



Minnesota Pollution
Control Agency

PROPOSED PLAN
For Proposed Remedy Changes at Operable Unit 2
The New Brighton/Arden Hills Superfund Site
Ramsey County, Minnesota

PUBLIC COMMENT PERIOD

Written comments will be accepted during the 30-day public comment period, which will occur during the following days:

June 11, 2008 through July 11, 2008

PUBLIC MEETING

The Army will hold a public meeting to explain the Proposed Plan and the proposed changes to the OU2 remedies. Written comments will also be accepted at the meeting. The public meeting will be held:

Date: June 24, 2008

Time: 7:00 PM

Place: Ramsey County Public Works
1425 Paul Kirkwood Dr.
Arden Hills, MN 55112

ADMINISTRATIVE RECORD FILE

For more information, see the Administrative Record file, available at the following location:

Twin Cities Army Ammunition Plant
470 West Highway 96, Suite 100
Shoreview, MN 55126
Hours: 8:00 AM to 3:00 PM
Monday through Friday

For directions call:
651-294-4930

INTRODUCTION

This *Proposed Plan*¹ identifies the United States Army (Army) proposed changes to certain remedies for soil and shallow groundwater contamination in *Operable Unit 2* (OU2) at the New Brighton/Arden Hills (NB/AH) Superfund Site. The site, which is also known as the *Twin Cities Army Ammunition Plant* (TCAAP), is located in Arden Hills, Minnesota. This Proposed Plan was prepared in consultation with the United States Environmental Protection Agency (USEPA) and the Minnesota Pollution Control Agency (MPCA).

The Army's *preferred amended alternatives* address contamination in five OU2 soil sites and one OU2 shallow groundwater site. The original final remedies for all six sites were delineated in the 1997 OU2 *Record of Decision* (ROD). Affected OU2 sites include two shallow soil sites (Sites E and H), one dump site (Site 129-15) and two deep soil sites (Sites D and G) (collectively hereafter referred to as the "soil/dump sites"), as well as Site I shallow groundwater. In addition, this plan identifies the Army's *preferred alternatives* for final remedies for five other OU2 shallow soil sites that were not included in the 1997 ROD (the Grenade Range, Outdoor Firing Range, 135 Primer/Tracer Stormwater Ditch, Trap Range, and Water Tower Area), but where subsequent interim *removal actions* have reduced contamination to below cleanup levels or where further investigations found no evidence of a release of contamination above unrestricted use levels.

Under the authority of the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA), 42 U.S. Code, Section 9601, et seq. and Executive Order 12580, the Army is the lead agency for response actions at this Superfund site. All *remedial actions* are subject to the provisions of the *Federal*

¹Words shown in bold italics are defined in the glossary at the end of the document.

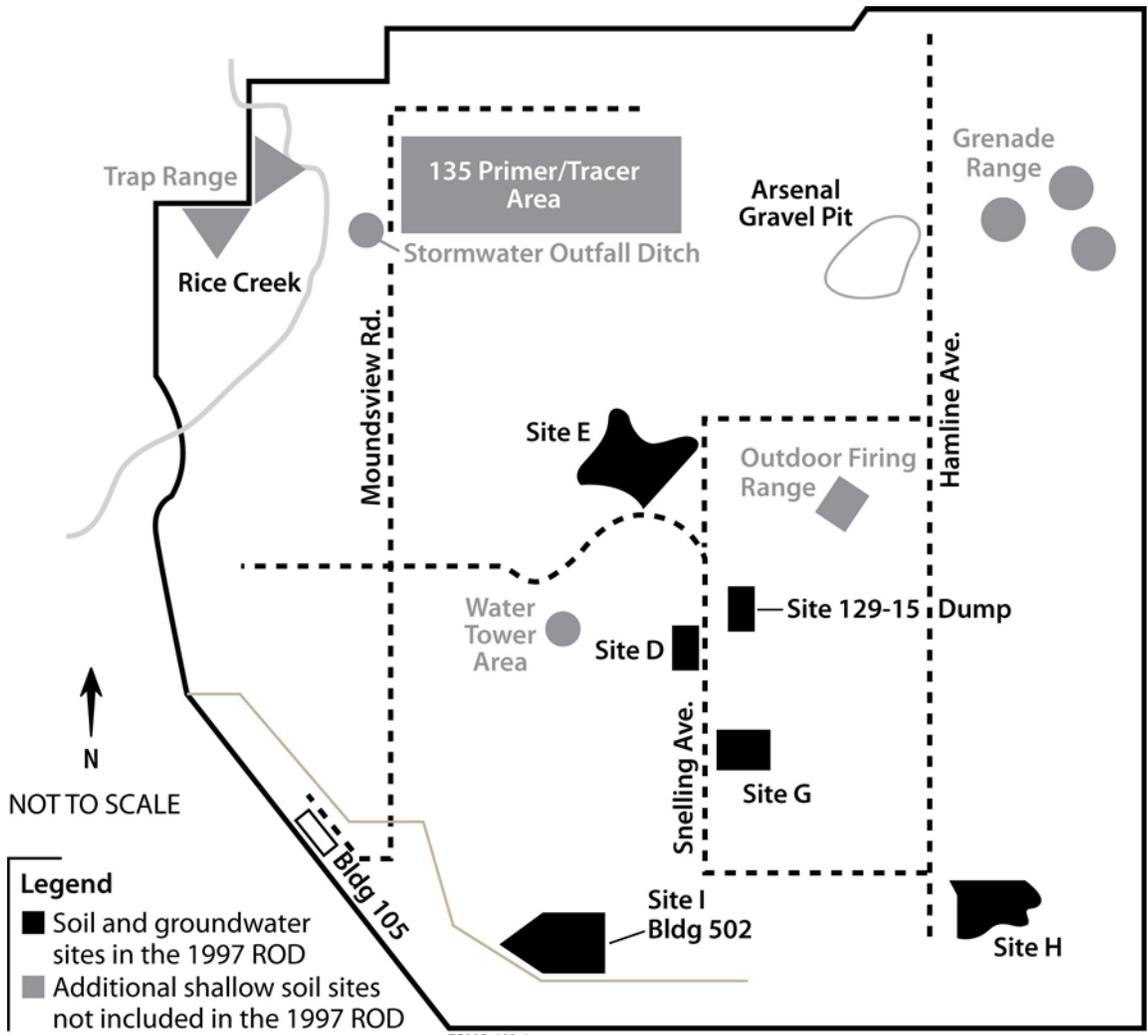


Figure 1. TCAAP Site Layout

¹Words shown in bold italics are defined in the glossary at the end of the document.

