PROPOSED PLAN FOR OPERABLE UNIT 2 AND 3 (OU2) (OU3) NIROP FRIDLEY MN
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Proposed Plan
for
Operable Unit (OU) 2 and Operable Unit (OU) 3

Naval Industrial Reserve Ordnance Plant
Fridley, Minnesota

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0003

August 2002

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Project Number 6966

Commander, Southern Division
Naval Facilities Engineering Command
Attn: Jeff Meyers, Code ES32
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN CONTRACT No. N62467-94-D-0888
Contract Task Order N[redacted]

Subject: Revised Proposed Plan for OU2 and OU3
NIROP Fridley, Fridley Minnesota

Dear Jeff:

Please find enclosed a copy of the subject document. Per our prior discussions, the Navy is optimistic that the team will confirm their requested revisions have been incorporated into this document and provide confirmation of this to the Navy on or before August 1, 2002 to allow adequate time for public notification to support the August 22 public comment meeting.

If you have any comments, or questions, please contact me at (412) 921-8216.

Sincerely,

Mark Sladic P.E.
Task Order Manager

MS/kf
Enclosure

cc: Dave Douglas, MPCA (1 copy)
Craig Thomas, USEPA (2 copies)
Richard Harris, RAB Co-Chair (1 copy)
Mark Perry/File 6966 TtNUS (Unbound copy)
Debra Wroblewski TtNUS (Cover Letter Only)

PROPOSED PLAN
FOR OU2 AND OU3 AT NIROP FRIDLEY

I. INTRODUCTION

The Remedial Investigation of contaminated soils at the Naval Industrial Reserve Ordnance Plant Fridley (NIROP), located in Fridley, Minnesota (as shown on Figure 1) has been conducted to evaluate and cleanup environmental contamination in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments Reauthorization Act (SARA). The investigation also conforms to the Minnesota Environmental Response and Liability Act (MERLA). This Proposed Plan presents the preferred remedial alternative to address soil impacts at the NIROP and the rationale for this preference. This document is issued by the Naval Facilities Engineering Command, Southern Division of the United States Navy (US Navy), the lead agency for addressing environmental impacts at NIROP, in close cooperation with the United States Environmental Protection Agency - Region V (US EPA) and the Minnesota Pollution Control Agency (MPCA). The US Navy, in consultation with the US EPA and MPCA will select a final remedy for the site after reviewing and considering all information submitted during the 30-day public comment period. The US Navy, in consultation with US EPA and MPCA, may modify the preferred alternative or select another response action presented in this plan based on new information or public comments.

The US Navy, US EPA, and MPCA signed a Record of Decision (ROD) in September 1990 to address groundwater contamination at the NIROP. A Federal Facilities Agreement (FFA) was signed by the US Navy, US EPA, and MPCA in March 1991 to formalize roles and responsibilities, and declare a schedule, for the construction of the groundwater remedy. A groundwater pump and treat remedy was selected. The groundwater operable unit became OU1. The ROD stated that during the evaluation of alternatives for OU1, it was determined that the available data was not sufficient to determine what appropriate response, if any, was required for contaminated soil. The ROD required the Navy to conduct additional investigative work concerning the source of contamination.

The Operable Unit 2 (OU2) Remedial Investigation/Feasibility Study (RI/FS) was initiated in September 1993 to investigate potential source areas remaining in unsaturated soil (above groundwater elevation) in the North 40 area and other areas outside of the NIROP building. The OU2 RI/FS was also intended to determine if residual contamination remaining in soils in the North 40 area presented an unacceptable potential for migration to groundwater.

Concurrent with OU2 activities, the Navy initiated another OU investigation. Operable Unit 3 included contaminant source areas beneath the NIROP building and saturated soil (below groundwater elevation) source areas throughout the NIROP site.

The US Navy, US EPA, and MPCA agreed that it would be more effective to address remedy selection for both OU2 and OU3 concurrently. Therefore, development of this Proposed Plan had not proceeded further pending the completion of the OU3 RI Report. The US EPA approved the OU3 RI Report on May 29, 2002, and MPCA approved the report on May 20, 2002. The updated OU2 Risk Assessment was approved by US EPA on May 30, 2002, and by MPCA on May 20, 2002.

In this Proposed Plan, the US Navy explains why it has selected the proposed remedial alternative, describes the other remedial alternatives considered, and requests the public's involvement in the remedial decision making process.

II. FACILITY HISTORY

NIROP dates to 1940 when Northern Pump Company, under contract from the US Navy, constructed a new manufacturing plant and began producing five-inch gun mounts for Naval vessels. The arrangement between the US Navy and Northern Pump Company was unique in that the plant was partially owned by the government and partially by Northern Pump Company. The NIROP was the first Government Owned - Contractor Operated (GOCO) facility. The Northern Pump Company assets, and responsibility for operation of the US Navy part of the facilities, changed hands several times until, in 1997, the Carlisle group purchased United Defense LP (UDLP). The Armament Systems Division of UDLP currently operates the NIROP.

III. PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS

NIROP Fridley has previously stored and disposed of industrial wastes, scrap materials, drummed wastes, and chemicals at the facility. The following paragraphs discuss the former chemical and waste disposal, storage, and removal practices.

