FEDERAL FACILITIES AGREEMENT

(FFA)

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LIST OF ACRONYMS AND ABBREVIATIONS

AGREEMENT - Federal Facilities Agreement

CERCLA - Comprehensive Environmental Response, Compensation and Liability Act

CRP - Community Relations Plan

DERP - Defense Environmental Restoration Program

DOD - Department of Defense

DRC - Designated Resolution Committee

FCC - Federal Cartridge Corporation

FS - Feasibility Study

IRA - Interim Remedial Actions

MDH - Minnesota Department of Health

MPCA - Minnesota Pollution Control Agency

NCP - National Contingency Plan

NOV - Notice of Violation

RCRA - Resource Conservation and Recovery Act

RFRA - Request for Response Action

RI - Remedial Investigation

SARA - Superfund Amendments and Reauthorization Act of 1986

TCAAP - Twin Cities Army Ammunition Plant

U.S. EPA - U.S. Environmental Protection Agency

VOC - volatile organic compound

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V
AND THE
MINNESOTA POLLUTION CONTROL AGENCY

IN THE MATTER OF:	)	
The U.S. Department of Defense's Twin Cities Army Ammunition Plant, Arden Hills, Minnesota and Impacted Environs	)	FEDERAL FACILITY AGREEMENT UNDER CERCLA SECTION 120
	)	Administrative Docket Number:

Based on the information available to the Parties on the effective date of this FEDERAL FACILITY AGREEMENT (Agreement), and without trial or adjudication of any issues of fact or law, the Parties hereto agree and it is hereby agreed as follows:

I.

Jurisdiction

Each Party is entering into this Agreement pursuant to the following authorities:

(i) The U.S. Environmental Protection Agency (U.S. EPA), Region V, enters into those portions of this Agreement that relate to the remedial investigation/feasibility study (RI/FS) pursuant to Section 120(e)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §9620(e)(1), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. 99-499 (hereinafter jointly referred to as CERCLA/SARA) and the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §6901 et seq;

(ii) U.S. EPA, Region V, enters into those portions of this Agreement that relate to interim remedial actions and final

remedial actions pursuant to Section 120(e)(2) of CERCLA/SARA and RCRA;

(iii) the Army enters into those portions of this Agreement that relate to the RI/FS pursuant to Section 120(e)(1) of CERCLA, RCRA, the Defense Environmental Restoration Program (DERP), 10 U.S.C. §2701 et seq., and Executive Order 12580;

(iv) the Army enters into those portions of this Agreement that relate to interim remedial actions and final remedial actions pursuant to Section 120(e)(2) of CERCLA/SARA, RCRA, DERP and Executive Order 12580.

(v) the Minnesota Pollution Control Agency (MPCA) enters into this Agreement pursuant to CERCLA/SARA, RCRA, and Minnesota Stats., chs. 115, 115B, and 116.

Pursuant to Section 120(a) of CERCLA/SARA, the Army agrees that it is bound by this Agreement and that its terms may be enforced against it pursuant to Part XXXVII of this Agreement.

II.

U.S. EPA AND MPCA DETERMINATIONS

A. On the basis of the results of the testing and analyses described in the Statement of Facts, infra, and U.S. EPA and MPCA files and records, the U.S. EPA and the MPCA have determined that:

(1) the Twin Cities Army Ammunition Plant (TCAAP) located at Arden Hills, Minnesota constitutes a facility within the meaning of 42 U.S.C. §9601(9) and Minn. Stat. §115B.02, subd. 5;

(2) hazardous substances, pollutants or contaminants within

the meaning of 42 U.S.C. §§9601 (14) and (33) and 9604 (a)(2) and Minn. Stat. §115B.02, subds. 8, 9 and 13, have been disposed of at TCAAP;

(3) there have been releases and there continue to be releases and threatened releases of hazardous substances, pollutants or contaminants into the environment within the meaning of 42 U.S.C. §§9601 (22), 9604, 9606 and 9607 and Minn. Stat. §115B.02, subd. 15, at and from TCAAP;

(4) with respect to those releases and threatened releases, U.S. Army is a responsible person within the meaning of 42 U.S.C. §9607 and Minn. Stat. §§115B.03, 115B.17 and 115B.18;

(5) the actions to be taken pursuant to this Agreement are reasonable and necessary to protect the public health or welfare or the environment; and

(6) a reasonable time for beginning and/or completing the actions required by this Agreement has been provided.

The U.S. EPA and MPCA have determined that the Submittals, actions, and other elements of work required by this Agreement are necessary to protect the public health and welfare, and the environment.

B. The U.S. EPA and MPCA have also determined that:

(1) TCAAP includes certain facilities authorized to operate under Section 3005(a) of RCRA, 42 U.S.C. §6925(a);

(2) TCAAP as shown on Attachment 1A constitutes a facility within the meaning of Section 3004 of RCRA, 42 U.S.C. §6924 and Minnesota Rules Part 7045. 0020, Subp. 24;

(3) The U.S. Army is the owner of the TCAAP facility.

III.

Parties

The Parties to this Agreement are the U.S. EPA, MPCA and the Army. The terms of this Agreement shall apply to and be binding upon the U.S. EPA, the MPCA, their agents, employees and response action contractors for the Site and the Army, its agents, employees, response action contractors for the Site and all subsequent owners, operators and lessees of TCAAP. The Army will notify U.S. EPA and MPCA of the identity and assigned tasks of each of its contractors performing work under this Agreement upon their selection. This Agreement shall be enforceable against all of the foregoing via the Parties to this Agreement. This Part shall not be construed as an agreement to indemnify any person. The Army shall notify its agents, employees, response action contractors for the Site, and all subsequent owners, operators and lessees of TCAAP of the existence of this Part. Each undersigned representative of a Party certifies that he or she is fully authorized to enter into the terms and conditions of this Agreement and to legally bind such Party to this Agreement.

IV.

Definitions

Except as noted below or otherwise explicitly stated, the definitions provided in CERCLA and SARA shall control the meaning of the terms used in this Agreement.

In addition:

A. "Authorized representative" may include a Party's

contractors acting in any capacity, including an advisory capacity.

B. "CERCLA" or "CERCLA/SARA" shall mean the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601 et seq, as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499.

C. "Consistency Test" shall mean a review by U.S. EPA and MPCA to determine whether an activity or element of work undertaken or performed pursuant to this Agreement including a document, Submittal, contract or action developed or taken pursuant to this Agreement meets all appropriate procedural and substantive objectives, standards and requirements set forth pursuant to promulgated State laws and regulations, CERCLA/SARA, the National Contingency Plan (NCP), RCRA, U.S. EPA guidelines, regulations, rules, criteria, national Superfund policy and Superfund practices in effect at the time of performance of the activity or element of work. These standards shall be applied by U.S. EPA and MPCA in the same manner and to the same extent that such standards are applied to any nongovernmental entity or facility.

D. "Days" shall mean calendar days, unless business days are specified. Any Submittal, Written Notice of Position or written statement of dispute that under the terms of this Agreement would be due on a Saturday, Sunday or holiday shall be due on the following business day.

E. "Determination of Consistency" or "passing the Consistency Test" shall mean that an item subjected to the Consistency Test meets or exceeds the standards applied pursuant to such Test.

F. "Feasibility Study" or "FS" means that study which fully evaluates and develops remedial action alternatives to prevent or mitigate the migration or the release of hazardous substances, pollutants or contaminants at and from the Site.

G. "Agreement" shall refer to this document and shall include all Attachments to this document. All such Attachments shall be appended to and made an integral and enforceable part of this document.

H. "Interim Remedial Actions" or "IRA" shall mean all discrete response actions implemented prior to a final remedial action which are consistent with the final remedial action and which are taken to prevent or minimize the release of hazardous substances, pollutants or contaminants so that they do not migrate or endanger public health, welfare or the environment. All interim remedial actions shall be undertaken in accordance with 40 CFR Part 300.68 and with the requirements of CERCLA/SARA.

I. " MPCA" shall mean the Minnesota Pollution Control Agency, its employees and authorized representatives.

J. "Remedial Investigation" or "RI" means that investigation conducted to fully determine the nature and extent of the release or threat of release of hazardous substances, pollutants or

contaminants and to gather necessary data to support the feasibility study and endangerment assessment (to be conducted by U.S. EPA).

K. "RCRA" shall mean the Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., as amended by the Hazardous and Solid Waste Amendments of 1984, Pub. L. 98-616.

L. "Site" shall include TCAAP and any other areas contaminated by the migration of a hazardous substance, pollutant or contaminant from TCAAP as discussed in Part V of this Agreement. The term shall have the same meaning as "facility" as defined by Section 101(9) of CERCLA/SARA, 42 U.S.C. §9601(9).

M. "Submittal" shall mean every document, report, schedule, deliverable, work plan or other item to be submitted to U.S. EPA or MPCA pursuant to this Agreement.

N. "TCAAP" shall mean the Twin Cities Army Ammunition Plant located in Ramsey County in Minnesota, including all Areas identified in Attachment 1A.

O. "timetables and deadlines" shall mean schedules as well as that work and those actions which are to be completed and performed in conjunction with such schedules (including performance of actions established pursuant to the dispute resolution procedures set forth in Part XV of this Agreement).

P. " U.S. Army" or "Army" shall mean the U.S. Army, its employees, contractors, agents, successors, assigns and authorized

representatives as well as the Department of Defense (DOD), to the extent necessary to effectuate the terms of this Agreement, including, but not limited to, appropriations and Congressional reporting requirements.

Q. " U.S. EPA" shall mean the United States Environmental Protection Agency, its employees and authorized representatives.

R. "Written Notice of Position" shall mean a written statement by a Party of its position with respect to any matter which any other Party may dispute pursuant to Part XV of this Agreement.

V.

Site

For the purposes of this Agreement, the approximately twenty-five (25) square mile area where ground water is contaminated by volatile organic compounds (VOC) as identified on Attachment 1, shall constitute the Twin Cities Army Ammunition Plant/New Brighton/ Arden Hills/St. Anthony Area Site (hereafter referred to as the Site). The U.S. EPA and the MPCA Director may change the Site designation on the basis of additional investigations including the Phase 1A study performed by U.S. EPA and the MPCA, and the Site Remedial Investigation performed by the Army, as described in Part X below and Attachment 3, to more accurately reflect the areas contaminated by VOCs, other hazardous substances, pollutants or contaminants, or radiological wastes related in whole or in any part to the TCAAP. The work

to be performed under this Agreement will conform to the definition of the Site as established by the U.S. EPA and the MPCA Director.

TCAAP lies within the boundaries of the current Site. TCAAP is approximately four (4) square miles in area and is located in T30N, R23W, Sections 9, 10, 15 and 16, Ramsey County, Minnesota (see Attachment 1).

VI.