In 1997, a ROD was issued for OU2. The ROD identified cleanup remedies for contamination in soils (shallow soils, deep soils, dump sites) and shallow and deep groundwater to restore contamination to below health-based risk cleanup levels. Refer to the 1997 ROD for further discussion of site characteristics, a summary of risks, and **remedial action objectives**. Since the 1997 ROD, subsequent investigations conducted on TCAAP have further characterized site contamination, including investigations conducted following additional remedial activities and/or removal actions, as well as pilot tests and remedial design plans.

Table 1 (pages 12 to 13) summarizes 1997 ROD requirements for each of the six 1997 ROD sites addressed in this Proposed Plan, the results of key investigations and remedial/removal actions at each affected site, and the rationale for any proposed changes or additions to the 1997 remedies based on these findings. It also summarizes key investigation findings and removal actions results for the five shallow soil sites that were not included in the 1997 ROD (because they were still considered operational areas at the time of **remedial investigation** work) and the rationale for any final remedies being considered for these sites.

SCOPE AND ROLE OF THE ACTION

OU2 is one of three OUs identified for the NB/AH site, which are described below.

Operable Unit 1 - OU1 consists of the North Plume of off-TCAAP contaminated groundwater. A 1993 ROD addressed remediation of the North Plume. A 2006 OU1 ROD Amendment sets forth changes in evaluating how to demonstrate the effectiveness of the remedy.

Operable Unit 2 - OU2 consists of on-TCAAP soil, sediment, surface water, and groundwater. The OU2 ROD was issued in 1997 and a ROD amendment (#1) for Site C-2 (a portion of Site C) was finalized in 2007. This Proposed Plan addresses additional changes to five soil/dump sites remedies and to the remedy for Site I shallow groundwater described in the OU2 ROD. It also addresses final remedies for five additional OU2 shallow soil sites not included in the 1997 ROD, but where further investigation or removal work has identified appropriate final remedy needs. For two of these sites (the Grenade Range and Outdoor Firing Range), separate action memoranda were prepared by the Army, approved by MPCA and USEPA, and signed by all three

parties in 1999, selecting excavation, stabilization, and off-site disposal as the approved removal actions at these two sites to address any contamination above cleanup levels established for an industrial setting (see Table 1 for further details). Based on the removal actions completed at these two sites, a final remedy is now proposed for each site.

Operable Unit 3 - OU3 consists of the South Plume of off-TCAAP contaminated groundwater. A ROD was issued for OU3 in September 1992. A 2006 OU3 ROD Amendment was issued to address changes in the extraction and treatment remedy.

SUMMARY OF ALTERNATIVES

This Proposed Plan summarizes remedy changes to those contained in the 1997 OU2 ROD, which are based on information contained in the approved close out/completion reports for each site. The alternatives below were evaluated in detail for the following sites: (1) the five soil/dump sites in the 1997 ROD where remedy change are warranted; (2) Site I shallow groundwater; and (3) the five shallow soil sites not in the 1997 ROD where final remedies are now recommended. Refer to Table 1 for a status of response actions at each of these sites and the rationale for remedy changes proposed in this plan.

In general, the preferred alternatives add the use of land use controls to remedial/removal actions already conducted on site. Because most of these sites have already undergone remedial or removal work to reduce site contamination to acceptable levels, the only other alternative considered for each site in this Proposed Plan was No Further Action (beyond that already required by the 1997 ROD, where applicable).

SOIL/DUMP SITE ALTERNATIVES Sites D, E, G, H, and 129-15

Preferred amended alternatives for the five soil/dump sites (Sites D, E, G, H, 129-15) that were originally addressed in the 1997 ROD focus on the establishment of land use controls *in addition* to previous remedial and/or removal actions already conducted at these sites. Adding land use controls would be further protective of human health and the environment for any contamination remaining on site above health-based risk cleanup levels for contaminants, which were established for an industrial setting. As part of the remedies implemented at all five soil/dump sites, soil covers were constructed over soil areas containing heavy metals, **polychlorinated biphenyls** (PCBs), **polycyclic aromatic hydrocarbons** (PAH), or **asbestos-containing material** (ACM) at concentrations above those needed to enable

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the site to be designated for unrestricted use. Hence, the addition of land use controls would protect the integrity of the soil cover remedies, prohibit unauthorized disturbance of underlying contaminated soils, and restrict future use to industrial use.

Alternative S/D1: No Further Action. Under this alternative, no further action would be taken for the existing soil/dump sites with chemicals of concern concentrations less than the health-based risk cleanup levels. There would be no protection of the soil cover remedies and there would be no land use restrictions. Consequently, this alternative may not be protective of human health if the land use at the site changes. CERCLA 121(c) **5-year reviews** would be conducted because the contamination remaining on site would not allow for unlimited use and unrestricted exposure.

Alternative S/D2: Add Land Use Controls (preferred). This alternative consists of implementing land use controls to protect the integrity of soil covers, prohibit unauthorized disturbance to underlying shallow soils, and restrict the area to industrial use. General land use controls would include actions to be taken by the Army and/or Army National Guard while the property is under federal control. If the property were to be transferred from federal control, then controls would include deed restrictions and state environmental covenants. The existing soil cover remedy would be maintained. Because contaminated soil in excess of health-based risk cleanup levels as well as soil that contains ACM would remain on site in underlying soils below the soil covers, CERCLA 121(c) 5-year reviews would be conducted.

