were typically disposed of in landfills off Navy property."		
	h. Page 8-3, Section 8.3 Waste materials were disposed of in two pits at the site (OU2 soils site). "The pits were reportedly used during a period of wet weather which prevented access to the **normal disposal site off Navy property** [emphasis added.] The pits were used on a one-time basis and covered with soil."		See response to MPCA IV.1
MPCA IV Part III.1	Did any of the materials (in the waste generation and disposal activities described above from the IAS) disposed of on NIROP Fridley and/or transported off NIROP Fridley contain hazardous substances or wastes? ["Hazardous substances" and "Hazardous wastes" are defined by the following statutes: United States Code, Title 42, Sections 7412 and 6921; Title 33 Section 1321 (b)(2)(A) and Minn. Stat. Section 115B.02, Subdivisions 8(a)(b)(c) and 9(a)(b)] If the answer is YES to any part of this question, identify: a. every date on which these hazardous substances or wastes were disposed of on NIROP Fridley and/or transported off NIROP Fridley; b. for each transaction, the nature of the waste material or hazardous substances, including the chemical content, characteristics, physical state (e.g. solid, liquid), and the process for which the substances was used or the process which generated the substance; c. the quantity of the materials or hazardous materials involved (weight or volume) in each transaction and the total quantity for all transactions; d. all tests, analyses, and analytical results concerning such material; e. the measures taken to determine the actual methods, means, and site of treatment or disposal of the waste materials or hazardous substances involved in such transactions; f. the type and number of containers in which the waste materials or hazardous substances were contained when th y were located on the Site, and all markings on such containers;		See response to MPCA IV.1

Regulat ry Comment No.	Regulatory Comment	RI Volume and Section	Response/Action Taken
	g. all information pertaining to the disposal of the waste materials or hazardous substances involved in such transactions including information on the transport and final disposition of the waste materials or hazardous substances; h. the type and number of containers in which the waste materials or hazardous substances were contained when any arrangements were made for transport, treatment or disposal and any records pertaining to these services; i. all documents containing information responsive to items a –h above, or in lieu of identification of all relevant documents, provide copies of all such documents or provide a time and place at which you will produce all such documents for inspection and copying; and j. all persons with knowledge, information, or documents responsive to a – h above. 2. Identify any other persons who may have arranged for disposal or treatment or who may have arranged for transportation for disposal or treatment of waste materials, including hazardous materials and/or drums at the Site. Include any documentation you have regarding arrangement, disposal and transportation. 3. Identify any measures that were taken to determine the operating conditions of the sanitary sewer system and whether tests were conducted to ensure its proper maintenance and operability. 4. Identify any other persons who may be able to provide a more detailed or complete response to the above questions or who may be able to provide additional relevant documents.		