Purpose

A. The general purposes of this Agreement are to:

(1) ensure that the environmental impacts associated with past and present activities at the TCAAP are thoroughly investigated and appropriate remedial action taken as necessary to protect the public health, welfare and the environment;

(2) establish a procedural framework and schedule for developing, implementing and monitoring appropriate response actions at the Site in accordance with CERCLA/SARA, the NCP, Superfund guidance and policy, RCRA, RCRA guidance and policy; and,

(3) facilitate cooperation, exchange of information and participation of the Parties in such actions.

B. Specifically, the purposes of this Agreement are to:

(1) Identify Interim Remedial Action (IRA) alternatives which are appropriate to prevent the further migration of contaminated groundwater prior to the implementation of final remedial action(s) for the Site. IRA alternatives shall be

identified and proposed to the Parties as early as possible prior to final selection of IRAs by U.S. EPA pursuant to CERCLA/SARA. This process is designed to promote cooperation among the Parties in identifying IRA alternatives prior to selection of final IRAs by U.S. EPA.

(2) Establish requirements for the performance of an on TCAAP RI to determine fully the nature and extent of the threat to the public health or welfare or the environment caused by the release and threatened release of hazardous substances, pollutants or contaminants at TCAAP and to establish requirements for the performance of a FS for the Site to identify, evaluate, and select alternatives for the appropriate remedial action(s) to prevent, mitigate, or abate the release or threatened release of hazardous substances, pollutants or contaminants at the Site in accordance with CERCLA/SARA.

(3) Identify the nature, objective and schedule of response actions to be taken at the Site. Response actions at the Site shall attain that degree of clean up of hazardous substances, pollutants or contaminants mandated by CERCLA/SARA.

(4) Implement the selected interim and final remedial action(s) in accordance with CERCLA/SARA.

(5) Assure compliance with federal and state hazardous waste laws and regulations for matters covered by this Agreement.

The Parties recognize that on-going operations at TCAAP require the issuance of permits under Section 3005 of RCRA, 42 U.S.C. §6925, and federal hazardous waste regulations

found at 40 CFR Parts 260 through 271, and under Minn. Stat. §116.07, Subd. 4b, Section 116.081, and Minn. Rules Chapters 7001 and 7045. This Agreement does not affect the requirement to obtain federal and state hazardous waste permits for activities at TCAAP unrelated to this Agreement. However, the Parties do intend that actions conducted in accordance with this Agreement will be deemed to satisfy the currently promulgated corrective action requirements of Section 3004(u) and (v) of RCRA, 42 U.S.C. §6924(u) and (v), for a RCRA permit, and Section 3008(h), 42 U.S.C. §6928(h), for interim status facilities and requirements of State law. The above-mentioned requirements and any other promulgated corrective action requirements that are in effect at the time of selection of remedial action shall be considered ARARs in accordance with §121 of CERCLA/SARA. At the time a permit is issued to the Army for on-going hazardous waste management activities at the TCAAP, U.S. EPA and the MPCA Director shall reference and incorporate any appropriate provisions, including appropriate schedules and deadlines (and the provision for extension of such schedules and deadlines), of this Agreement into such permit. The Parties intend that the review of any permit conditions which reference this Agreement shall, to the extent authorized by law, only be reviewed under the provisions of CERCLA/SARA.

Nothing in this Agreement shall alter the Army's authority with respect to removal actions conducted pursuant to Section 104 of CERCLA/SARA, 42 U.S.C. §9604.

VII.

Determination of Facts

For purposes of this Agreement, the following constitutes a summary of the facts upon which this Agreement is based. None of the facts related herein shall be considered admissions by any Party. This Part contains a determination of facts, determined solely by the U.S. EPA and MPCA, and shall not be used by any person related or unrelated to this Agreement for purposes other than determining the basis of this Agreement.

1. The United States acquired approximately four (4) square miles of farmland and commenced construction of the TCAAP in 1941. TCAAP has operated consistently since 1942, mainly for arms manufacture.

2. Eighteen (18) inch and twenty-four (24) inch forcemain sewer lines connect TCAAP to the Minneapolis sewer system. The lines carry both TCAAP industrial and domestic wastes. A thirty-six (36) inch overflow line connects TCAAP to nearby Round Lake as an alternative to discharge to Rice Creek during forcemain breakdown periods.

3. Federal-Hoffman, Inc., previously known as Federal Cartridge Corporation (hereafter referred to as FCC), has operated the TCAAP facility under contract with the Army for most of the forty-six (46) years of the TCAAP existence and has also been engaged in production activities for part of this time period.

4. Numerous companies and government entities, including Honeywell, Inc., have leased or otherwise arranged for use of facilities at TCAAP. Production has been facilitated through commercial and defense contracts. Some or all of the production, storage and/or disposal activities have caused or are contributing to the releases and threatened releases of hazardous substances, pollutants and contaminants at the Site.

5. In 1978, as part of the DOD's Installation and Restoration Assessment Program, the U.S. Army Toxic Hazardous Materials Agency prepared a report entitled Installation Assessment of Twin Cities Army Ammunition Plant, Report No. 129 (hereinafter "Report 129"). The report detailed extensive waste disposal activities and use of radioactive materials at TCAAP. The report indicated present or past use of at least fifteen (15) areas on TCAAP used for the disposal of waste solvents, acids, caustics, heavy metals and other production wastes.

6. A copy of Report 129 was received and reviewed by MPCA staff in May, 1981 and as a result, MPCA staff conducted volatile organic compound (VOC) and metal sampling activities. Subsequent analysis of those samples by the Minnesota Department of Health (MDH) Environmental Health Lab indicated production wells at TCAAP, the Arden Manor Trailer Park well in Arden Hills, and a number of residential wells in Arden Hills, Shoreview, and New Brighton were contaminated with VOCs.

7. As a result of MPCA requests to the Army and others, the Army proceeded with a preliminary Phase I investigation of the hydrologic, geologic and contaminant conditions at TCAAP.

FCC assisted in this activity.

8. Later MPCA and MDH staff sampling and MDH lab analysis of New Brighton and St. Anthony municipal wells and New Brighton rendering plant wells located southwest of TCAAP also showed the wells to be contaminated by VOC's. The MDH deemed the VOC contaminant levels in the municipal wells, using EPA guidance documents, to be chronically toxic in most wells and acutely toxic in several others.

9. The MDH recommended that a number of Arden Hills/New Brighton residents, the operators/owners of TCAAP, the Arden Manor Trailer Park, New Brighton/St. Anthony municipalities, and the New Brighton rendering plants with VOC-contaminated ground water find alternate drinking water supplies.

10. The Army provided bottled water to several Arden Hills residents with contaminated water supplies beginning in 1983. In addition, the Army reimbursed the Arden Manor Trailer Park for costs related to replacing the Trailer Park's contaminated wells with an acceptable water supply.

11. As a result of the VOC contaminated ground water (a) the city of New Brighton abandoned several municipal wells, and either placed on standby or deepened several others, (b) the city of St. Anthony closed down one well and connected a portion of the city with Roseville water supplies through U.S. EPA/MPCA funds; (c) a number of Arden Hills/New Brighton residents with VOC-contaminated wells were provided municipal water through construction of a U.S. EPA/MPCA funded watermain extension and (d) a New Brighton residence was provided MPCA Superfund dollars

for connection to the New Brighton municipal water supply.

12. Honeywell, Inc., a TCAAP lessee since 1958, initiated environmental investigations relative to hydrology, geology and contaminant conditions at TCAAP Buildings 103 and 502.

13. In 1982 the area-wide VOC contaminant problem was included on the U.S. EPA's National Priorities List.

14. In 1983 the U.S. EPA issued Notice Letters to the Army and several other potential responsible parties requesting their investigation of VOC contaminated groundwater in the Arden Hills/ New Brighton area. The requests were declined.

15. Beginning in 1981, the MPCA requested U.S. EPA Superfund monies to fund a Remedial Investigation (RI) and Initial Remedial Measures for the area-wide VOC contaminant problem to determine any sources of VOC release or threatened release in the area. In June 1983 the U.S. EPA approved a 1.46 million dollar two-phased State-lead RI.

16. On June 28, 1983, the MPCA Board, pursuant to ERLA, issued the Army, FCC and Honeywell, Inc. a Request for Response Action (RFRA) requesting that they, as responsible parties, conduct an adequate RI of the hazardous waste disposal areas and VOC contaminated ground water at TCAAP. On October 25, 1983, the MPCA Board issued an Amended RFRA to the Army and FCC clarifying responsibilities and schedules for the TCAAP RI. Honeywell, Inc. was issued the same Amended RFRA on January 24, 1984.

17. Army submittals of investigations and studies at the TCAAP (Phase I, II and III) in 1983 and 1984 identified major

and minor disposal areas on-TCAAP that were sources of release or threatened release of hazardous substances (mainly VOCs). MPCA and U.S. EPA review of the reports noted inadequate investigations and studies, the need to address the extent and magnitude of contaminated groundwater and the need to complete an assessment of the disposal areas identified on TCAAP.

18. In 1984 and 1985 Honeywell, Inc. submitted (through the Army) investigative reports related mainly to VOC contamination at Honeywell-leased TCAAP Buildings 103 and 502 indicating the Buildings' operations were a source of VOC contaminated ground-water migrating towards (a) Rice Creek from Building 103 and (b) to the west or southwest from the Building 502 area.

19. Honeywell, Inc. announced, on July 28, 1984, a 3-phase off-TCAAP investigation to supplement the work being conducted by the MPCA to identify sources of release off-TCAAP.

20. On February 26, 1985, the MPCA Board issued a Second Amended RFRA to the Army, FCC and Honeywell recognizing investigative and study activities undertaken by Honeywell at TCAAP Buildings 103 and 502 and requesting completion of those activities and implementation of appropriate response actions at those buildings.

21. On April 23, 1985, the MPCA Board issued a Third Amended RFRA to the Army, FCC and Honeywell, Inc. requesting adequate and timely completion of the Army's Phase II and III activities to address the past hazardous waste disposal activities at TCAAP.

22. On May 28, 1985, the MPCA released the Phase I Report by Camp Dresser & McKee, entitled New Brighton/Arden Hills, Minnesota Multi-Point Source Remedial Investigation. The Report identified four potential source areas of release of VOCs in the study area that could have contaminated the area ground water. The source areas included two areas on-TCAAP and two areas adjacent to TCAAP. Phase IA RI activities were under taken beginning in July, 1986, to further identify or screen out potential disposal areas within the source areas outside of TCAAP. Completion of the Phase 1A RI is expected in January, 1988.

23. In the Spring of 1985, the U.S. EPA initiated an investigation of the forcemains off-TCAAP since a number of documented breaks had occurred in the line in the study area and because VOCs and other hazardous wastes and metals had been found in the sewer sediments on-TCAAP.

24. On June 6, 1985, the Army announced a plan to begin addressing ground water contamination found on TCAAP. The plan included a proposed ground water pump out and treatment system to address TCAAP ground water contaminated by VOCs. The plan also identified Honeywell as the coordinator of the TCAAP groundwater clean up efforts.