SHALLOW GROUNDWATER

ALTERNATIVES

Site I Shallow Groundwater

The preferred amended alternative for Site I shallow groundwater replaces one component of the 1997 remedy—extraction of Site I shallow groundwater and discharge to a publicly owned treatment works (POTW)—with land use controls that are designed to be fully protective of human health. Based on further investigations and pilot studies conducted on Site I shallow groundwater since 1997, the extraction component of the remedy proved technologically infeasible due to site geology conditions (low permeability soils), which limited groundwater extraction rates, making recovery infeasible. Instead, the existing TCAAP groundwater recovery system (TGRS) being used successfully to treat Unit 3 deep

groundwater, which is directly underneath Site I shallow groundwater, would continue to be used to capture and treat any downward migration of Site I shallow groundwater contamination. Both shallow and deep groundwater is contaminated primarily with *trichloroethene* (TCE) and its breakdown products.

Alternative GW1: Original 1997 ROD Remedy. This alternative would keep in place all components of the original remedy outlined by the 1997 OU2 ROD. These elements include: (1) additional site characterization of Unit 1 and 2 soil and groundwater; (2) use of an existing well to extract impacted Unit 1 groundwater, (3) discharge of extracted groundwater to a POTW, and (4) groundwater monitoring to track remedy performance. Site characterization work has been completed (see Conestoga-Rovers & Associates 1997 *Source Investigation* and 2001 *Dual Phase Vacuum Extraction Pilot Study, Predesign Investigation Report for Site I*). The results of this work showed that the original remedy is not feasible.

Alternative GW2: 2008 Amended Remedy, Amended Extraction/Add Land Use Controls (preferred). The existing Site I shallow groundwater extraction and POTW discharge component in the original 1997 remedy would be removed from the final remedy. In place of this component, land use controls would be put in place to (1) prohibit water supply wells within the contaminated portion of the Unit 1 *plume*; (2) protect the groundwater monitoring infrastructure, and (3) prevent human exposure to contaminated soils that remain beneath Building 502.

SITES NOT INCLUDED IN THE 1997 ROD

The addition of land use controls to two of the five sites not included in the 1997 ROD (the Grenade Range and the Outdoor Firing Range) would serve to provide greater protection to human health and the environment for any hazardous substances, pollutants, or contaminants that may remain on site at levels above those that would allow for unrestricted use or unrestricted exposure. For the other three sites, no action or no further action is needed (see Table 1 for the rationale for these recommendations).

Grenade Range Site

The Grenade Range has been cleaned up to the health-based risk cleanup levels, which are based on an industrial land use scenario.

Alternative GR1: No Further Action. Under this alternative, no further action would be taken for the existing shallow soils with chemicals of concern concentrations less than the health-based risk cleanup

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levels, which are based on an industrial land use scenario. In addition, no land use controls would be implemented to protect the land use as industrial. Consequently, this alternative may not be protective of human health if the land use at the site changes. CERCLA 121(c) 5-year reviews would be conducted because the contamination remaining on site would not allow for unlimited use and unrestricted exposure.

Alternative GR2: Add Land Use Controls (preferred). This alternative consists of implementing land use controls to maintain the land use as industrial. General land use controls would include actions to be taken by the Army and/or Army National Guard while the property is under federal control. If the property were transferred from federal control, then controls would include deed restrictions and state environmental covenants. Because hazardous substances, pollutants, or contaminants would remain on site above levels that allow for unrestricted use and unrestricted exposure, CERCLA 121(c) 5-year reviews would be conducted.

Outdoor Firing Range Site

Alternative OFR1: No Further Action. Under this alternative, no further action would be taken for the existing shallow soils with chemicals of concern concentrations less than the health-based risk cleanup levels. There would be no protection of the soil cover remedy and there would be no land use restrictions. Consequently, this alternative may not be protective of human health if the land use at the site changes. CERCLA 121(c) 5-year reviews would be conducted because the contamination remaining on site would not allow for unlimited use and unrestricted exposure. The cost estimate is based on performing the 5-year reviews six times during a 30-year period.

Alternative OFR2: Add Land Use Controls (preferred). This alternative consists of implementing land use controls to protect the integrity of soil covers, prohibit unauthorized disturbance to underlying shallow soils, and restrict the area to industrial use. General land use controls would include actions to be taken by the Army and/or Army National Guard while the property is under federal control. If the property were to be transferred from federal control, then controls would include deed restrictions and state environmental covenants. Because contaminated soil would remain on site in excess of the health-based risk cleanup levels, CERCLA 121(c) 5-year reviews would be conducted.

135 Primer/Tracer Stormwater Ditch

Alternative PT1: No Further Action (preferred). No further action is necessary at the stormwater outfall and downstream ditch associated with the 135 Primer/Tracer Area. The 2005 removal action at the stormwater outfall and ditch in the Rice Creek Area eliminated the risks and potential risks to human health and the environment; therefore, no further action is necessary. Unacceptable exposures to hazardous substances will not occur. The site is cleaned up for unrestricted use.

Trap Range

Alternative TR1: No Action (preferred). No remedial action is necessary at the Trap Range as the Preliminary Assessment showed that activities associated with this site did not cause unacceptable exposures to hazardous substances.

Water Tower Area

Alternative WT1: No Action (preferred). No remedial action is necessary at the Water Tower Area as previous investigation work showed that activities associated with this site did not cause unacceptable exposures to hazardous substances.

COMPARISON OF ALTERNATIVES

Each of the alternatives for OU2 soil and groundwater contamination contained in this Proposed Plan was evaluated based on seven of the nine NCP evaluation criteria. The remaining two criteria, state and community acceptance will not be completed until comments from this Proposed Plan are received. Evaluation of the overall protection of human health and the environment is based primarily on the predicted ability of the alternatives to achieve the remedial action objectives (RAOs) outlined in the 1997 ROD.