During the late 1960s or early 1970s, two borrow pits were used on a one-time basis for the disposal of drummed wastes on the northeast portion of the NIROP: one near the railroad gate, the other near the first railroad switch. Each of the pits was approximately 8 feet deep and irregularly shaped and contained about 25 barrels containing waste oil, plating sludge, cleaning solvent, and degreasing solvent. In addition to the barrels, the disposal pits contained miscellaneous construction debris, such as metal scraps, lumber, and concrete.

In 1972, two trenches were excavated at NIROP for waste disposal purposes in the area north of the main plant building. The trenches were used on a one-time basis. Each trench was approximately 10 feet wide and 8 to 10 feet deep, with a combined length of 75 to 100 feet. Between 50 and 100 drums containing wastes were placed into the trenches on their sides, stacked two or three deep, and covered with excavated soils. The material potentially disposed of in the drums included the same types of wastes as disposed in the borrow pits.

In 1975, an estimated 150 55-gallon drums of industrial waste were removed from NIROP. Prior to disposal, such waste material was collected and stored at a central waste storage area located outside near the northeastern corner of NIROP. The area consisted of a 30-foot by 30-foot asphalt and concrete pad graded toward the middle, which drained to a dry well that could be pumped if a spill occurred.

Large quantities of sand are consumed in the casting process at NIROP. Foundry core butts contain mostly sand with minor amounts of metal and resin or binders. Most foundry core butt disposal operations occurred off Navy property. However, it was reported that core butts were disposed of in the northern portion of NIROP on a very limited basis. An analysis of the foundry sand, both before and after use, was performed in November 1978. This analysis did not show any hazardous materials.

Through various geophysical and remote sensing techniques, nine areas were selected for excavation based on their likelihood for containing drummed wastes in the northern portion of the outside property. These areas were excavated in the fall of 1983 and the spring of 1984. Forty-three excavated drums and 1,200 cubic yards of underlying soil were found to contain volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), oil and grease, pesticides, and metal-bearing wastes. The drums and contaminated soil were disposed of at an USEPA-approved landfill (RMT, Inc., June 1997).

Based on the results of a geophysical investigation conducted in 1995, a total of twenty-three 55-gallon drums and 12 smaller containers were found in the north 40 area. These drums were excavated during a removal action conducted in April through June 1996. Eleven drums were determined to be non-hazardous, 11 drums contained contaminated soil, 1 drum contained hazardous waste, 4 1-gallon containers were determined to be non-hazardous, and 8 quart-sized containers contained ingredients such as brake fluid and paint thinner. The non-hazardous containers were disposed of as scrap metal by the UDLP metal recycling program, and their soil contents were placed in roll-off boxes for disposal as Special Waste [materials containing volatiles but having Toxic Characteristic Leaching Procedure (TCLP) results below hazardous levels as mandated in 40 CFR 261]. The remaining 13 drums and 8 containers, with contents, were sampled for disposal and sent to Emelle, Alabama for disposition and subsequent

incineration at Port Arthur, Texas. In addition, approximately 100 cubic yards of soil and debris consisting of trash, scrap metal, tires, construction and demolition rubble, metal casting waste, equipment parts, and cast concrete structures were removed and disposed of as non-hazardous waste (Morrison Knudsen Corp, December 1996).

In April 1995, inside the main production building, the East Plating Shop was being renovated to accommodate an electrical assembly facility. During the renovation a brief window, with all tanks removed and prior to floor repairs, was available for collection of soil and groundwater samples to determine whether past plating activities impacted soil and groundwater beneath the building. Trichloroethene (TCE), 1,1,1-Trichloroethane (TCA), and 1,2-Dichloroethene (DCE) were found present at elevated levels in soil and groundwater. Elevated metals concentrations were identified in the vicinity of a former sump.

During OU2 sampling in 1996 in the vicinity of a previously unexcavated area near the North 40, free liquids were encountered which resulted in a removal action. A total of 31 drums were sampled and overpacked in addition to several other empty and crushed drums which were removed with other debris. Elevated VOC concentrations were reported in subsurface soils.

Following the revision of the OU2 risk assessment by adding the exposure scenarios used in the OU3 RI, it was determined that in one subarea of OU2 risk was inordinately influenced by one single data point. Therefore, during summer 2002, the Navy conducted a time-critical removal action to remove approximately 35 cubic yards of soil around this one location. This removal was completed in June 2002, and addressed the last known location where there were unacceptable risks in surface soils.

IV. SITE DESCRIPTIONS

This section describes the physical characteristics and the nature and extent of contamination at OU2 and OU3.

The NIROP site consists of 82.6 acres of land, or which approximately 50 acres are paved or covered with buildings. The northern part of the main NIROP manufacturing building and the property north of the NIROP building, referred to as the North 40, is owned by the government. The southern part of the NIROP building is owned and operated by UDLP. The NIROP site consists of the government-owned part of the NIROP building, the area outside of the building referred to as the North 40, and the contaminated groundwater plume that has migrated from the NIROP property. The NIROP site is situated approximately 30 feet above and 700 feet east of the Mississippi River. Anoka County Regional

Riverfront Park is located between the NIROP and the Mississippi River, which is a 60-acre recreational facility.

A groundwater pump and treat containment system is in place and operating to prevent the groundwater contamination from leaving the NIROP property. Contaminated groundwater constitutes OU1. Some groundwater samples were collected during the OU3 investigation, but this groundwater data is being incorporated into the OU1 data set and will be used to develop future OU1 remedial decisions. This Proposed Plan addresses only OU2 and OU3.