25. On July 7, 1985, the U.S. Department of Justice, the Army and Honeywell, Inc. executed an agreement that included recognition of Honeywell's off-TCAAP investigations and required Honeywell's off-TCAAP investigations to be coordinated with studies by the MPCA and the U.S. EPA.

26. During the Summer and Fall of 1985, Honeywell constructed a passive ground water collection system at TCAAP Building 103 for later discharge to TCAAP's forcemain.

27. In October, 1985 Honeywell, Inc. submitted its Phase I off-TCAAP RI report indicating two VOC contaminated groundwater plumes were leaving TCAAP. Additional Phase I work was also proposed.

28. On January 14, 1986, the U.S. EPA asked the Army to participate in the Twin Cities Army Ammunition Plant/New Brighton/ Arden Hills/St. Anthony Site studies since the TCAAP facility was a major source of the regional VOC contaminated ground water.

29. The U.S. EPA and the MPCA attempted to negotiate the terms of a Federal Facilities Compliance Agreement with the Army in the Spring of 1986. The negotiations were continued, pending the reauthorization of CERCLA and the guidance it would provide the Parties. In the meanwhile, the Army pledged to make TCAAP environmentally sound by May, 1987.

30. On August 22, 1986, the MPCA issued a Notice of Violation (NOV) to the Army and FCC for RCRA related violations at the TCAAP facility.

31. On August 26, 1986, the MPCA Board issued a Fourth Amended RFRA to the Army, FCC and Honeywell requesting they complete all site investigations and interim response actions on TCAAP, and that they conduct a Site Feasibility Study, a Site Remedial Design and implement necessary Site Response Actions. Their responses to the latest RFRA were determined to

be inadequate by MPCA staff.

32. On October 17, 1986, the Superfund Amendments and Reauthorization Act of 1986 (SARA) was signed into law by President Reagan. Section 120 of SARA specifically applies to federal facilities.

33. On October 5, 1984, the Army submitted a Part A RCRA permit application to the MPCA. In its application the Army described the activities for which it sought Interim Status as disposal activities--"open burning/open detonation." The Army identified itself as "owner" and FCC as "operator." The Army's application identified both TCAAP Sites F and G as the Open Burning Grounds. Honeywell used the open burning/open detonation grounds. The Army's response to the August 22, 1986, NOV listed Honeywell as the burn operator from September, 1983, to August 1, 1985. In addition, the Army listed a FCC safety engineer as being present for each burn.

34. In an amended State Part A RCRA permit application dated August 25, 1985, Honeywell described the activities for which it sought Interim Status for storage and treatment activities at certain specified buildings at TCAAP. In its application, Honeywell identified itself as "operator" and the Army as "owner". Honeywell's Part A application identifies the storage and/or treatment operations conducted in TCAAP Buildings 103, 502, 524A2, 961, 962, 962A, and 962B as the subject of the application.

35. On November 24, 1986, the MPCA Director advised the Army of its obligations under RCRA including its obligations

pertaining to sites D, F, and G.

36. RCRA requires that corrective action be included in any RCRA permits issued to the Army, FCC and Honeywell.

VIII.

Scope of Agreement

Under this Agreement the U.S. Army agrees it shall:

1. Conduct Interim Remedial Actions (IRAs) as described in Part IX and Attachment 2 to this Agreement;

2. Conduct a Remedial Investigation (RI) on TCAAP as described in Part X and Attachment 3 to this Agreement;

3. Conduct a Feasibility Study (FS) of the Site as described in Part XI and Attachment 4 to this Agreement, incorporating, at a minimum, the results of the on TCAAP RI, all off TCAAP focused FSs related to the Site and the off TCAAP RI conducted by U.S. EPA and MPCA related to the Site;

4. Develop remedial action alternative(s) for the Site and implement those remedial actions selected by the U.S. EPA Administrator for the Site as described in Part XII and Attachment 5 to this Agreement;

5. Perform RCRA closure in accordance with authorized State hazardous waste rules for those areas at TCAAP described in Part XIII and Attachment 6 to this Agreement.

6. Reimburse the MPCA and MDH for their costs, including on-going oversight costs, pursuant to Part XXIX of this Agreement.

7. Reimburse the U.S. EPA for its costs, including ongoing

oversight costs, pursuant to Part XXIX of this Agreement.

These matters are set forth in more detail in Parts IX, X, XI, XII, XIII and XXIX and in Attachments 1-6 to this Agreement. In the event of any inconsistency between Parts I-XL of this Agreement and the Attachments to this Agreement, Parts I-XL of this Agreement shall govern unless and until duly modified pursuant to this Agreement. U.S. EPA and MPCA agree to provide the Army with guidance and timely response to requests for guidance to assist the Army in the performance of the requirements under this Agreement.

IX.

Interim Remedial Actions

The Army agrees that it shall develop the Interim Remedial Actions (IRAs) set forth in Attachment 2 and develop IRA monitoring plans, and after consultation with U.S. EPA and MPCA, publish its proposed interim remedial action alternative(s) for public review and comment. Following public comment, the Army shall submit its proposed interim remedial action alternative(s) to U.S. EPA and MPCA. The U.S. EPA Administrator, in consultation with the Army and MPCA, shall make final selection of the interim remedial action(s) for the Site. The final selection of the interim remedial action(s) by the U.S. EPA Administrator shall be final and not subject to dispute by the Army. Following final selection by U.S. EPA, the Army shall design, propose and submit a plan for implementation of the selected interim remedial action, including appropriate timetables and schedules, to U.S.

EPA and MPCA for a Determination of Consistency. Following the Determination of Consistency, the Army shall implement the interim remedial action(s) in a manner which passes the Consistency Test and in accordance with the requirements and time schedules set forth in Attachment 2 to this Agreement. A dispute arising under this Part on any matter other than U.S. EPA's final selection of an interim remedial action shall be resolved pursuant to Part XV.

All Submittals associated with the IRAs shall pass the Consistency Test set forth in Part XIV. All Submittals and elements of work undertaken pursuant to this Part shall be performed in accordance with the requirements and time schedules set forth in Attachment 2 to this Agreement. The IRAs shall meet the purposes set forth in Part VI of this Agreement.

X.

Remedial Investigation

The Army agrees it shall develop, implement and report upon a RI of TCAAP which passes the Consistency Test set forth in Part XIV and which is in accordance with the requirements and time schedules set forth in Attachment 3 to this Agreement. The RI shall meet the purposes set forth in Part VI of this Agreement. The Parties specifically agree that all criteria contained in Attachment 3 of this Agreement relate solely to the scope of the RI and do not reflect a predetermination of the Site clean-up level criteria. The parties further agree that final Site

clean-up level criteria will only be determined following completion of the Site-wide Endangerment Assessment by U.S. EPA.

XI.

Feasibility Study

The Army agrees it shall design, propose, undertake and report upon a FS for the Site which passes the Consistency Test set forth in Part XIV and which is in accordance with the requirements and time schedules set forth in Attachment 3 to this Agreement. The FS shall meet the purposes set forth in Part VI of this Agreement.

XII.

Remedial Action Selection and Implementation

Following completion and a Determination of Consistency by U.S. EPA and MPCA of the RI and the FS, the U.S. Army shall, after consultation with U.S. EPA and MPCA, publish its proposed remedial action alternative(s) for public review and comment. Following public comment, the Army shall submit its proposed remedial action alternative(s) to U.S. EPA and MPCA. The U.S. EPA Administrator, in consultation with the Army and MPCA, shall make final selection of the remedial action(s) for the Site. The final selection of the remedial action(s) by the U.S. EPA Administrator shall be final and not subject to dispute by the Army. Following final selection by U.S. EPA, the Army shall design, propose and submit a plan for implementation of the selected remedial action, including appropriate timetables and schedules, to U.S. EPA and MPCA for a Determination of

Consistency. Following the Determination of Consistency, the Army shall implement the remedial action(s) in a manner which passes the Consistency Test and in accordance with the requirements and time schedules set forth in Attachment 5 to this Agreement. A dispute arising under this Part on any matter other than U.S. EPA's final selection of a remedial action shall be resolved pursuant to Part XV.

The purpose of the plan for remedial action is to establish procedures for implementation of selected response actions.

XIII.

Closure Requirements

The Army shall comply with closure requirements under the authorized State hazardous waste rules for sites D and F at TCAAP in accordance with the requirements and time schedules set forth in Attachment 6. Site G at TCAAP shall be closed in accordance with these rules, requirements, and time schedules unless the Army provides and MPCA approves certifications establishing that Site G is not subject to RCRA closure. Closure under this Part shall be regulated by the MPCA and shall not be subject to the Consistency Test of Part XIV or to the Dispute Resolution provision of Part XV.

The MPCA's closure requirements with respect to sites D, F and G may include source control measures such as capping, soil decontamination, and soil removal. Groundwater contamination from sites D, F, and G is intended to be addressed by the RI/FS,

intended to be remedied by the CERCLA/SARA processes established under this Agreement, and shall not be the subject of RCRA closure. The Army retains its rights to resolve disputes which arise over application of MPCA closure requirements in accordance with RCRA and State law.

XIV.

Review and Determination of Consistency of Submittals

The review of each submittal, document, report, or schedule (collectively referred to hereafter as "Submittal") which is required to be submitted to and reviewed by the U.S. EPA and the MPCA Director shall be as follows:

A. U.S. EPA and the MPCA Director shall review each Submittal made by the Army as required by this Agreement within forty (40) calendar days of receipt and notify the Army in writing by the forty-first (41) calendar day, or the first business day thereafter, of the results of the Consistency Test with respect to the Submittal. Certain complex Submittals, such as quality assurance project plans, may require a longer time for review, in which event the U.S. EPA and MPCA Director shall notify the Army of that fact. In the event that the Submittal passes the Consistency Test, it shall become an integral and enforceable part of this Agreement. In the event the Submittal fails the Consistency Test, in whole or part, the U.S. EPA and MPCA Director shall notify the Army, shall state the reasons therefor, and shall, as appropriate, recommend modification of the Submittal.

B. Within thirty (30) calendar days of receipt of any notice of a determination of failure of the Consistency Test, or on the first business day thereafter, the Army shall either submit revisions to U.S. EPA and MPCA or provide U.S. EPA and MPCA with a written statement of a dispute pursuant to Part XV, Subpart A.

C. If the Army submits a revised Submittal pursuant to Paragraph B above, U.S. EPA and MPCA shall re-review the revised Submittal within thirty (30) days of receipt. If the revised Submittal is also found to fail the Consistency Test, U.S. EPA and MPCA shall notify the Army of the results of its Consistency Test and shall either recommend additional modification of the Submittal or provide the Army with a Written Notice of Position. Any dispute of this Written Notice of Position shall be submitted within fifteen (15) days and such dispute shall go directly to the Dispute Resolution Committee established pursuant to Part XV of this Agreement.

D. In the event that the Army receives notice of a determination of failure of the Consistency Test and request for additional modification of the Submittal pursuant to Subpart C, within fifteen (15) calendar days of receipt of such notice and request, or on the first business day thereafter, the Army shall submit revisions to U.S. EPA and MPCA conforming with the modifications requested pursuant to Subpart C, or provide a written statement of a dispute pursuant to Part XV.