COMPARISON FOR SOIL/DUMP SITES (Sites, D, E, G, H, and 129-15)

Comparison of the Soil/Dump (S/D) Sites alternatives based on NCP evaluation criteria is summarized in Table 2 (page 14) and described below.

Overall Protection of Human Health and the Environment. Alternatives S/D1 (No Further Action) would meet RAOs and be protective of human health and the environment as long as the soil covers remain in place and land use remains unchanged, but would not be protective if the site were used differently and allowed uncontrolled invasive work. S/D2 (Add Land Use Controls) would meet RAOs and be protective of human health and the environment.

¹Words shown in bold italics are defined in the glossary at the end of the document.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs). Both Alternatives S/D1 and S/D2 would comply with all ARARs listed in the 1997 OU2 ROD.

Long-Term Effectiveness and Permanence. The existing soil covers prevent contact with contaminants in the soils/dumps. Alternative S/D2 would have excellent long-term effectiveness and permanence because the land use controls would ensure the integrity of the soil covers and prevent exposure to subsurface soils/dumps from indiscriminate digging. Alternative S/D1 would not be as effective or provide long-term permanence as compared to Alternative S/D2 because there would not be adequate or reliable controls to ensure that site use would remain restricted and would restrict or limit construction into the soil covers.

Reduction of Toxicity, Mobility, or Volume through Treatment. Neither alternative would reduce toxicity, mobility, or volume through treatment. Such treatment is not practical because the dump contents, contaminated shallow soils, and ACMs are already contained.

Short-Term Effectiveness. Alternatives S/D1 and S/D2 would not cause community or site worker risks because there would not be any construction activities involved during implementation of either alternative.

Implementability. This criterion is based on the ability to perform construction and implement administrative actions. Alternative S/D1 would be easy to implement since no action is required. Alternative S/D2 would be administratively implementable; however, establishment of land use controls would require administrative effort.

Cost. The estimated present worth cost would range from \$32,400 for Alternative S/D1 to \$65,100 for Alternative S/D2.

State Acceptance. State acceptance will be evaluated after receipt of any comments on the Proposed Plan and supporting documentation.

Community Acceptance. Community acceptance will be evaluated following receipt and evaluation of all public comments at the conclusion of the public participation process.

COMPARISON FOR SITE I SHALLOW GROUNDWATER

The comparative analysis completed for the Site I shallow groundwater alternatives is summarized in Table 2 and described below.

Overall Protection of Human Health and the Environment. The 2008 Amended Remedy, Alternative GW2 (Amended Extraction/Add Land Use Controls) is protective of human health and the environment due to continued groundwater monitoring, the lack of a completed exposure pathway (prevented through land use controls), and continued operation of the TCAAP groundwater recovery system (TGRS) in the vicinity of Site I. While the affected Site I shallow groundwater is not actively removed, its presence will not harm human health or further damage environmental media. Alternative GW1 (Original 1997 ROD Remedy) would be no more protective than Alternative GW2.

Compliance with ARARs. Because chemicals of concern would remain above cleanup levels in the Site I shallow groundwater within the foreseeable future, Alternative GW2 would take longer to comply with ARARs. However, the time frame to achieve ARARs is not expected to be appreciably different between the two alternatives, given the technical constraints to groundwater extraction. Given the migration of contaminants to the Unit 3 deep groundwater aquifer, where treatment occurs, cleanup levels will be achieved eventually. It is doubtful that Alternative GW1 would achieve ARARs within a much shorter time. Pump and treat remedies typically are expected to require more than 30 years before cleanup levels are met.

Long-Term Effectiveness and Permanence. Alternative GW2 is effective at horizontally containing the shallow groundwater plume, and removing and treating (through the TGRS) contaminants that migrate to the Unit 3 deep groundwater aquifer. Removal and treatment of contaminants by the TGRS is a permanent process. Also, contaminants that break down through natural attenuation are permanently altered. These same processes would have occurred in Alternative GW1. The pilot study proved that shallow groundwater extraction at Site I, required under Alternative GW1, is not effective. Implementation of land use controls in Alternative GW2 would prohibit the potential but unlikely human use of contaminated groundwater over the long-term.

Reduction of Toxicity, Mobility, or Volume through Treatment. Alternative GW1 was expected to reduce the mobility and volume of contaminants by pumping contaminated groundwater from the shallow aquifer. However, pumping Site I shallow groundwater is not feasible because of site geology. This was the only advantage that Alternative GW1 would have been expected to have over Alternative GW2. Consequently, for both alternatives, the volume of contaminants would

¹Words shown in bold italics are defined in the glossary at the end of the document.

be reduced somewhat through the removal of contaminants by the TGRS.

Short-Term Effectiveness. Given that there are fewer components to implement with Alternative GW2, it would have fewer risks and a greater short-term effectiveness than Alternative GW1.

Implementability. A groundwater monitoring program is in place and the characterization of Units 1 and 2 is complete. The requirement of Alternative GW1 is not technically feasible at Site I. Therefore, Alternative GW2 is more readily implementable than Alternative GW1. There will be some administrative effort to establish land use controls under Alternative GW2.

Cost. Alternative GW2 would have a lower cost than Alternative GW1 since the capital cost of constructing the pumping and piping system to extract the shallow groundwater would be removed from the remedy. The costs to operate and maintain the pumping system and to discharge to the POTW for 30 years also would be removed in Alternative GW2. Under GW2, there would be some added administrative costs to establish land use controls.

State Acceptance. State acceptance will be evaluated after receipt and evaluation of any comments on the Proposed Plan and supporting documentation.

Community Acceptance. Community acceptance will be evaluated following receipt and evaluation of all public comments at the conclusion of the public participation process.

COMPARISON FOR SHALLOW SOIL SITES NOT IN THE 1997 ROD

The comparative analysis of the five shallow soil sites not included in the 1997 ROD is summarized in Table 3 (page 15) and described below. The five sites have been subdivided into three groups based on the type of remedy proposed since costs differ from one group to another.