Operable Unit 2 (OU2)

The land outside of the main NIROP building, from ground surface down to the groundwater elevation, has been identified as OU2. This land has been further divided into 'subareas' to simplify the risk assessment process. As shown in Figure 2, risk was evaluated for Subareas A1, A2, A3, A4, B1, B2, D, E, and F. The following items summarize the nature and extent of contamination at OU2: See Figure 2 for identification of sub areas.

- Soils within Sub-Area A1 have not been impacted by site activities.

- Sub-Area A2 has been impacted by site activities. Analytical results indicate that elevated VOC concentrations in the shallow soils are present. Results indicate that the problem may be related to a surface spill rather than to buried wastes since concentrations are highest in the near surface (1' to 3') samples and decrease with depth.

- Anomalies were areas indicated by electronic instrumentation as areas possibly containing buried material. Investigation results indicate two major areas of concern in Sub-Area A3, which includes the area around unexcavated Anomalies #13 and #14. Elevated concentrations of contaminants, particularly VOCs, remain in soils in these areas as a result of wastes buried prior to 1983. The area delineated as containing VOCs at concentrations greater than 10 µg/kg included more than one-half of Sub-Area A3. Unexcavated Anomalies #12 and #15 do not have significantly impacted soils in Sub-Area A3.

- Much of Sub-Area A4 has been impacted by site activities with the greatest impacts being located at previously excavated Anomaly #3. Previously excavated Anomalies #3 and #6 and unexcavated Anomalies #2 and #4 appear to be the major sources of these impacts.

- Sub-Area B1 has been slightly impacted by site activities.

- Sub-Area B2 has not been significantly impacted by site activities.

- Area D is the site of a previously unidentified disposal trench. The reported impacts are considerably less than those observed in Sub-Areas A2, A3, and A4.

- Although Sub-Area E1 has been slightly impacted by site activities, this area does not appear to be the source of contamination reported in nearby monitoring wells.

- Sub-Area E2 has been slightly impacted by site activities. However, this sub-area is not the source of VOCs identified in nearby monitoring wells.

- Results of this investigation show that there have been slight or no impacts to the soils in Sub-Area F1.

- Residual hydrocarbon-impacted soils remain in Sub-Area F2.

Operable Unit 3 (OU3)

The land underneath the main NIROP building, and soil at elevations below the groundwater elevation (the saturated zone) either under the building or outside the building, has been designated OU3. The following summarize the nature and extent of contamination at OU3:

- Several VOCs (primarily chlorinated hydrocarbons and aromatic compounds) were detected in surface (0 to 4 feet bgs), shallow subsurface (4 to 12 feet bgs), and deep subsurface (>12 feet bgs) soil samples. Relative detection frequencies for VOCs were similar among surface, shallow subsurface, and deep subsurface soil samples. However, as illustrated in the following table for VOCs, no consistent pattern of concentrations was evident among the three categories of soil samples. Hence, these COCs do not seem to indicate wide spread soil contamination exceeding risk-based thresholds.

Analyte	Concentration Range (µg/kg)		
	Surface Soils	Shallow Subsurface Soils	Deep Subsurface Soils
1,1,1-Trichloroethane	1-56	1-2	4
1,1-Dichloroethane	2-9	1-11	1
1,2-Dichloroethene (total)	3-15	1-15000	1-290
Bromomethane	2	1-2	ND
Carbon disulfide	1-13	5-14	1-18
Ethylbenzene	1-10	4-720	9-34
Styrene	4-33	1-54	10-72
Tetrachloroethene	1-90	1-760	1-3800
Toluene	1-14	1-1000	1-24
Trichloroethene	1-640	1-1100	1-100000
Xylenes, Total	1-45	1-7300	1-120

ND - not detected

Maximum concentrations of TCE and tetrachloroethene in all three categories of soil samples were detected in samples collected from the East Plating Shop, indicating the possible presence of a "hot spot" of TCE and tetrachloroethene in this area and the likelihood that this area is the source area for TCE (and chromium).

- Several seimvolatile organic compounds (SVOCs), primarily polyaromatic hydrocarbons (PAHs), were sporadically detected in surface and shallow subsurface soil samples. With few exceptions, concentrations and detection frequencies of SVOCs in surface soil samples exceeded those reported for shallow subsurface soil samples. 4-Chloro-3-methylphenol was detected in a single shallow subsurface soil sample (collected from AOC32, the location of an oil/water separator sump) at a concentration of 11,000 µg/kg. Concentrations of PAHs in shallow subsurface soil samples ranged from 11 µg/kg to 2,300 µg/kg, while concentrations of PAHs in surface soil samples ranged from 10 µg/kg to 5,600 µg/kg.

- All twenty-two metals on the analyte list and cyanide were detected in surface soil samples, and cyanide and twenty of these metals were detected in the shallow subsurface soil samples in OU3 underneath the main NIROP building. Concentrations and detection frequencies of metals detected in surface and shallow subsurface samples were very similar. Concentrations of most metals and cyanide exceeded background concentrations in one or more soil samples.

- The maximum concentrations of all detected chemicals in soil (0- to 12-feet in depth) were less than the MPCA soil reference values (SRVs) for industrial exposures with the exception of lead in one surface soil sample and chromium in one subsurface soil sample. Estimated cumulative excess cancer risks slightly exceed MPCA target risk levels.