E. If, following revisions by the Army pursuant to Subpart D above, the Submittal still fails the Consistency Test, U.S. EPA and MPCA may either make those changes necessary for the Submittal to pass the Consistency Test or provide the Army with a Written Notice of Position. Any dispute of the changes or of the Written Notice of Position shall be submitted within fifteen (15) days and such dispute shall go directly to the Dispute Resolution Committee established pursuant to Part XV of this Agreement.

F. If dispute resolution is sought pursuant to a disagreement under this Part, within fourteen (14) days of resolution of the dispute pursuant to Part XV the Army shall provide any final Submittal which may be required to reflect the final resolution of such dispute. If the Army does not dispute the changes made by U.S. EPA and MPCA, they become integral and enforceable terms of this Agreement which shall be implemented by the Army.

G. All Submittals, revisions or modifications thereto, and all elements of work, shall be of a quality sufficient to pass the Consistency Test.

H. The U.S. EPA, the MPCA Director and the Army shall provide the opportunity to consult with each other during the review of Submittals or modifications.

I. No work or work element related to an item failing the Consistency Test may proceed until after a Determination of Consistency has been made. A work or work element for which a

Determination of Consistency has been made, or any work or work element unrelated to an item failing the Consistency Test, shall not be stopped as a result of the failure of any unrelated item to pass the Consistency Test.

J. If U.S. EPA and MPCA disagree with respect to a Determination of Consistency, such disagreement constitutes a dispute which may be raised by any Party.

XV.

Resolution of Disputes

Except as specifically set forth elsewhere in this Agreement, if a dispute arises under this Agreement the procedures of this Part shall apply. In addition, during the pendency of any dispute, the Army agrees that it shall continue to implement those portions of this Agreement which are not in dispute and which the U.S. EPA and the MPCA Director determine can be reasonably implemented pending final resolution of the issue(s) in dispute. If U.S. EPA and MPCA determine that all or part of those portions of work which are affected by the dispute should stop during the pendency of the dispute, the Army shall discontinue implementing those portions of the work. All Parties to this Agreement agree they shall make reasonable efforts to informally resolve all disputes.

A. The Army shall, within thirty (30) days of any action by U.S. EPA or MPCA which it is disputing, provide the U.S. EPA and the MPCA with a written statement of dispute setting forth the nature of the dispute, the Army's position with respect to

the dispute and the information the Army is relying upon to support its position. If the Army does not provide such written statement to U.S. EPA and MPCA within this thirty (30) day period, the Army shall be deemed to have agreed to the position taken by U.S. EPA.

B. Where U.S. EPA or MPCA issue a Written Notice of Position any other Party which disagrees with the Written Notice of Position may provide the issuing Party a written statement of dispute setting forth its position with respect to the dispute and the information it is relying upon to support its position. If neither other Party provides such a written statement within thirty (30) days of receipt of the Written Notice of Position, they shall be deemed to have agreed with the Written Notice of Position.

C. Upon receipt of the written statement of dispute, U.S. EPA, MPCA and the Army shall engage in dispute resolution among the Project Managers. The Project Managers shall have fourteen (14) days from the receipt by the U.S. EPA and the MPCA Director of the written statement of dispute to resolve the dispute. During this period the Project Managers shall meet as many times as are necessary to discuss and attempt resolution of the dispute. If agreement cannot be reached on any issue within this fourteen (14) day period, any Party may, by written notice, elevate the dispute to the Dispute Resolution Committee (DRC) for resolution. If none of the Parties elevate the dispute to the DRC within this fourteen (14) day period, the position of

U.S. EPA's Project Manager shall be final with respect to resolution of the dispute.

D. The Army, U.S. EPA and MPCA shall each designate one individual and an alternate to serve on the Dispute Resolution Committee (DRC). The individuals designated to serve on the DRC shall be those designated in Subpart E of this Part or their delegate authorized to participate in the DRC on behalf of such designated individual for the purposes of dispute resolution under this Agreement. The DRC will serve as a forum for resolution of disputes for which agreement has not been reached pursuant to Subparts A, B or C of this Part. If all designated members of the DRC do not unanimously agree on a resolution of the dispute within thirty (30) days, any Party may, by written notice to the Parties, refer the matter to the Administrator of U.S. EPA for a final resolution of the dispute. Notwithstanding this Part, the State of Minnesota retains all rights described in Parts XXXI and XXXVII of this Agreement. In the event that the matter is not referred to the Administrator of U.S. EPA within the thirty (30) day period, the position of the U.S. EPA designated member of the DRC shall be final with respect to resolution of the dispute.

E. The U.S. EPA designated member of the DRC is the Waste Management Division Director of Region V. The MPCA designated member is the MPCA Executive Director. The Army designated member is the Deputy for Environmental, Safety and Occupational Health. Notice of any delegation of authority from a Party's

designated member on the DRC shall be provided to all other Parties pursuant to the procedures of Part XX.

F. The pendency of any dispute under this Part shall not affect the Army's responsibility for timely performance of the work required by this Agreement, except that the time period for completion of work affected by such dispute shall be extended for a period of time not to exceed the actual time taken to resolve any good faith dispute in accordance with the procedures specified herein. All elements of the work required by this Agreement which are not affected by the dispute shall continue and be completed in accordance with the work plan schedule. The determination of elements of work, submittals or actions affected by the dispute shall be determined by U.S. EPA and not subject to dispute under this Part.

G. Within fourteen (14) days of resolution of any dispute, the Army shall incorporate the resolution and final determination into the appropriate plan, schedule or procedures and proceed to implement this Agreement according to the amended plan, schedule or procedures.

H. Resolution of a dispute pursuant to this Part of the Agreement constitutes a final resolution of any dispute arising under this Agreement. The U.S. EPA Administrator shall provide the Army and the MPCA with a written final decision resolving any dispute presented to the U.S. EPA Administrator for resolution pursuant to this Part of this Agreement. The Army shall abide by all terms and conditions of any final resolution of dispute

obtained pursuant to this Part of this Agreement.

XVI.

Additional Work Or Modification To Work

A. In the event that the U.S. EPA or MPCA Director determine that additional work, or modification to work, including remedial investigatory work and/or engineering evaluation, is necessary to accomplish the objectives of this Agreement, notification of such additional work or modification to work shall be provided to the Army. The Army agrees, subject to the dispute resolution procedures set forth in Part XV, to implement any such work.

B. Any additional work or modification to work determined to be necessary by the Army shall be proposed by the Army and will be subject to the Consistency Test in accordance with Part XIV of this Agreement prior to initiating any work or modification to work.

C. Any additional work or modification to work approved pursuant to Subpart A or B shall be completed in accordance with the standards, specifications, and schedule determined or approved by U.S. EPA and the MPCA Director. If any additional work or modification to work will adversely affect work scheduled or will require significant revisions to an approved Work Plan, the U.S. EPA and the MPCA Project Managers shall be notified immediately of the situation followed by a written explanation within five (5) business days of the initial notification.

XVII.

Permits

A. The Parties recognize that under Sections 121(d) and 121(e)(1) of CERCLA/SARA, 42 U.S.C. §§ 9621(d) and 9621(e)(1), and the NCP, portions of the response actions called for by this Agreement and conducted entirely on TCAAP are exempted from the procedural requirement to obtain a federal, state, or local permit but must satisfy all the applicable or relevant and appropriate federal and state standards, requirements, criteria, or limitations which would have been included in any such permit.

When the Army proposes a response action (including a Work Plan pursuant to this Agreement) to be conducted entirely on TCAAP, which in the absence of § 121(e)(1) of CERCLA/SARA and the NCP would require a federal or state permit, the Army shall include in the Submittal:

(1) Identification of each permit which would otherwise be required;

(2) Identification of the standards, requirements, criteria, or limitations which would have had to have been met to obtain each such permit;

(3) Explanation of how the response action proposed will meet the standards, requirements, criteria or limitations identified in (2) immediately above.

Upon request of the Army, U.S. EPA and the MPCA will provide their position with respect to (2) and (3) above in a timely manner.

B. Subpart A above is not intended to relieve the Army

from the requirement(s) of obtaining a permit whenever it proposes a response action involving the shipment or movement off the TCAAP of a hazardous substance.

C. The Army shall notify the MPCA Director and U.S. EPA in writing of any permits required for off TCAAP activities as soon as it becomes aware of the requirement. Upon request, the Army shall provide the MPCA Director and U.S. EPA copies of all such permit applications and other documents related to the permit process.

D. If a permit which is necessary for implementation of this Agreement is not issued, or is issued or renewed in a manner which is materially inconsistent with the requirements of this Agreement, the Army agrees it shall notify the MPCA Director and U.S. EPA of its intention to propose modifications to this Agreement to obtain conformance with the permit (or lack thereof). Notification by the Army of its intention to propose modifications shall be submitted within seven (7) calendar days of receipt by the Army of notification that: (1) a permit will not be issued; (2) a permit has been issued or reissued; or (3) a final determination with respect to any appeal related to the issuance of a permit has been entered. Within thirty (30) days from the date it submits its notice of intention to propose modifications, the Army shall submit to the MPCA Director and U.S. EPA its proposed modifications to this Agreement with an explanation of its reasons in support thereof.

E. The MPCA Director and the U.S. EPA shall subject the Army's proposed modifications to this Agreement to the Consistency Test in accordance with Part XIV of this Agreement. If the Army submits proposed modifications prior to a final determination of any appeal taken on a permit needed to implement this Agreement, the MPCA Director and the U.S. EPA may elect to delay review of the proposed modifications until after such final determination is entered. If the MPCA Director and the U.S. EPA elect to delay review, the Army shall continue implementation of this Agreement as provided in Subpart F of this Part.

F. During any appeal of any permit required to implement this Agreement or during review of any of the Army's proposed modifications as provided in Subpart D above, the Army shall continue to implement those portions of this Agreement which can be reasonably implemented pending final resolution of the permit issue(s).

G. Except as otherwise provided in this Agreement the Army shall comply with applicable state and federal hazardous waste management requirements at the TCAAP facility.

XVIII.

Creation of Danger

In the event the MPCA Director or the U.S. EPA determines that activities conducted pursuant to this Agreement, or any other circumstances or activities, are creating a danger to the health or welfare of the people on the Site or in the surrounding area or to the environment, the MPCA Director or the U.S. EPA

may order the Army to stop further implementation of this Agreement for such period of time as needed to abate the danger.

XIX.

Reporting

The Army agrees it shall submit to the MPCA Director and the U.S. EPA monthly written progress reports which describe the actions which the Army has taken during the previous month to implement the requirements of this Agreement. Progress reports shall also describe the activities scheduled to be taken during the upcoming month. Progress reports shall be submitted by the tenth (10) day of each month following the effective date of this Agreement. The progress reports shall include a detailed statement of the manner and extent to which the requirements and time schedules set out in the Attachments to this Agreement are being met. In addition, the Progress Reports shall identify any anticipated delays in meeting time schedules, the reason(s) for the delay and actions taken to prevent or mitigate the delay.