Grenade Range

Overall Protection of Human Health and the Environment. Contaminated soils, that is, soils with concentrations of chemicals of concern greater than the industrial land use based cleanup levels, were previously remediated. Existing conditions meet the RAOs and are protective of human health and the environment. Alternative GR1 (No Further Action) would be protective of human health and the environment if the site remains industrial, but may not be protective if the site were used differently.

Alternative GR2 (Add Land Use Controls) would meet RAOs and ensure protectiveness of human health and the environment by using land use controls to ensure site use is restricted to industrial purposes.

Compliance with ARARs. Both Alternatives GR1 and GR2 would comply with all ARARs.

Long-Term Effectiveness and Permanence. The contaminated soils have been previously remediated. Alternative GR1 may not provide long-term effectiveness or permanence because there would not be adequate or reliable controls to ensure that the site use would remain restricted. Alternative GR2 would have excellent long-term effectiveness and permanence because the land use controls would ensure that site usage would remain industrial.

Reduction of Toxicity, Mobility, or Volume through Treatment. Neither alternative GR1 nor GR2 would reduce toxicity, mobility, or volume through treatment. Such treatment is not applicable because soils with chemicals of concern at concentrations greater than the cleanup levels have already been previously remediated.

Short-Term Effectiveness. Alternatives GR1 and GR2 would not cause community or site worker risks because there would not be any construction activities involved during implementation of either alternative.

Implementability. This criterion is based on the ability to perform construction and implement administrative actions. Alternative GR1 would be easy to implement since no action is required. Alternative GR2 would be administratively implementable; however, establishing land use controls would require administrative effort.

Cost. The estimated present worth cost would range from \$32,400 for Alternative GR1 to \$55,700 for GR2.

State Acceptance. State acceptance will be evaluated after receipt and evaluation of any comments on the Proposed Plan and supporting documentation.

Community Acceptance. Community acceptance will be evaluated following receipt and evaluation of all public comments at the conclusion of the public participation process.

Outdoor Firing Range (OFR)

The comparison of evaluation criteria for Alternatives OFR1 (No Further Action) and Alternative OFR2 (Add Land Use Controls) under consideration for the Outdoor Firing Range is identical to that described for Alternative S/D1 (No Further Action) and S/D2 (Add Land Use Controls) described for the five soil/dump sites included in the 1997 ROD. Refer to that discussion on page 7 as well as the summary of each OFR

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alternative's conformance with evaluation criteria, which is provided in Table 3 (page 15).

135 Primer/Tracer Stormwater Ditch

No further remedial action is necessary at the stormwater outfall and downstream ditch associated with the 135 Primer/Tracer Area. As described in Table 1, about 970 cy of PAH-contaminated sediment were excavated and disposed of off site during a 2005 removal action. The remaining soils were cleaned up to concentrations allowing for unrestricted use. This removal action at the stormwater outfall and ditch eliminated the risks and potential risks to human health and the environment, so that no further action is necessary. As shown in Table 3, this no further action alternative meets all of the first seven evaluation criteria. The alternative meets RAOs, is fully protective of human health and the environment, complies with ARARs, does not require further treatment, has no short-term impacts, and is readily implementable. State and community acceptance of this alternative will be evaluated after all comments on the Proposed Plan are received.

Trap Range and Water Tower Area

No remedial action is required at these sites and both sites can be used for unrestricted use. No remedial action is necessary at the Trap Range since the July 1999 Preliminary Assessment found no evidence that a release of contamination occurred as a result of activities at this site. No remedial action is necessary at the Water Tower Area, since a 1995 investigation following Army removal of some soil and metal confirmed that soil concentrations were below preliminary remediation goals. These investigations confirmed that activities conducted at the Water Tower Area did not cause the site to be contaminated. Therefore, no unacceptable exposure to hazardous substances has occurred at either of these sites.

As shown in Table 3, these no action alternatives both meet all of the first seven evaluation criteria. The no action alternatives meets RAOs, are fully protective of human health and the environment, comply with ARARs, do not require further treatment, have no short-term impacts, and are readily implementable. State and community acceptance of these alternatives will be evaluated after all comments on the Proposed Plan are received.

SUMMARY OF THE PREFERRED ALTERNATIVES

OU2 Soil/Dump Sites – For sites D, E, G, H, and 129-15, land use controls would be implemented to protect the integrity of soil covers, prohibit unauthorized disturbance to underlying shallow soils, and restrict the areas to industrial use. General land use controls would include actions to be taken by the Army and/or Army National Guard while these properties are under federal control. If any of the property were to be transferred from federal control, then controls would include deed restrictions and state environmental covenants. The existing soil cover remedies would be maintained. Site reviews would be conducted every 5 years.

OU2 Site I Shallow Groundwater – The Site I shallow groundwater extraction and POTW discharge component in the original 1997 remedy would be removed from the final remedy. In place of this component, land use controls would be implemented to prohibit water supply wells within the contaminated portion of the Unit 1 plume; protect the groundwater monitoring infrastructure, and prevent human exposure to contaminated soils that remain beneath Building 502. The existing TGRS, which is successfully extracting and treating Unit 3 deep groundwater, would continue to capture and treat any downward migration of Site I shallow groundwater contamination.

Five Additional OU2 Shallow Soil Sites Not in the 1997 ROD – At the Grenade Range, land use controls would be implemented to maintain the land use as industrial. At the Outdoor Firing Range, land use controls would be implemented to protect the integrity of soil covers, prohibit unauthorized disturbance to underlying shallow soils, and restrict the area to industrial use. At both sites, general land use controls would include actions to be taken by the Army and/or Army National Guard while the property is under federal control. If the property were transferred from federal control, then controls would include deed restrictions and state environmental covenants. Because hazardous substances, pollutants, or contaminants may remain on site above levels that allow for unrestricted use and unrestricted exposure, CERCLA 121(c) 5-year reviews would be conducted at both of these sites.