V. SUMMARY OF SITE RISKS

This section summarizes the results of the human health risk assessment for OU3 and OU2 at the NIROP Fridley. The risk assessment estimates the potential risks to people who come in contact with site contaminants that remain in site soil. Risk assessment is necessarily complex, and the full risk assessment for the NIROP Fridley cannot be fully reproduced here. However, significant additional detailed definitions, calculations, and discussion of results are available in the appropriate sections of the Supplemental Remedial Investigation Report and the OU3 RI Report.

To determine whether or not unacceptable risks to human health existed, the Navy conducted a risk assessment, and developed three exposure scenarios to represent how people could come in contact with site contaminants. For NIROP Fridley, the exposure scenarios were developed for site and construction workers since these people are most likely to come in contact with soil contamination. The risk scenarios represent a set of assumptions about how workers would come in contact with site soil contaminants. These exposure scenarios included the typical industrial worker, minor frequent construction worker, and major infrequent construction worker. These scenarios differed on magnitude, duration and frequency of contact with contaminated soil. The typical industrial worker was assumed to contact only surface soils, whereas the minor frequent construction worker and the major infrequent construction worker were assumed to contact subsurface soils as well as surface soils. A focus was placed on future construction because these activities typically penetrate below the ground surface allowing potential contact with subsurface contamination. Since it was not known which specific soils would be contacted conservative estimates of the soil contaminant concentrations were utilized in the risk assessment. A screening level risk assessment utilizing a residential exposure scenario was completed. The screening level risk assessment indicated that in its current condition, for potential site residents, there an unacceptable risk level exists. However, since the site is not likely to be used for residential purposes, this screening level risk assessment for residential exposures was not further developed.

In accordance with MPCA methodology and as agreed to by the US Navy and US EPA, a Hazard Quotient (HQ) and an Incremental Cancer Risk (ICR) were used to express the risk to human health to site-related contaminants based on the previously described hypothetical exposure scenarios. The ICR is a measure of cancer-related risk, and the HQ is a measure of toxic, non-cancer effects. The HQs and ICRs were compared to acceptable risks. Table 1 presents a summary of ICR and HQ values by subarea

(as delineated in Figure 2). These risk values represent site conditions after all previously described removal actions have taken place. Shaded HQs and ICRs indicate that the estimated risks exceeded acceptable levels.

An ecological risk assessment was also conducted to estimate possible adverse effects to terrestrial biota. The lack of suitable habitat in either OU2 or OU3 makes it unlikely that significant numbers of organisms are or will be affected.

VI. REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAO) are site specific, qualitative, cleanup objectives based on the nature and extent of contaminants, resources currently or potentially threatened, and current or future human and ecological exposures. The objectives were developed based on the results of risk assessments and applicable or relevant and appropriate requirements (ARARs) for the NIROP.

The overall remediation objective at the NIROP is to protect human health and the environment from unacceptable risks which may be posed by contaminated soil and groundwater. The site specific remedial response objective is as follows:

- Protect humans, including sensitive groups, over a lifetime, from exposure to contaminants in soils via ingestion, inhalation, or dermal contact. Protection can be provided by limiting exposure or remediating sites to levels appropriate for future use of the land.

VII. SUMMARY OF REMEDIAL ALTERNATIVES

Remedial alternatives for soil contamination at NIROP are presented below. The reasonably anticipated projected future use of this property is industrial or commercial. Therefore, the proposed remedies are viewed with respect to how they provide protection that future land use. DOD policy actually requires the evaluation of an unrestricted use alternative to best evaluate long-term costs and liabilities. However, because of the particular distribution of contamination across this site, including contamination underneath the plant floor, there is no practical way to address this requirement at this time. Therefore, the following alternatives only address protectiveness criteria for industrial or commercial property uses.

Alternative 1: No Action

Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Construction Timeframe: N/A

Regulations governing the Superfund program generally require that the 'No Action' alternative be evaluated to establish a baseline for comparison. Under this alternative, the US Navy would take no action at the site to prevent exposure to the soil contamination.

Alternative 2: Land Use Controls (Engineering Controls and Institutional Controls)

Estimated Capital Cost: $0
Estimated Annual O&M Cost: $1,609
Estimated Construction Timeframe: N/A

As detailed in section III (Previous Investigations and Removal Actions) of this Proposed Plan, the Navy has conducted numerous actions in which contaminated material and soil has been removed from the NIROP property. These removal actions occurred as early as 1983, and as late as June 2002. Collectively, they resulted in the removal of all contaminated surface soil locations that could result in an unacceptable risk to a typical industrial worker, a minor frequent construction worker, or a major infrequent construction worker. Accordingly, this alternative effectively incorporates these prior removal actions, and thus addresses the subsurface contamination that remains.

Engineering controls are physical barriers to exposure and do not include institutional controls. Engineering controls do not reduce contamination levels. However, engineering controls can effectively prevent or reduce exposure to contaminants.

Institutional controls are legal mechanisms to restrict the use of or access to property. Institutional controls do not reduce contamination levels and do not allow monitoring of naturally occurring changes over time. However, institutional controls can reduce exposure to contaminants.

Together, engineering controls and institutional controls constitute Land Use Controls (LUCs).

As part of Alternative 2 the US Navy would implement LUCs at the NIROP Fridley. Specifically:

- Property can only be used for industrial or restricted commercial uses, as defined below.

- No soil disturbance deeper than 3 feet bgs is allowed in Designated Restricted Areas sub-areas A3 and A4

- No disturbance of soils beneath the Designated Restricted Area concrete pit foundations where metal-finishing operations previously occurred at the former Plating Shop within the Main Industrial Building is allowed.