XX.

Notification

A. Unless otherwise specified, any report or Submittal provided pursuant to a schedule or deadline identified in or developed under this Agreement shall be sent by certified mail,

return receipt requested and addressed or hand delivered to:

TCAAP Project Manager
Division of Solid and Hazardous Waste
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, Minnesota 55155

and

U.S. Environmental Protection Agency, Region V
Attn: TCAAP Project Manager (MN Unit), 5HE-12
230 South Dearborn Street
Chicago, Illinois 60604

Documents sent to the Army shall be addressed as follows unless the Army specifies otherwise by written notice:

TCAAP Remedial Project Manager
Twin Cities Army Ammunition Plant
New Brighton, Minnesota 55112

Unless otherwise requested, all routine correspondences may be sent via regular mail to the above-named persons.

B. U.S. EPA shall provide the Secretary of the Army and the MPCA Director with a forty-five (45) day advance notice of the U.S. EPA Administrator's intention to delegate the authority to resolve disputes or to select appropriate remedial actions pursuant to this Agreement.

XXI.

Project Managers

The U.S. EPA, MPCA and the Army shall each designate a Project Manager and Alternate (hereinafter jointly referred to as Project Manager) for the purpose of overseeing the implementation of this Agreement. Within ten (10) days of the effective date of this Agreement, the Army shall notify the MPCA Director

and the U.S. EPA of the name and address of its Project Manager. Any Party may change its designated Project Manager by notifying the other Parties, in writing, within five days of the change. To the maximum extent possible, communications between the Parties concerning the terms and conditions of this Agreement shall be directed through the Project Managers as set forth in Part XX of this Agreement. Each Project Manager shall be responsible for assuring that all communications from the other Project Managers are appropriately disseminated and processed by the entities which the Project Managers represent.

Subject to the limitations set forth in Part XXIV, Subpart A, the MPCA and U.S. EPA Project Managers shall have the authority to: (1) take samples, request split samples of Army samples and ensure that work is performed properly and pursuant to U.S. EPA protocols as well as pursuant to the Attachments and plans incorporated into this Agreement; (2) observe all activities performed pursuant to this Agreement, take photographs and make such other reports on the progress of the work as the Project Manager deems appropriate; (3) review records, files and documents relevant to this Agreement; and (4) recommend and request minor field modifications to the work to be performed pursuant to this Agreement, or in techniques, procedures or design utilized in carrying out this Agreement, which are necessary to the completion of the project.

The Army Project Manager may also recommend and request minor field modifications to the work to be performed pursuant

to this Agreement, or in techniques, procedures or design utilized in carrying out this Agreement, which are necessary to the completion of the project.

Any field modifications proposed under this Part by any Party must be approved orally by all three (3) Project Managers to be effective. If agreement cannot be reached on the proposed additional work or modification to work, dispute resolution as set forth in Part XV may be used in addition to this Part. Within five (5) business days following a modification made pursuant to this Part, the Project Manager who requested the modification shall prepare a memorandum detailing the modification and the reasons therefore and shall provide or mail a copy of the memorandum to the other Project Managers.

The Project Manager for the Army shall be physically present on TCAAP or reasonably available to supervise work performed at TCAAP during implementation of the work performed pursuant to this Agreement and shall make himself available to U.S. EPA and MPCA Project Managers for the pendency of this Agreement. The absence of the U.S. EPA or MPCA Project Managers from the Site shall not be cause for work stoppage.

XXII.

Sampling and Data/Document Availability

The Parties shall make available to each other quality assured results of sampling, tests or other data generated by any Party, or on their behalf, with respect to the implementation

of this Agreement within forty-five (45) days of their collection or performance. If quality assurance is not completed within forty-five (45) days, raw data or results shall be submitted within the forty-five (45) day period and quality assured data or results shall be submitted as soon as they become available.

At the request of either the MPCA or U.S. EPA Project Manager, the Army shall allow split or duplicate samples to be taken by the MPCA or U.S. EPA during sample collection conducted during the implementation of this Agreement. The Army's Project Manager shall endeavor to notify the U.S. EPA and MPCA Project Managers not less than ten (10) business days in advance of any sample collection. If it is not possible to provide ten (10) business days prior notification, the Army shall notify the MPCA and/or U.S. EPA Project Managers as soon as possible after becoming aware that samples will be collected.

XXIII.

Retention of Records

Each Party to this Agreement shall preserve for a minimum of ten (10) years after termination of this Agreement all of its records and documents in its possession or in the possession of its divisions, employees, agents, accountants, contractors or attorneys which relate in any way to the presence of hazardous substances, pollutants and contaminants at the Site or to the implementation of this Agreement, despite any document retention policy to the contrary. After this ten (10) year period, the Army shall notify the U.S. EPA and MPCA at least forty-five (45) days

prior to destruction or disposal of any such documents or records. Upon request by the U.S. EPA or MPCA the Army shall make available such records or documents to the U.S. EPA or MPCA.

XXIV.

Access

A. Without limitation on any authority conferred on U.S. EPA or MPCA by statute or regulation, the U.S. EPA, MPCA and/or their authorized representatives, shall have authority to enter the Site at all reasonable times for the purposes of, among other things: (1) inspecting records, operating logs, contracts and other documents relevant to implementation of this Agreement; (2) reviewing the progress of the Army, its response action contractors or lessees in implementing this Agreement; (3) conducting such tests as the MPCA and the U.S. EPA Project Managers deem necessary; and (4) verifying the data submitted to the U.S. EPA and MPCA by the Army. The Army shall honor all reasonable requests for such access by the U.S. EPA and MPCA conditioned only upon presentation of proper credentials. However, such access shall be obtained in conformance with Army security regulations and in a manner minimizing interference with any military operations at TCAAP.

B. To the extent that access is required to areas of the Site presently owned by or leased to parties other than the Army, the Army agrees to exercise its authorities to obtain access pursuant to Section 104(e) of CERCLA/SARA from the present owners and/or lessees within thirty (30) calendar days after the effective

date of this Agreement or, where appropriate, within thirty (30) days after the relevant Submittals which require access pass the Consistancy Test pursuant to Part XIV. The Army shall use its best efforts to obtain access agreements which shall provide reasonable access to U.S. EPA and MPCA and/or its authorized representatives. With respect to non-Army property upon which monitoring wells, pumping wells, treatment facilities or other response actions are to be located, the access agreements shall also provide that no conveyance of title, easement, or other interest in the property shall be consummated without provisions for the continued operation of such wells, treatment facilities, or other response actions on the property. The access agreements shall also provide that the owners of TCAAP or of any property where monitoring wells, pumping wells, treatment facilities or other response actions are located shall notify the Army, the MPCA Director, and the U.S. EPA by certified mail, at least thirty (30) days prior to any conveyance, of the property owner's intent to convey any interest in the property and of the provisions made for the continued operation of the monitoring wells, treatment facilities, or other response actions installed pursuant to this Agreement.

C. In the event that Site access is not obtained within the thirty (30) day time period set forth in Subpart B above, within fifteen (15) days after the expiration of the thirty (30) day period the Army shall notify the MPCA Director and U.S. EPA regarding the lack of, and efforts to obtain, such access agreements. Within fifteen (15) days of any such notice, the Army shall submit appropriate modification(s) in response

to such inability to obtain access.

D. The Army may request the assistance of U.S. EPA and MPCA where access problems arise.

XXV.

Five Year Review

Consistent with Section 121(c) of CERCLA/SARA, and in accordance with this Agreement, the Army agrees that U.S. EPA and the MPCA will review the remedial action no less often than each five years after the initiation of the final remedial action to assure that human health and the environment are being protected by the remedial action being implemented. If upon such review it is the judgement of U.S. EPA and the MPCA that additional action or modification of the remedial action is appropriate in accordance with Section 104 or 106 of CERCLA/SARA, the U.S. EPA and the MPCA shall require the Army to implement such additional or modified action.

Any dispute by the Army of the determination by U.S. EPA and the MPCA under this Part shall be resolved under Part XV of this Agreement. If the State disagrees with U.S. EPA on whether additional or modified action is appropriate under this Part, the dispute shall be resolved under Part XV of this Agreement.

XXVI.

Other Claims

Nothing in this Agreement shall constitute or be construed as a bar or release from any claim, cause of action or demand

in law or equity by or against any person, firm, partnership or corporation not a signatory to this Agreement for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken from TCAAP.

The U.S. EPA and MPCA shall not be held as a party to any contract entered into by the Army to implement the requirements of this Agreement.

This Agreement shall not restrict U.S. EPA or MPCA from taking any legal or response action for any matter not specifically part of the work covered by this Agreement.

XXVII.

Other Applicable Laws

All actions required to be taken pursuant to this Agreement shall be undertaken in accordance with the requirements of all applicable state and federal laws and regulations to the extent required by CERCLA/SARA.

XXVIII.

Confidential Information

The Army may assert a confidentiality claim covering all or part of the information requested by this Agreement. Analytical data shall not be claimed as confidential by the Army. Information determined to be confidential by U.S. EPA pursuant

to 40 CFR Part 2 shall be afforded the protection specified therein and such information shall be treated by the MPCA Director as "non-public data" pursuant to Minn. Stat. ch. 13. The Army hereby waives any and all claims to confidentiality under Minnesota law for any information determined by U.S. EPA not to be confidential pursuant to 40 CFR Part 2. If no claim of confidentiality accompanies the information when it is submitted to the U.S. EPA or the MPCA Director, the information may be made available to the public without further notice to the Army.

XXIX.

Recovery of Expenses

A. U.S. EPA shall submit to the Army an accounting of all Superfund response costs (including Superfund overhead) incurred by U.S. EPA prior to the effective date of this Agreement, including relevant cost summaries in support of such accounting, which relate to the Site. All such response costs incurred and set forth in the accounting shall be costs of a response action not inconsistent with the NCP.

B. Except as allowed pursuant to Subpart C below, within ninety (90) days of receipt of the accounting submitted pursuant to Subpart A, the Army shall reimburse U.S. EPA for the cost of the response actions in the amount set forth in the accounting. Payment to U.S. EPA shall be made by check payable to the order of: "U.S. EPA Hazardous Substance Superfund". Such payment shall specifically reference the TCAAP and the U.S. EPA Docket

Number for this Agreement and be forwarded to: U.S. Environmental Protection Agency, Superfund Accounting, P.O. Box 371003M, Pittsburgh, Pennsylvania 15251, Attn: Superfund Collection Office. Notification of payment to U.S. EPA shall be made in writing at the time of payment to the U.S. EPA Project Manager and to the accounts receivable accountant, Financial Management Branch (5MF), U.S. Environmental Protection Agency, 230 South Dearborn Street, Chicago, Illinois, 60604.

C. In the event that the Army disputes that the accounting submitted pursuant to Subpart A includes only those response costs: (1) incurred prior to the effective date of this Agreement, (2) which relate to the Site, and, (3) which are not inconsistent with the NCP, the Army may dispute the accounting pursuant to Part XV of this Agreement.