For the remaining three sites, no further action would be conducted at the 135 Primer/Tracer Stormwater Ditch and no actions would be conducted at the Trap Range and the Water Tower Area. All three sites could be used for unrestricted use.

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COMMUNITY PARTICIPATION

The Army provides information about the TCAAP OU2 remediation through public meetings, the Administrative Record file, and announcements in the local newspapers. The dates for the public comment period; the date, location and time of the public meeting; and the location of the Administrative Record file are provided on the front page of this Proposed Plan. The Administrative Record file contains a list of documents containing findings and recommendations pertaining to remedy changes and remedy additions identified in this Proposed Plan.

The USEPA, in consultation with the MPCA, will make a final decision on the changes to the remedy for OU2 after the public has had an opportunity to comment. Public comment may lead the USEPA and MPCA to modify the proposed changes to the remedy. Therefore, the public is encouraged to gain a more comprehensive understanding of the site and comment on this Proposed Plan during the public comment period. All written comments received during the public comment period will be considered in making a final decision.

All written comments received will be addressed in a responsiveness summary, which will be included as part of the ROD Amendment, and will become part of the site's Administrative Record, in accordance with Section 300.825(a)(2) of the NCP, after the ROD Amendment is signed.

Comments or questions about any of the information presented in this Proposed Plan may be directed to:

Mike Fix
Commander's Representative
Twin Cities Army Ammunition Plant
(651) 294-4930

GLOSSARY

Administrative Record: A body of documents USEPA uses to form the basis for selection of a response.

Alternative: An option for reducing site risk by cleaning up or otherwise limiting exposure to contamination.

Annual Cost: The annual cost and time frame of operating labor, maintenance, materials, energy, disposal, and administrative activities, including 5-year reviews of the remedy.

Applicable or Relevant and Appropriate Requirements (ARARs): Federal, state, and local environmental and public health laws with which remedial action alternatives must comply.

Asbestos-Containing Material (ACM): Construction materials containing more than 1 percent asbestos by weight. Management and disposal is regulated under the Toxic Substances Control Act.

Capital Costs: Expenses related to the labor, equipment, and material costs of construction.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and revised in 1986 by the Superfund Amendments and Reauthorization Act (SARA). CERCLA created a special tax that goes into a trust fund, commonly known as "Superfund," to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Federal Facility Agreement: An agreement between a department of the federal government, USEPA and the state that facilitates the cleanup of a federally owned facility.

Five-Year Reviews: Section 121 of CERCLA, as amended by SARA, requires that remedial actions that result in any hazardous substances, pollutants, or contaminants remaining at a site be subject to a 5-year review. The NCP further provides that remedial actions that result in any hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to ensure protection of human health and the environment.

Land Use Controls: Legal restriction to control or restrict present and future use.

National Oil and Hazardous Substances Contingency Plan (NCP): The USEPA's regulation governing all cleanups under the Superfund program.

National Priorities List (NPL): USEPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response.

Operable Unit (OU): A distinct portion of a Superfund site or a distinct action at a Superfund site. A number of OUs can be used in the course of a site cleanup.

Plume: The area of contamination within groundwater.

Polychlorinated Biphenyl (PCB): A group of toxic, persistent chemicals used as insulators and coolants in transformers and capacitors. Further sale or new use was banned by law in 1979.

Polycyclic Aromatic Hydrocarbon (PAH): A group of compounds formed during the incomplete burning of

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fuels, such coal, oil, and gas. Some of these compounds are highly toxic after long-term exposure.

Preferred Alternative or Preferred Amended Alternative: Out of all the alternatives considered, the preferred alternative is the alternative that is proposed to remediate the site.

30-Year Present Worth Cost: An analysis of the current value of all costs. Also known as Net Present Worth, the Present Worth Cost is calculated on a 30-year time period and a pre-determined interest rate.

Proposed Plan: A document requesting public input on a proposed remedial alternative.

Record of Decision (ROD): A document that is a consolidated source of information about the site, the remedy selection process, and the selected remedy for a cleanup under CERCLA.

Remedial Action: The remedial action is the actual construction or implementation of the remedy

Remedial Action Objective (RAO): Medium-specific (for example, soil, sediment, groundwater, surface water) goals for protecting human health and the environment.

Remedial Investigation: A study to determine the nature and extent of contamination at a hazardous waste site.

Removal Action: A removal action is usually a short-term effort designed to stabilize or cleanup a hazardous waste site that poses an immediate threat to human health, or the environment.

Trichloroethene (TCE): A semi-volatile organic compound used as a cleaning solvent. It is considered carcinogenic.

Twin Cities Army Ammunition Plant (TCAAP): Facility constructed by the federal government in 1941 to produce small-caliber ammunition for the United States military.

Volatile Organic Compound (VOC): A group of compounds that have a tendency to evaporate when exposed to air. VOCs disappear more rapidly from surface water than groundwater, since groundwater does not usually come in contact with air. When present in drinking water, some VOCs pose a potential threat to human health. Some VOCs are believed to cause cancer in humans.

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**TABLE 1
STATUS OF AFFECTED OU2 SOILS/GROUNDWATER SITES INCLUDED IN THIS PROPOSED PLAN**