- These Designated Restricted Areas are shown in Figure 3.

Property is classified as industrial where use will not allow public access to areas where residual contamination may be present in soil. In risk evaluation scenarios, potential occupational exposure assumptions are used in the calculation of cleanup levels. Industrial property uses generally include, but are not limited to, the following types of uses: public utility services, rail and freight services, raw storage facilities, refined material storage facilities, and manufacturing facilities engaged in the mechanical or chemical transformation of materials or substances into new products.

Restricted commercial use is defined as use where access or occupancy by non-employees is less frequent or is restricted, including a wide variety of uses, ranging from non public access and both outdoor and indoor activities (e.g., large scale warehouse operations), to limited public access and indoor office worker activities (e.g., bank, dentist office). The on-site worker represents the most heavily exposed human receptor. In general, restricted commercial property use excludes uses such as day-care centers, churches, social centers, hospitals, elder care facilities, and nursing homes.

The soil disturbance restrictions described above do not apply to areas outside of the Designated Restricted Areas as shown on Figure 3.

These LUCs, as described above, would be protective and permanent to the extent they remain in place, until such time that it can be demonstrated that there is no unacceptable risk posed by unrestricted access and unlimited use of the property.

Costs to be associated with the implementation and administration of the LUCs would include: deed preparation and recording, LUC inspection and reporting, LUC enforcement, and CERCLA five year review activities including necessary documentation. The Navy intends to include in the property deed

requirements for future property owners to perform an annual LUC inspection and provide a signed certification of such to the Navy, EPA, and MPCA.

VIII. EVALUATION OF ALTERNATIVES

The nine criteria specified in the NCP [40 CFR 300.430(e)] are used to evaluate the different remediation alternatives individually and against each other in order to recommend a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine remedy selection criteria provided in the NCP are as follows.

1. Overall Protection of Human Health and the Environment.
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).
3. Long-term Effectiveness and Permanence.
4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment.
5. Short-term Effectiveness.
6. Implementability.
7. Cost.
8. State Acceptance.
9. Community Acceptance.

Nine Criteria	Alternative 1: No Action	Alternative 2: Engineering Controls and Institutional Controls
Overall Protection	Criteria not met	Criteria met
Compliance with ARARs	Criteria not met	Criteria met
Long Term Effectiveness	Criteria not met	Criteria met
Reduction of Toxicity, Mobility, or Volume	Criteria not met	Criteria not met
Short Term Effectiveness	Criteria partially met	Criteria met
Implementability	Criteria met	Criteria met
Cost	Criteria met	Criteria met
Regulatory Acceptance	Criteria not met	Criteria met
Community Acceptance	To be determined	To be determined

IX. SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative to address soil contamination in OU2 and OU3 at NIROP is Alternative 2, Engineering Controls and Institutional Controls. The preferred alternative is recommended over No

Action because it provides for overall protection of human health, long term effectiveness and compliance with ARARs for both OU2 and OU3. Engineering controls and institutional controls provide short-term effectiveness, are easily implementable, and are low in cost. Engineering controls and institutional controls do not provide reduction of toxicity, mobility, and volume through treatment.

The US Navy, US EPA, and MPCA have evaluated the first seven criteria. Both US EPA and MCPA have indicated agreement with the preferred alternative. Once comments from the public are received, the US Navy will finish comparing the alternatives for OU2 and OU3 addressed in this Proposed Plan. The table on the prior page compares alternatives evaluated for the NIROP. Although the comparison was conducted separately for each site, for simplification, the table summarizes the comparison in general terms for each alternative against the evaluation criteria.

X. COMMUNITY PARTICIPATION

The US Navy provides information regarding the cleanup of the NIROP to the public through public meetings (RAB meetings), the Administrative Record files for the site, and announcements published in the Fridley Focus Newspaper. The US Navy, US EPA, and MPCA encourage the public to gain a more comprehensive understanding of the site and the investigation and cleanup activities that have been conducted at the site.

A Public Comment Meeting for this Proposed Plan is scheduled for 6:00 PM Thursday, August 22 at the Fridley Municipal Center on Fifth Street in Fridley, Minnesota. The Administrative Record file for this project is located at the MPCA offices on Lafayette Road in St. Paul, Minnesota.

XI. NEXT STEP

The US Navy will consider public comments received during the 30-day public comment period from Monday, August 12 through Thursday, September 12, 2002 in selecting a final cleanup remedy for the NIROP. All comments received during the public comment period will be addressed in the 'Responsiveness Summary' section in the final decision document (ROD). The ROD will become part of the Administrative Record for the site and will be available for public review.

Comments should be provided to any of the following personnel:

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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	area of concern
ARARs	applicable or relevant and appropriate requirements
BGS	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
cPAHs	carcinogenic polynuclear aromatic hydrocarbon
DCE	dichloroethene
DOD	Department of Defense
FFA	Federal Facilities Agreement
FS	feasibility study
GOCO	government-owned contractor-operated
HI	hazard index
HQ	hazard quotient
ICR	incremental cancer risk
MERLA	Minnesota Environmental Response and Liability Act
MPCA	Minnesota Pollution Control Agency
NAVFACENGCOM	Naval Facilities Engineering Command
NCP	National Contingency Plan
NIROP	Naval Industrial Reserve Ordnance Plant
O&M	operation and maintenance
OU	operable unit
PAH	polynuclear aromatic hydrocarbon
PCBs	polychlorinated biphenyls
RAO	remedial action objectives
RI	remedial investigation
ROD	Record of Decision
SARA	Superfund Amendments Reauthorization Act
SRV	soil reference value
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCA	trichloroethane
TCE	trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure

UDLP	United Defense Limited Partnership
µg/kg	microgram per kilogram
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

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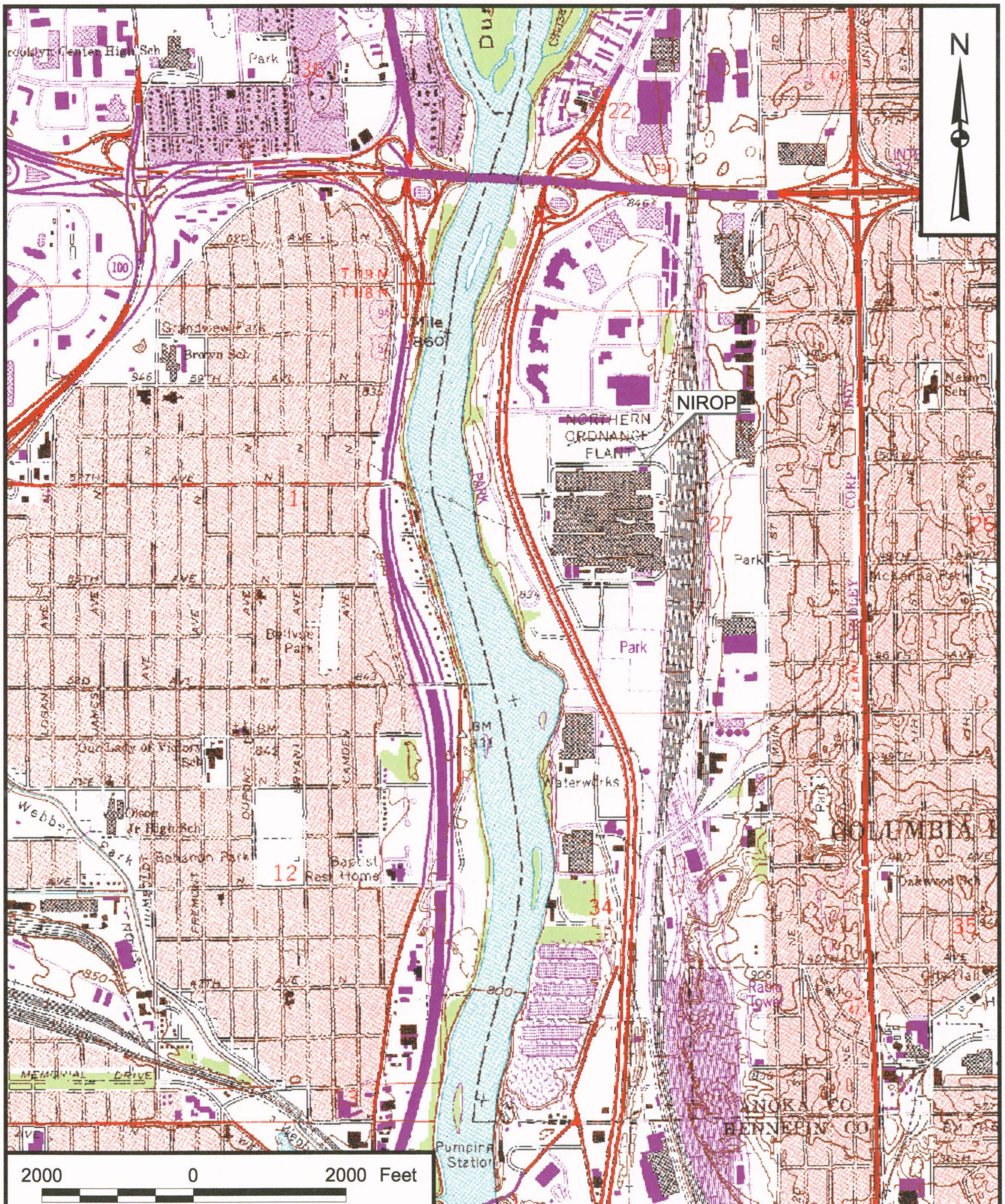
TABLE 1