D. The MPCA shall submit to the Army an accounting of all Superfund response costs (including Superfund overhead) incurred by MPCA prior to the effective date of this Agreement, including relevant cost summaries in support of such accounting, which relate to the Site. All such response costs incurred and set forth in the accounting shall be costs of a response action not inconsistent with the NCP.

E. Except as allowed pursuant to Subpart F below, within ninety (90) days of receipt of the accounting submitted pursuant to Subpart D, the Army shall reimburse MPCA for the cost of response actions in the amount set forth in the accounting. Payment to MPCA shall be made by check payable to the Environmental Response Compensation and Compliance Fund of the State

of Minnesota. Such payment shall specifically reference the TCAAP and be forwarded to the Director of Fiscal Services, Minnesota Pollution Control Agency, 520 Lafayette Road, St. Paul Minnesota 55155. Notification of payment to MPCA shall be made in writing at the time of payment to the MPCA Project Manager.

F. In the event that the Army disputes that the accounting submitted pursuant to Subpart D includes only those response costs: (1) incurred prior to the effective date of this Agreement, (2) which relate to the Site, and (3) which are not inconsistent with the NCP, the Army may challenge the amount to be paid to MPCA in federal district court.

G. Within sixty (60) days of the effective date of this Agreement, U.S. EPA and MPCA shall provide the Army with written estimates of their costs necessary to oversee this Agreement from the effective date of the Agreement through September 30, 1988. Thereafter, on or before August 1, 1988, and annually thereafter, U.S. EPA and MPCA shall provide the Army with an estimate of their oversight costs expected to be incurred in the subsequent federal fiscal year.

H. Following the effective date of this Agreement, after the end of each federal fiscal year, U.S. EPA and MPCA shall submit to the Army separate accountings including both costs incurred in performing oversight of this Agreement and costs of response actions related to the Site. Such oversight costs shall include the costs associated with: (1) reviewing Submittals and work performed pursuant to this Agreement, (2) fulfilling

their respective obligations under this Agreement, (3) arranging for or contracting with a qualified person to assist in overseeing and reviewing the Submittals and work performed pursuant to this Agreement.

I. Except as allowed pursuant to Subpart J, within ninety (90) days of receipt of the accountings provided pursuant to Subpart H, the Army shall reimburse U.S. EPA and MPCA in the amounts set forth in the accountings submitted pursuant to Subpart H. Payment shall be made by the Army in the same manner as set forth in Subparts B and E.

J. In the event that the Army disputes the amounts set forth in the accountings provided pursuant to Subpart H, the Army may dispute the amount to be paid to U.S. EPA pursuant to Part XV of this Agreement and the Army reserves its right to dispute the amount to be paid to MPCA in federal district court.

K. The Army agrees to reimburse U.S. EPA for the cost of an Endangerment Assessment to be performed for the Site. Upon completion of the Endangerment Assessment, U.S. EPA will forward a request for payment to the Army for the cost of the Endangerment Assessment.

L. Except as allowed pursuant to Subpart M, within ninety (90) days of receipt of the request for payment pursuant to Subpart K, the Army shall reimburse U.S. EPA for cost of the Endangerment Assessment. Payment shall be made by the Army in the same manner as set forth in Subpart B.

M. In the event that the Army disputes the cost of the Endangerment Assessment, the Army may dispute the amount to be paid to U.S. EPA pursuant to Part XV of this Agreement.

N. In the event of a dispute with respect to an amount to be reimbursed to U.S. EPA or MPCA pursuant to this Part, the Army shall bear the burden of showing that a response cost is not related to the site or is inconsistent with the NCP.

XXX.

Amendment of Agreement

This Agreement may be amended by a written agreement between the Army, the MPCA and U.S. EPA.

XXXI.

Covenant Not to Sue And Reservation of Rights

In consideration for the Army's compliance with this Agreement, and based on the information known to the Parties on the effective date of this Agreement, the State and the U.S. EPA agree that compliance with this Agreement shall stand in lieu of any administrative, legal and equitable remedies against the Army available to them regarding the currently known release or threatened release of hazardous substances including hazardous wastes, pollutants or contaminants at the Site which are the subject of the RI/FS and which will be addressed by the remedial action provided for under this Agreement; except that nothing in this Agreement shall preclude the State or U.S. EPA from exercising any administrative, legal and equitable remedies available to them to require

additional response actions by the Army in the event that: (1) conditions previously unknown or undetected by U.S. EPA or MPCA arise or are discovered at the Site; or (2) U.S. EPA or MPCA receive additional information not previously available concerning the premises which they employed in reaching this Agreement, and the implementation of the requirements of this Agreement are no longer protective of public health and the environment. The MPCA agrees to exercise its corrective action authority for any release or threatened release of a hazardous waste which is directly addressed by this Agreement only where conditions (1) or (2) exist and only in the following manner:

If the State in an action in federal district court can establish by a preponderance of the evidence that the remedial action selected by the Administrator and implemented by the Army is not protective of public health and the environment, and that further response action consistent with the State's corrective action requirements is necessary to protect public health and the environment, such further response action will be performed, unless the Administrator of U.S. EPA has determined within 45 days of notice from the State to U.S. EPA and the Army that the remedy is protective of public health and the environment and that no further response action is required or that only a portion of the response action sought by the State should be implemented. If the Administrator has made a determination as specified above, further response action consistent with the State's corrective action authority shall be performed if the

State can establish through an action in federal district court that the Administrator's decision does not provide adequate protection for public health or the environment. The Parties reserve their right to argue the appropriate standard of review of the U.S. EPA Administrator's decision.

This Covenant Not To Sue does not affect any claims for natural resource damage assessments or for damages to natural resources.

Notwithstanding this Part, or any other Part or this Agreement, the State may obtain judicial review of any final decision of the U.S. EPA on selection of an interim or final remedial action, and may invoke its authority under CERCLA/SARA §§121(e)(2) and 121(f).

XXXII.

Stipulated Penalties

A. At the discretion of U.S. EPA or MPCA, the Army shall be liable for payment into the Hazardous Substances Superfund administered by the U.S. EPA of the sums set forth below as stipulated penalties if the Army fails to provide a Submittal or comply with a timetable or deadline, including remedial action start dates, in accordance with the requirements of this Agreement. Stipulated penalties shall accrue for each week or part therof that the Army fails to provide a Submittal or comply with a timetable or deadline, including remedial action start dates, in accordance with the requirements of this Agreement. The due dates and schedule may be extended pursuant to Part XXXIII of this Agreement. Such penalties shall be due and payable

within thirty (30) days of receipt of notification from the U.S. EPA or MPCA Director assessing the penalties. In the event that MPCA alone assesses stipulated penalties, the Army reserves its right to challenge in federal district court the factual basis for the determination that a penalty is due. These stipulated penalties shall accrue in the amount of $5000.00 for the first week or part thereof, and $10,000.00 for each additional week or part thereof for which a due date or schedule has been missed. But in no event shall the Army be liable for a penalty in excess of the amount authorized by CERCLA/SARA.

B. The stipulated penalties set forth in Subpart A of this Part shall not preclude U.S. EPA or the MPCA from electing to pursue any other remedy or sanction otherwise available due to the Army's failure to specifically comply with any of the terms, schedules or due dates of this Agreement, including a suit to enforce the terms of this Agreement. Except as provided by law, said stipulated penalties shall not preclude U.S. EPA or the MPCA from seeking statutory penalties up to the amount authorized by law in the event of the Army's failure to comply with any terms, schedules or due dates of this Agreement.

XXXIII.

Extension of Schedules

Extensions of schedules shall be granted if requests for extensions are submitted in a timely fashion and good cause exists as described in Part XV, Subpart F, or if other good cause exists for granting the extension. Extensions shall also be granted

where the Army demonstrates that the reason the extension is needed is due to a delay directly attributable to any changes in permit terms or conditions or refusal to issue a permit needed to implement the requirements of this Agreement. Any Army request for extension shall first be made orally, and confirmed in writing within three (3) days of the oral request. The written request shall specify the reason(s) why the extension is needed. Extensions shall only be granted for such period of time as the MPCA Director and the U.S. EPA determine is reasonable under the circumstances. A requested extension shall not be effective until approved by the MPCA Director and the U.S. EPA.

No stipulated penalties shall accrue pursuant to Part XXXII when U.S. EPA and MPCA disagree with one another as to an extension under this Part.

XXXIV.

Conveyance of Title

No conveyance of title, easement, or other interest in the Army property on which any containment system, treatment system, monitoring system or other response action(s) is installed or implemented pursuant to this Agreement shall be consummated by the Army without provision for continued maintenance of any such system or other response action(s). At least thirty (30) days prior to any conveyance, the Army shall notify U.S. EPA and the MPCA Director of the provisions made for the continued operation and maintenance of any response action(s) or system installed or implemented pursuant to this Agreement.

XXXV.

Public Participation

A. The Parties agree that this Agreement and any subsequent proposed remedial action alternative(s) and subsequent plan(s) for remedial action at the Site arising out of this Agreement shall comply with the administrative record and public participation requirements of CERCLA/SARA, including Section 117 of SARA, the NCP, U.S. EPA guidances on public participation and administrative records.

B. The Army shall develop and implement a Community Relations Plan (CRP) which responds to the need for an interactive relationship with all interested community elements, both on TCAAP and off, regarding activities and elements of work undertaken by the Army. The Army agrees to develop and implement the CRP in a manner consistent with Section 117 of SARA, the NCP, U.S. EPA guidelines set forth in U.S. EPA's Community Relations Handbook, and any modifications thereto.

The CRP is subject to the Consistency Test set forth in Part XIV of this Agreement.

C. The public participation requirements of this Agreement shall be implemented so as to meet the public participation requirements applicable to RCRA permits under 40 CFR Part 124 and Section 7004 of RCRA.

D. Any Party issuing a formal press release to the media regarding any of the work required by this Agreement shall

advise the other Parties of such press release and the contents thereof, at least forty-eight (48) hours before the issuance of such press release and of any subsequent changes prior to release.

E. The Army agrees it shall establish and maintain an administrative record at or near TCAAP in accordance with Section 113(k) of CERCLA/SARA. The administrative record shall be established and maintained in accordance with current and future U.S. EPA policy and guidelines. A copy of each document placed in the administrative record will be provided to the U.S. EPA and MPCA. The administrative record developed by the U.S. Army shall be updated and supplied to U.S. EPA and MPCA on at least a quarterly basis. An index of documents in the administrative record will accompany each update of the administrative record.

F. The Army agrees it shall follow the public participation requirements of CERCLA/SARA Section 113(k) and comply with any guidance and/or regulations promulgated by U.S. EPA with respect to such Section.

XXXVI.