STATUS OF AFFECTED OU2 SOILS/GROUNDWATER SITES INCLUDED IN THE 1997 ROD			
OU2 Site / Medium	1997 OU2 ROD Remedy	Status of Investigation Results and/or Remedial/Removal Actions	Proposed Remedy Additions or Changes/Rationale for Preference
Site E Shallow Soil	Excavate, stabilize, and off-site dispose of contaminated shallow soils.	Remedial actions conducted from 1999 to 2001 excavated and disposed of approximately 20,900 cy of metals-contaminated soils off site. Cleanup levels were based on an industrial land use scenario. A soil cover was constructed over the Area E1-2 west dump to contain ACM.	Declaration that the cover construction is part of the final remedy, with the addition of land use controls to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the cover area and remediated areas to industrial use.
Site H Shallow Soil	Excavate, stabilize, and off-site dispose of contaminated shallow soils.	Remedial actions conducted from 1999 to 2001 excavated and disposed of approximately 8,620 cy of contaminated soils off site. Cleanup levels were based on an industrial land use scenario. A soil cover was constructed over the Area H1-3 dump to contain debris and ACM.	Declaration that the cover construction is part of the final remedy, with the addition of land use controls to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the cover area and remediated areas to industrial use.
Site 129-15 Dump Site	Characterize the dump to determine its contents. If contents are found to be toxic, hazardous, or contaminated, identify a remedy for the landfill and document the remedy in a post-ROD amendment. If not, a no further action remedy would be employed.	Dump contents were characterized during a 1998 investigation and found to be contaminated primarily with polycyclic aromatic hydrocarbons (PAHs). A soil cover was constructed during a 2001 removal action to contain the dump contents.	Declaration that the cover construction is part of the final remedy, with the addition of land use controls to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to industrial use.
Site D Deep Soil	Following completion of the soil vapor extraction (SVE) remediation of deep soils, characterize Site D shallow soil to determine the appropriate action needed.	During a 1985 interim remedial action, 1,470 cy of soils contaminated with polychlorinated biphenyls (PCB) were incinerated on site. Some backfilled soil has PCB concentrations exceeding unrestricted use levels, but it is covered by clean soil. An SVE remedial action operated from 1986 to 1998 to extract and treat trichloroethene (TCE). A 2000 investigation confirmed the SVE system could be discontinued. 2001 investigation results indicated concentrations of lead, antimony, and nitroglycerine in shallow soils exceeded the industrial use based cleanup levels. In 2002, 1,300 cy of contaminated soils were excavated, stabilized, and transported to an off-site landfill for disposal.	Declaration that the removal actions and soil cover to contain and restrict contact with PCB-contaminated soils are part of the final remedy for the site, with the addition of land use controls to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the soil cover area and remediated areas to industrial use.
Site G Deep Soil	Following completion of the SVE remediation of deep soils, characterize Site G dump to determine appropriate action.	An SVE remedial action operated from 1986 to 1998 to extract and treat chlorinated solvents. A clay layer was constructed for the SVE system. A 2000 investigation confirmed the SVE system could be discontinued. The TCE cleanup level was revised to reflect existing conditions (the presence of the clay cap). Based on a review and evaluation of information from the 1983 to 2000 investigations, the Site G dump was characterized as industrial solid waste and delineated as required. A 2003 removal action constructed a soil cover to contain the dump contents.	Documentation of a revision to the TCE cleanup level in soil, declaration that the dump cover construction is part of the final remedy, with the addition of land use controls to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the cover area and remediated areas to industrial use.

¹Words shown in bold italics are defined in the glossary at the end of the document.

STATUS OF AFFECTED OU2 SOILS/GROUNDWATER SITES INCLUDED IN THE 1997 ROD

OU2 Site / Medium	1997 OU2 ROD Remedy	Status of Investigation Results and/or Remedial/Removal Actions	Proposed Remedy Additions or Changes/Rationale for Preference
Site I Groundwater Shallow Groundwater	Perform groundwater monitoring, extract Unit 1 groundwater and discharge to a publicly owned treatment works (POTW). Perform additional characterization of the Unit 1 and Unit 2 soil and groundwater.	The required characterization was completed in 1997. A 2000 pilot study for groundwater and/or vapor extraction determined that the low permeability soils make extraction infeasible. Monitoring has shown that contaminant concentrations are decreasing and minimal downward migration is contained by the TCAAP Groundwater Recovery System (TGRS) Unit 3 (deep) groundwater remedy, which extracts and treats VOC contaminated water with granular activated carbon.	Remove the groundwater extraction and POTW discharge component from the remedy. Continue to rely on the TGRS as a component of the remedy. Implement land use controls to (1) prohibit water supply wells within the plume, (2) protect the groundwater monitoring infrastructure, and (3) to prevent human exposure to contaminated soils beneath Building 502.

STATUS OF OU2 SHALLOW SOILS SITES NOT INCLUDED IN THE 1997 ROD

OU2 Site / Medium	1997 OU2 ROD Remedy	Status of Investigation Results and/or Remedial/Removal Actions	Site Status/Needs
Grenade Range Shallow Soil	No remedy selected.	Unexploded ordnance (UXO) was removed in a 1993 removal action. During a 1999 removal action, about 2,180 cy of metals-contaminated soil were excavated and disposed of off site. Site cleanup levels were selected based upon an industrial land use scenario.	Declaration that the removal actions constitute the final remedy for the site with the addition of land use controls that restrict area to industrial use.
Outdoor Firing Range Shallow Soil	No remedy selected.	UXO was removed in a 1993 removal action. During a 1999 removal action, about 990 cy of metal-contaminated soils were excavated and disposed of off site. A soil cover was constructed at the 1,900 Yard Range in 2003-2004 over soils contaminated with polycyclic aromatic hydrocarbons (PAHs). Site cleanup levels were based on an industrial land use scenario.	Declaration that the removal actions and cover construction constitute the final remedy for the site with the addition of land use controls to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to industrial use.
135 Primer/ Tracer Area Stormwater Ditch Shallow Soil	No remedy selected.	During a 2005 removal action, about 970 cy of PAH-contaminated sediment were excavated and disposed of off site. The remaining soils were cleaned up to concentrations allowing for unrestricted use.	Declaration that the removal actions constitute the final remedy for the ditch (No Further Action). The ditch can be used for unrestricted use.
Trap Range Shallow Soil	No remedy selected.	A preliminary assessment was conducted in July 1999, which found no evidence that a release to soil or sediment, air, groundwater, or surface water has occurred as a result of activities at this site.	No Action. The Trap Range can be used for unrestricted use.
Water Tower Area Shallow Soil	No remedy selected.	A July 1990 investigation at this site concluded that the metal turnings could be left in place because soil was determined to be non-hazardous. Although the soil/metal presented no known health, safety, or environmental threat, the Army completed physical removal of soil and metal from the area in 1993. A 1995 investigation confirmed that soil concentrations were below preliminary remediation goals.	No Action. The Water Tower Area can be used for unrestricted use.