SUMMARY OF HUMAN HEALTH RISK ASSESSMENT
NIROP FRIDLEY, MINNESOTA

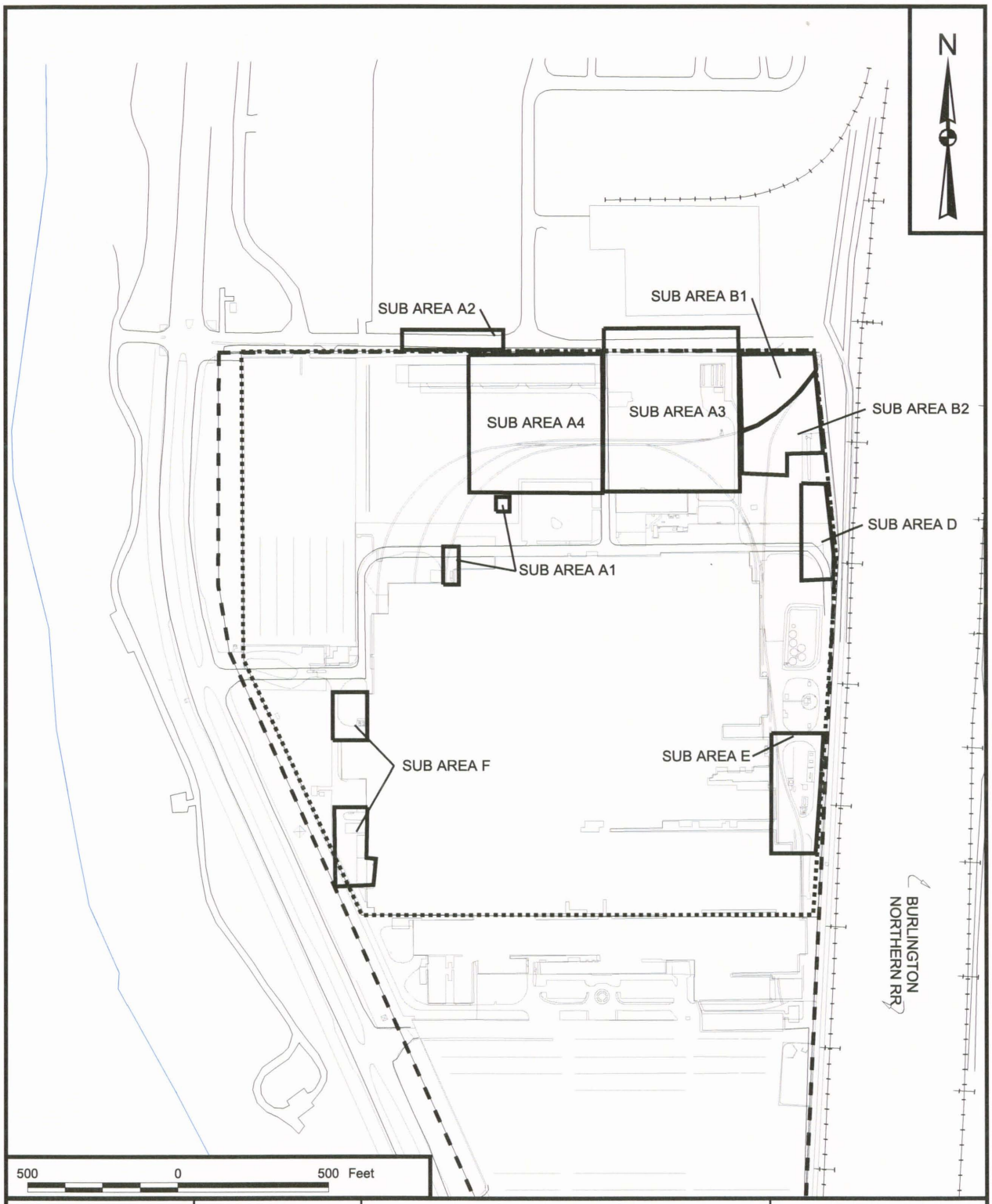
Exposure Scenario	Target Risk [1]	Target Hazard Quotient [1]	Estimated Risk										
			Operable Unit 2										Operable Unit 3
			Sub Area A1	Sub Area A2	Sub Area A3	Sub Area A4	Area B1	Area B2	Area D	Area E	Area F	Other	
Typical Industrial Worker	1E-05	0.2	HQ < 0.2 ICR = 2E-6	HQ < 0.2 ICR = 5E-6	HQ < 0.2 ICR = 6E-6	HQ < 0.2 ICR = 1E-5	HQ < 0.2 ICR = 6E-6	HQ < 0.2 ICR = 2E-6	HQ < 0.2 ICR = 7E-6	HQ < 0.2 ICR = 1E-5	HQ < 0.2 ICR = 4E-6	HQ < 0.2 ICR = 6E-7	HQ < 0.2 ICR = 3.6E-6
Minor Frequent Construction Worker	1E-05	0.2	HQ < 0.2 ICR = 1E-6	HQ < 0.2 ICR = 5E-6	HQ < 0.2 ICR = 8E-6	HQ < 0.2 ICR = 1E-5	HQ < 0.2 ICR = 7E-6	HQ < 0.2 ICR = 3E-6	HQ < 0.2 ICR = 8E-6	HQ < 0.2 ICR = 2E-5	HQ < 0.2 ICR = 4E-6	HQ < 0.2 ICR = 8E-7	HQ < 0.2 ICR = 3.6E-6
Major Infrequent Construction Worker	1E-06	1	HQ < 1 ICR = 1E-7	HQ < 1 ICR = 5E-7	HQ > 1 ICR = 2E-5	HQ < 1 ICR = 2E-6	HQ < 1 ICR = 5E-7	HQ < 1 ICR = 2E-7	HQ < 1 ICR = 6E-7	HQ < 1 ICR = 1E-6	HQ < 1 ICR = 3E-7	HQ < 1 ICR = 5E-8	HQ = 1.4 ICR = 2.1E-6

Notes:
Risks for the major infrequent construction worker are based on the maximum detected concentration for all areas.
For the typical worker and minor frequent construction workers risks for Sub Areas A1, A2, B1, B2, D, F , and Other are based on maximum detected concentration. Risks for OU3 and Sub Areas A3, A4, and E are based on 95 percent UCL concentration.
Shading indicates that the estimated risks exceed acceptable levels.
The typical worker and minor frequent construction worker are exposed to soils 0 to 4 feet deep, the major infrequent construction worker is exposed to soil 0 to 12 feet deep.
1 - Values represent MPCA acceptable levels. USEPA target risk range is 1E-6 to 1E-4 and target hazard quotient is 1.