Public Comment

A. Within fifteen (15) days of the date of the acceptance of this Agreement, U.S. EPA shall announce the availability of

this Agreement to the public for review and comment. U.S. EPA shall accept comments from the public for a period of thirty (30) days after such announcement. At the end of the comment period, U.S. EPA and MPCA shall review all such comments and shall either:

(1) Determine that the Agreement should be made effective in its present form, in which case the Army shall be so notified in writing, and the Agreement shall become effective on the date said notice is issued; or

(2) Determine that modification of the Agreement is necessary, in which case the Army will be forwarded a revised Agreement which includes all required changes to the Agreement.

B. In the event of significant revision or public comment, notice procedures of Sections 117 and 211 of SARA shall be followed and a responsiveness summary shall be published by the U.S. EPA.

C. In the event that modification of the Agreement is determined by U.S. EPA to be necessary pursuant to Subpart A(2) above, within twenty (20) days of receipt of the revised Agreement the Army and MPCA reserve the right to withdraw from the Agreement. If neither the Army or MPCA provide U.S. EPA with written notice of withdrawal from the Agreement within such twenty (20) day period, the Agreement, as modified, shall automatically become effective on the twenty-first (21) day, and U.S. EPA shall issue a notice to the Parties to that effect.

D. All plans and activities related to Community Relations and Public Participation undertaken by the Army shall be subject to the Consistency Test set forth in Part XIV of this Agreement. In the case of dispute, Part XV of this Agreement may be invoked.

XXXVII.

Enforceability

The parties agree: (1) that all timetables and deadlines associated with development and completion of the RI/FS shall be enforceable by any person under Section 310 of CERCLA/SARA and that violations of such timetables and deadlines will be subject to civil penalties under Sections 310(c) and 109 of CERCLA/SARA; and (2) that all conditions of this Agreement associated with interim remedial actions and final remedial actions shall be enforceable by any person under Section 310 of CERCLA/SARA and that violation of such conditions will be subject to civil penalties under Sections 310(c) and 109 of CERCLA/SARA; and (3) that any final resolution of a dispute pursuant to Part XV of this Agreement which establishes terms and conditions (including any timetables and deadlines established pursuant to the dispute resolution procedures set forth in Part XV of this Agreement) shall be enforceable by any person under Section 310 of CERCLA/SARA and any violation of such terms and conditions (including any timetables and deadlines established pursuant to such final resolution) will be subject to civil penalties under Sections 310(c) and 109 of CERCLA/SARA.

Nothing in this Agreement shall be construed as authorizing

any person to seek judicial review of any action of the Army, the State of Minnesota or U.S. EPA where review is barred by any provision of CERCLA/SARA, including Section 113(h) of CERCLA/SARA.

The Parties agree that all Parties, including the State of Minnesota, shall have the right to enforce the terms of this Agreement.

In the event that U.S. EPA or MPCA elect to assess stipulated penalties pursuant to Part XXXII of this Agreement for failure of the Army to provide a Submittal or comply with a timetable or deadline in accordance with the requirements of this Agreement, such stipulated penalties shall constitute diligent prosecution as contemplated by Section 310 of CERCLA/SARA.

XXXVIII.

Termination

The provisions of this Agreement shall be deemed satisfied and terminated upon receipt by the Army of written notice from U.S. EPA and the MPCA Director that the Army has demonstrated, to the satisfaction of the U.S. EPA and MPCA Director, that all the terms of this Agreement have been completed.

XXXIX.

Effective Date

This Agreement is effective upon issuance of a notice to the Parties by U.S. EPA following implementation of Part XXXVI, Subparts A through C, of this Agreement.

XL.

Funding

The Army agrees to advise U.S. EPA and MPCA of its efforts to obtain the funding necessary to implement this Agreement under Section 120(e)(5)(B) of CERCLA/SARA. Nothing in this Agreement shall be construed to require the Army to obligate funds in any fiscal year for work under this Agreement in contravention of the Anti-Deficiency Act, 31 U.S.C. §1341.

In the event that the Army is unable to obtain timely funding for performance of the off TCAAP FS in 1988, U.S. EPA and MPCA reserve the right to perform and complete the off TCAAP FS.

In the event that the Army is unable to obtain timely funding to perform response actions under this Agreement, the State reserves the authority to perform response actions to the extent authorized by law.

IT IS SO AGREED:

By: _____ 6 Aug 1987
John W. Shannon
Assistant Secretary
U.S. Department of Army
(Installations & Logistics)
Date

By: _____ 6 August 1987
Susan J. Crawford
General Counsel
U.S. Department of Army
Date

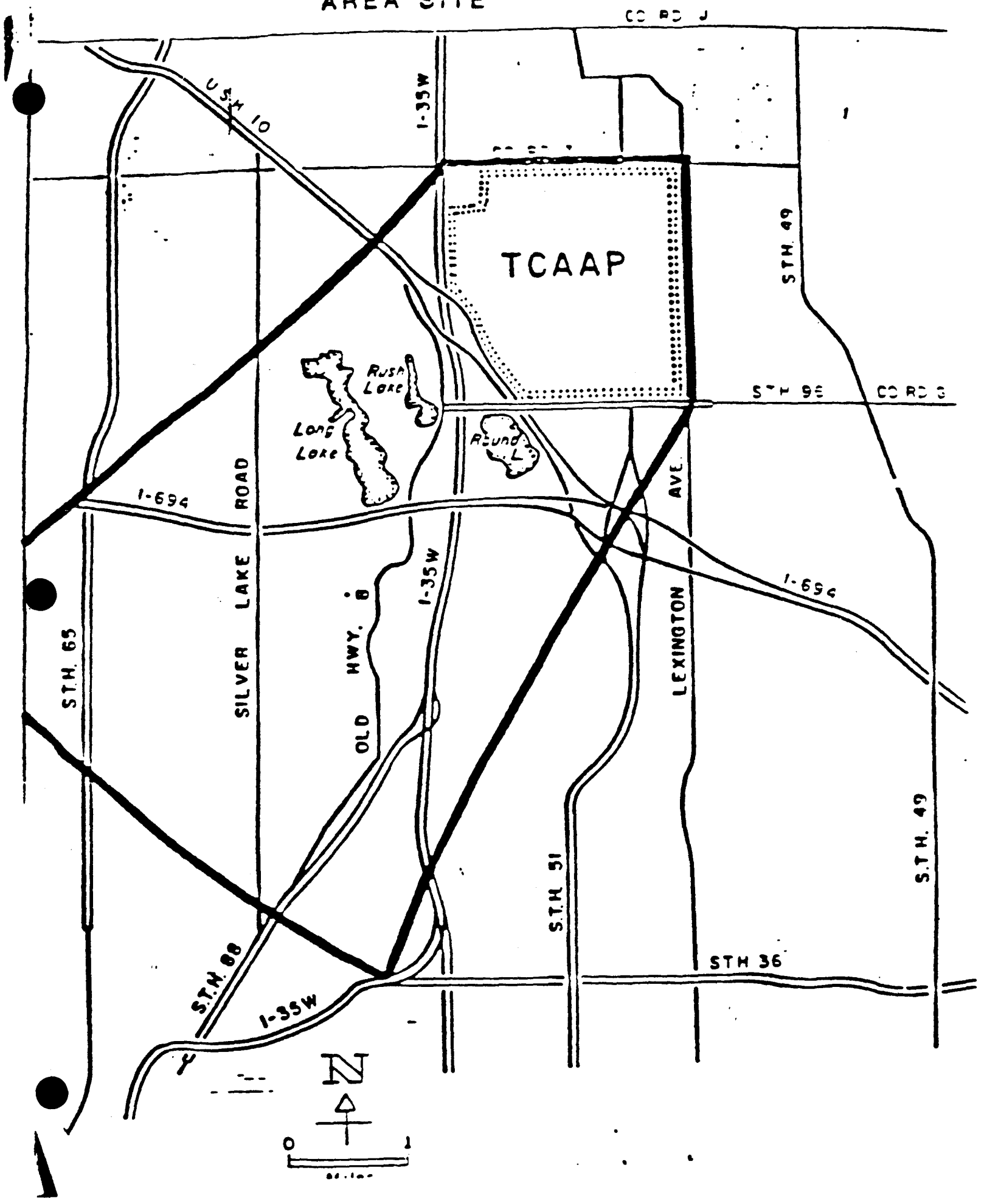
By: _____ 7/30/87
for Thomas J. Kalitowski
Executive Director
Minnesota Pollution Control
Agency
Date

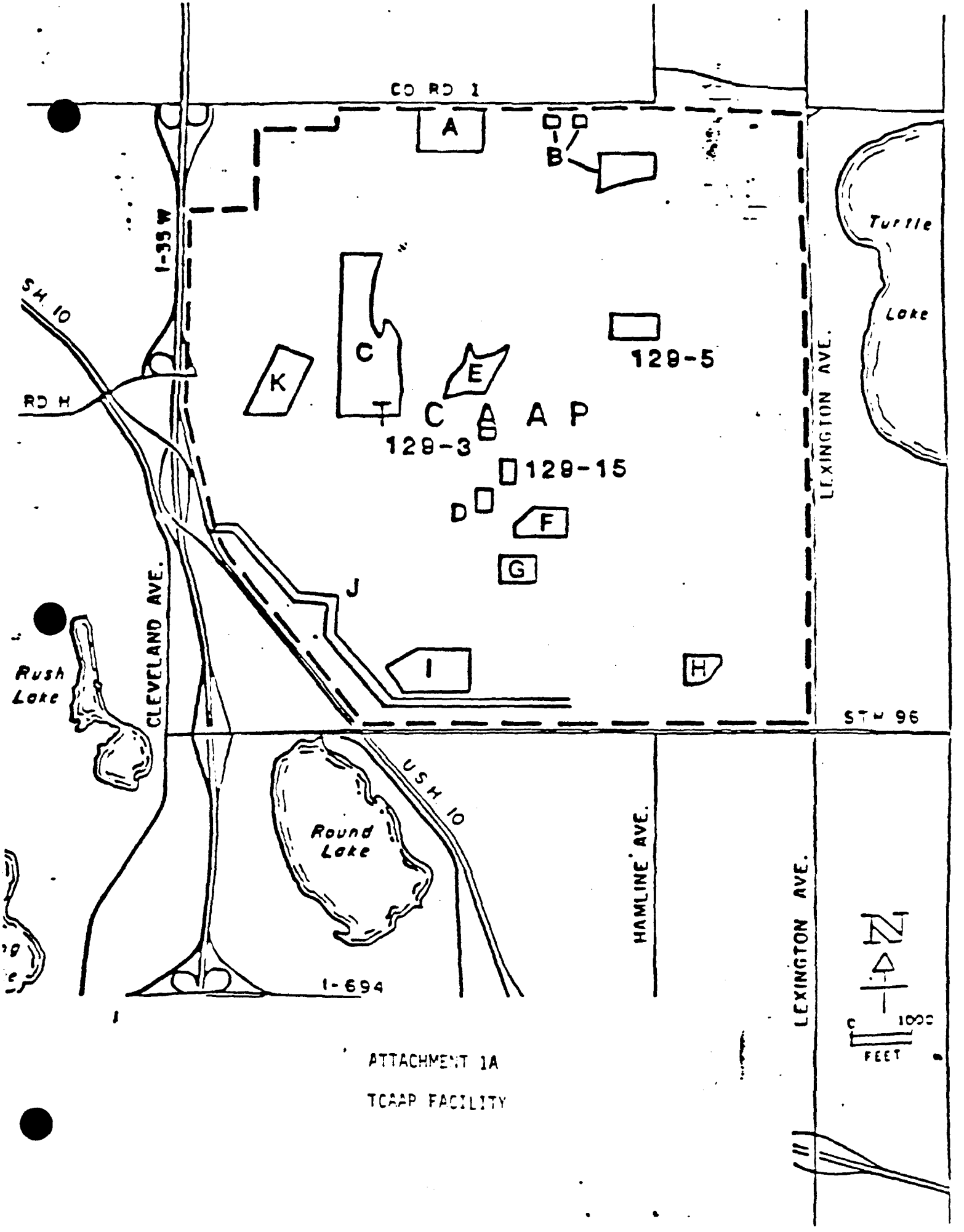
By: _____ 7/31/87.
Hubert H. Humphrey, III
Attorney General
State of Minnesota
Date