¹Words shown in bold italics are defined in the glossary at the end of the document.

TABLE 2
SUMMARY OF COMPARATIVE ANALYSIS OF AMENDED REMEDIAL ALTERNATIVES
FOR AFFECTED OU2 SOIL/DUMP SITES AND SITE I SHALLOW GROUNDWATER

EVALUATION CRITERIA ¹	SOIL/DUMP SITES		GROUNDWATER SITES	
	(Sites D, G, E, H, and 129-15 ONLY)		(SITE I SHALLOW GROUNDWATER ONLY)	
	ALTERNATIVE S/D1	ALTERNATIVE S/D2	ALTERNATIVE GW1	ALTERNATIVE GW2
	NO FURTHER ACTION	ADD LAND USE CONTROLS	ORIGINAL 1997 ROD REMEDY	2008 AMENDED REMEDY
Overall Protection of Human Health and the Environment	May not be protective of human health and the environment. ² Meets RAOs.	Protective of human health and the environment. Meets RAOs.	Equally protective of human health and the environment. Meets RAOs.	Equally protective of human health and the environment. Meets RAOs.
Compliance with ARARs	Complies with all ARARs.	Complies with all ARARs.	May take slightly less long to comply with ARARs.	Would take longer – but not significantly longer – to comply with ARARs.
Long-Term Effectiveness and Permanence	Moderate effectiveness and long-term permanence.	High long-term effectiveness and permanence.	Equal long-term effectiveness and permanence.	Equal long-term effectiveness and permanence.
Reduction of Toxicity, Mobility, or Volume through Treatment	Alternative does not include treatment. ³	Alternative does not include treatment. ³	Extraction of Site I shallow groundwater is not technically feasible; therefore, it has no effect on the reduction of toxicity, mobility, or volume through treatment. Use of the TGRS would reduce the volume of contaminants.	Use of the TGRS would reduce the volume of contaminants.
Short-Term Effectiveness	No short-term impacts.	No short-term impacts.	More short-term impacts.	Less short-term impacts.
Implementability	Readily implementable since no action would be taken.	Administratively implementable; establishment of land use controls would require administrative effort.	Less implementable, since groundwater extraction is not technically feasible.	More implementable. Some administrative effort because the remedy would include establishment of land use controls.
Present Worth Cost	\$32,400	\$65,100	Higher cost.	Lower cost.
State Acceptance	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.
Community Acceptance	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.

1. The final two criteria, state acceptance and community acceptance, will be evaluated after a review of any comments on the Proposed Plan.
2. Would be protective of human health and the environmental as long as the soil cover remained in place and land use remained unchanged; would not be protective if the site were used differently and allowed uncontrolled invasive work.
3. Treatment to reduce toxicity, mobility, or volume through treatment is not practical, since, dump, contaminated soil, and/or ACM contents are contained.

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**TABLE 3
SUMMARY OF COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES FOR SITES NOT IN THE 1997 ROD**

EVALUATION CRITERIA	GRENADE RANGE		OUTDOOR FIRING RANGE		135 PRIMER / TRACER STORMWATER DITCH	TRAP RANGE SITE; WATER TOWER AREA
	ALTERNATIVE GR1	ALTERNATIVE GR2	ALTERNATIVE OFR1	ALTERNATIVE OFR2	ALTERNATIVE PT1	ALTERNATIVES TR1/WT1
	NO FURTHER ACTION	ADD LAND USE CONTROLS	NO FURTHER ACTION	ADD LAND USE CONTROLS	NO FURTHER ACTION	NO ACTION
Overall Protection of Human Health and the Environment	May not be protective of human health and the environment. ¹ Meets RAOs.	Protective of human health and the environment. Meets RAOs.	May not be protective of human health and the environment. ¹ Meets RAOs.	Protective of human health and the environment. Meets RAOs.	Protective of human health and the environment. Meets RAOs.	Protective of human health and the environment. Meets RAOs.
Compliance with ARARs	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.
Long-Term Effectiveness and Permanence	Moderate effectiveness and long-term permanence. ²	High long-term effectiveness and permanence.	Moderate effectiveness and long-term permanence. ²	High long-term effectiveness and permanence.	High effectiveness and permanence.	High effectiveness and permanence.
Reduction of Toxicity, Mobility, or Volume through Treatment	Alternative does not include treatment. ³	Alternative does not include treatment. ³	Alternative does not include treatment. ⁴	Alternative does not include treatment. ⁴	Treatment not required. ⁵	Treatment not required.
Short-Term Effectiveness	No short-term impacts.	No short-term impacts.	No short-term impacts.	No short-term impacts.	No short-term impacts.	No short-term impacts.
Implementability	Readily implementable since no further action would be taken.	Administratively implementable; land use controls would require administrative effort..	Readily implementable since no further action would be taken.	Administratively implementable; land use controls would require administrative effort.	Readily implementable.	Readily implementable.
Present Worth Cost	\$32,400	\$55,700	\$32,400	\$65,100	\$0	\$0
State Acceptance	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.
Community Acceptance	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.	Pending review of Proposed Plan.

1. Would be protective of human health and the environmental as long as the land use remained unchanged (i.e, the site remains industrial), but may not be protective if the site were used differently and allowed uncontrolled invasive work.
2. May not provide long-term effectiveness or permanence because there would not be adequate or reliable controls to ensure that site usage would remain as restricted.
3. Treatment is not required since soils with chemicals of concern contamination greater than cleanup levels were previously remediated.
4. Treatment to reduce toxicity, mobility, or volume through treatment is not practical, since PAH-contaminated soil is contained by the use of a soil cover.
5. No treatment required since previous PAH-contaminated soils cleanup occurred to concentrations allowing for unrestricted use.

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