DRAWN BY K. PEILA	DATE 7/2/02		CONTRACT NUMBER 6966
CHECKED BY	DATE	SITE LOCATION MAP NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT FRIDLEY, MINNESOTA	APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV 0

P:\GIS\NIROP_FRIDLEY\APR\6966_SOILS.APR SITE LOCATION MAP 7/2/02 KMP



DRAWN BY K. PEILA	DATE 6/26/02		CONTRACT NUMBER 6966
CHECKED BY	DATE	SUB AREA LOCATION MAP NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT FRIDLEY, MINNESOTA	APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 REV 0

P:\GIS\NIROP_FRIDLEY\APR\6966_SOILS.APR PROPOSED PLAN 7/2/02 KMP

ACAD: 6966CP01.dwg 07/01/02 MF PIT

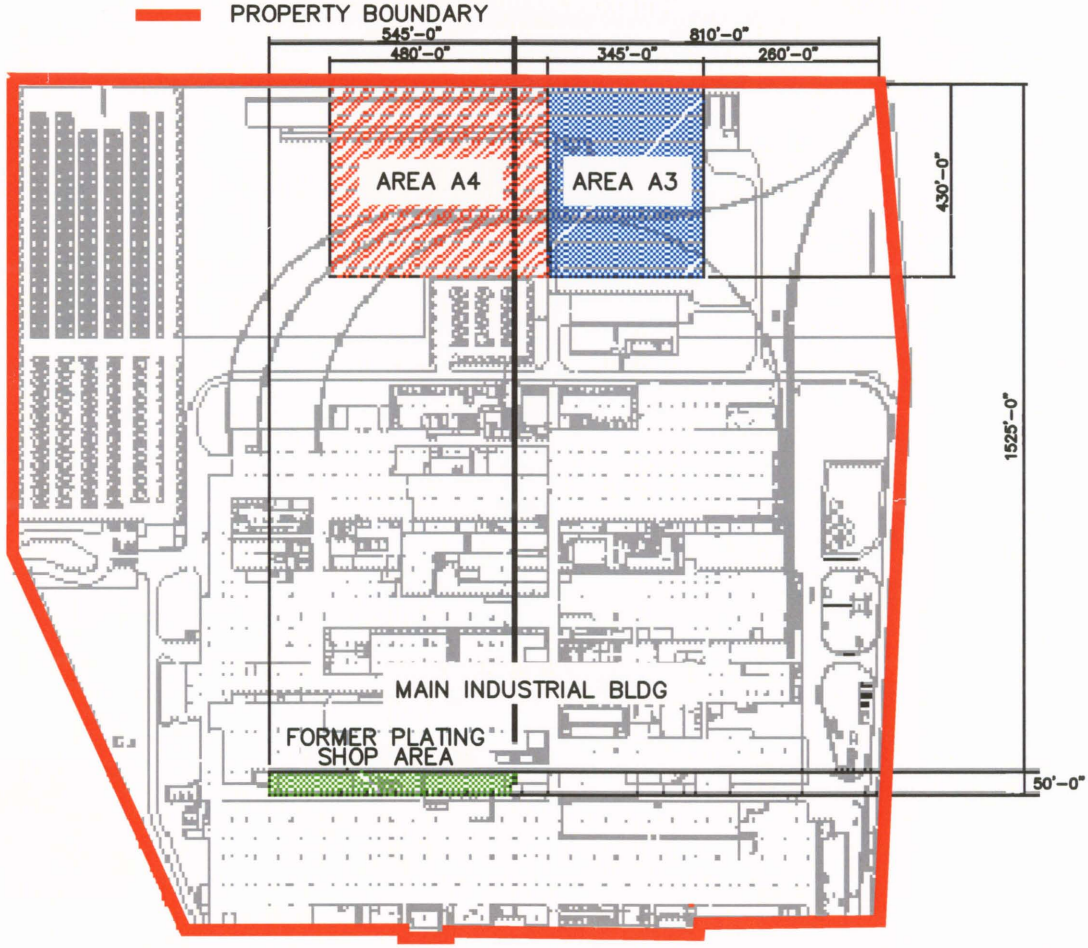
DESIGNATED RESTRICTED AREAS

FORMER PLATING SHOP AREA:
NO DISTURBANCE OF SOILS BELOW CONCRETE PIT FLOORS WITHOUT PRIOR WRITTEN APPROVAL OF EPA AND MPCA.

AREA A3:
NO DISTURBANCE OF SOILS THREE (3) FEET OR GREATER BELOW GROUND SURFACE WITHOUT PRIOR WRITTEN APPROVAL OF EPA AND MPCA.

AREA A4:
NO DISTURBANCE OF SOILS (3) FEET OR GREATER BELOW GROUND SURFACE WITHOUT PRIOR WRITTEN APPROVAL OF EPA AND MPCA.

PROPERTY BOUNDARY



DRAWN BY MF DATE 7/1/02	DEPARTMENT OF THE NAVY NAVFAC SOUTHERN DIV FACILITIES ENGINEERING COMD	DESIGNATED RESTRICTED AREAS NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT FRIDLEY, MINNESOTA	CONTRACT NO. 6966
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED–AREA			APPROVED BY DATE
SCALE NOT TO SCALE			DRAWING NO. FIGURE 3 / REV. 0

FORM CADD NO. SDIV_AV.DWG – REV 0 – 1/20/98