By: _____ 7/24/87
J. Winston Porter
Assistant Administrator
U.S. Environmental Protection
Agency
Date

By: _____ 12 August, 1987
Valdas V. Adamkus
Regional Administrator
U.S. Environmental Protection
Agency
Date

ATTACHMENT 1 - APPROXIMATE EXTENT OF TCAAP/NBIA AREA SITE





ATTACHMENT 1A

TCAAP FACILITY

ATTACHMENT 2

OPERABLE UNITS

SITE INTERIM REMEDIAL ACTIONS (IRA) SCOPE OF WORK

1.0 Purpose of Site IRA Scope of Work

Remedial Investigative activities have been undertaken by the U.S. Department of Army (U.S. Army), U.S. Environmental Protection Agency (U.S. EPA) and Minnesota Pollution Control Agency (MPCA) within the Site which have identified an extensive area of volatile organic compounds (VOCs) contaminated ground water migrating downgradient from several Twin Cities Army Ammunition Plant (TCAAP) sources. This Attachment is a Scope of Work which the U.S. Army shall undertake to resolve immediate ground water contamination problems. The U.S. Army shall submit to the U.S. EPA and MPCA for a Consistency Test in accordance with Part XIV of this Agreement within sixty (60) days of the effective date of this Agreement, an Interim Remedial Action Plan (IRAP) incorporating the concepts set forth in this Attachment.

These Interim Remedial Actions (IRAs) are necessary to minimize the continued migration of volatile organic compounds (VOCs) from Twin Cities Army Ammunition Plant (TCAAP) source areas D, G and I, within the Hillside Sand and Prairie du Chien/Jordan aquifers. In addition, this IRA Scope of Work sets forth the minimum monitoring requirements neccessary to evaluate initial IRA effectiveness. The U.S. Army shall recognize the results of the U.S. EPA and MPCA Phase IA Remedial Investigation, evaluate and undertake any

appropriately identified Interim Remedial Actions or additional investigative activities required due to TCAAP activities. The IRAP shall be modified at the request of the U.S. EPA and MPCA Director. This request may be based on the results of the Phase IA Remedial Investigation, the U.S. EPA sewer line study, or the TCAAP Remedial Investigation (TCAAP RI) performed by the U.S. Army, as outlined in Attachment 3 of this Agreement.

The IRAP shall be consistent with Attachment 4 (Feasibility Study) and Attachment 5 (Remedial Design/Remedial Actions), incorporating the concepts set forth within this Attachment. The interim response actions addressed in the IRAP shall be initiated by the U.S. Army to immediately stop the migration of contaminated ground water from the TCAAP and shall be terminated only in accordance to Part XXXVIII of this Agreement. A site Health and Safety Plan for the IRA will be submitted to the U.S. EPA and MPCA for review within sixty (60) days of the effective date of this Agreement.

2.0 Ground Water Pump-Out Systems

The U.S. Army shall design, construct and operate ground water pump-out systems in the Hillside Sand and Prairie du Chien/Jordan aquifers in accordance with the concepts set forth in the following Sections. The IRAP shall, at a minimum, include a detailed design description of the selected IRA that complies with the requirements in this IRA Scope of Work. The design description shall include all neccessary engineering plans and specifications.

The Hillside Sand aquifer pump out system (Section 2.1 of this Attachment) and the Prairie du Chien/Jordan aquifer pump out system (Section 2.2 of this Attachment) shall be operated in a coordinated matter so as to prevent further degradation of either aquifer and to reduce the potential of vertical migration.

2.1 Hillside Sand Aquifer

The U.S. Army shall design, construct and operate a Hillside Sand aquifer pumpout system consisting of a gradient control system and a source control system.

2.1.1 Hillside Sand Gradient Control System

The purpose of the gradient control system is to establish an effective hydraulic barrier located along the TCAAP southwest boundary to intercept contaminants currently migrating from TCAAP (including source areas D, G and I) within the Hillside Sand aquifer. An effective barrier is one that maintains ground water quality that meets or exceeds the criteria identified by the Army under Section 3.1 of this Attachment.

2.1.1.1 Contaminant Capture Zone - Hillside Sand Aquifer

The Army shall design, construct and operate a ground water gradient control pumpout system for the Hillside Sand aquifer. The capture zone for the gradient control system shall be such that ground water within the Hillside Sand aquifer having contaminant concentrations greater than the Criteria Levels discussed in Section 3.1 of this Attachment will be intercepted. The capture zone shall extend approximately from TCAAP well nest S1 to TCAAP well nest S5 S5 along the TCAAP southwest boundary. Figure 2.1 illustrates the approximate extent of the Hillside Sand aquifer gradient control contaminant containment area based on TCE concentrations. The gradient control system capture zone may be expanded or contracted based on monitoring results obtained as described during operation in Section 2.1.1.3, Contaminant Capture Zone Modification.

2.1.1.2 Hillside Sand Extraction Well Locations

The Hillside Sand aquifer gradient control pump-out system wells shall be placed to capture ground water from the containment area contaminated in excess of Criteria Levels established under Section 3.1 of this Attachment.

Each extraction well shall be located and will maintain a minimum pumping rate sufficient to provide an effective hydraulic barrier to migration between adjacent extraction wells. Each extraction well shall be screened throughout the entire saturated thickness of the Hillside Sand Aquifer. Refinement of extraction well location and pumpage shall be based on the IRA Ground Water Monitoring Program, Section 3 of this Attachment, and the results of the Phase IA study performed by MPCA and the U.S. EPA, the U.S. EPA Sewer Line RI, and the TCAAP RI performed by U.S. the Army under this Agreement (Attachment 3).

2.1.1.3 Contaminant Capture Zone Modification

If, after operation of the gradient control system, the concentration of hazardous substances, pollutants and contaminants in the Hillside Sand capture zone is reduced to below criteria levels in three consecutive quarterly samples from any Hillside Sand monitoring or extraction well. The U.S. Army may propose to exclude the area monitored by that well, to the U.S. EPA and MPCA in accordance with Part XVI of this Agreement.

Samples will be collected from the wells in any excluded area in conformance with Section 3 of this Attachment, IRA Ground Water Monitoring Program. Operation of the gradient control system shall be adjusted to capture ground water in the area monitored by any well where ground water samples show a concentration in excess of criteria levels for the contaminants

identified under Section 3.1 of this Attachment. In accordance with Section XVI the U.S. Army shall submit to the U.S. EPA and MPCA, at least thirty (30) days in advance, any proposed modification to the gradient control capture zone for a Determination of Consistency prior to proposed implementation.

2.1.1.4 System Effectiveness Monitoring

The U.S. Army shall submit in the IRAP the details of a program to monitor the effectiveness of the Hillside Sand ground water gradient control system. The Hillside Sand ground water gradient control system effectiveness shall be monitored by taking water level measurements and analyzing ground water samples from the network of wells discussed in Section 3 of this Attachment, Hillside Sand Monitoring.

2.1.2 Source Control System

The purpose of the source control system is to capture highly contaminated ground water upgradient from the gradient control system near TCAAP source areas D, G and I. Extraction of Hillside Sand aquifer water of high concentrations will expedite the ground water clean-up. The indicator parameter and action level for implementation of the source control system will be 1,1,2-trichloroethene (TCE) above 1000 ppb or as modified in Section 2.1.2.3.

2.1.2.1 Contaminant Capture Zone

The U.S. Army shall design, construct and operate a ground water source control pumpout system for two capture zones within the Hillside Sand aquifer. The capture zones for the source control system shall be designed such that ground water within the Hillside Sand aquifer having TCE concentrations greater than 1,000 ppb shall be intercepted. The first capture zone for the source

control system will extend approximately from TCAAP well nest S17 to TCAAP well nest S21. The second capture zone for the source control system will extend approximately 500 feet either side of TCAAP well S29 along an equipotential extending through the well. Figure 2.2 illustrates the approximate extent of the Hillside Sand aquifer source control contaminant containment areas.

2.1.2.2 Extraction Well Locations

The Hillside Sand aquifer source control extraction wells shall be placed to capture ground water from the contaminant containment area with TCE in concentrations in excess of 1,000 ppb. In addition, each extraction well shall be located and shall maintain a minimum pumping rate sufficient to extract ground water within the source contaminant containment area. Refinement of extraction well locations and pumpage shall be based on the results of the IRA Ground Water Monitoring Program (Section 3) and as a result of the Phase IA study performed by the U.S. EPA and MPCA, the U.S. EPA Sewer Line RI and the TCAAP RI performed by the U.S. Army under this Agreement (Attachment 3).

2.1.2.3 Contamination Capture Zone Modification

If, after operation of the source control system, the TCE concentration in the Hillside Sand capture zone is reduced to below 1,000 ppb in three consecutive quarterly samples from any Hillside Sand monitoring or extraction well, modifications to the operation of the source control system may be proposed by the U.S. Army, in accordance with Part XVI, to exclude the area monitored by that well. Samples shall be collected from the wells in any excluded area in conformance with Section 3, IRA Ground Water Monitoring Program. Operation

of the source control system shall be adjusted to capture ground water area monitored by any well where ground water samples show a TCE concentration of 1,000 ppb or greater.

In accordance with Part XVI of this Agreement, the U.S. Army shall propose to the U.S. EPA and MPCA, at least thirty (30) days in advance, any proposed modification to the source system, including contaminant control capture zones.

2.1.2.4 Groundwater Source Control System Effectiveness Monitoring

The U.S. Army shall propose in the IRAP the details of a program to monitor the Hillside Sand ground water source control system. The Hillside Sand groundwater source control system effectiveness will be monitored by taking water level measurements and analyzing ground water samples from the network of wells specified in Section 3 of this Attachment.

2.2 Prairie du Chien/Jordan Aquifer

The U.S. Army shall design, construct and operate a Prairie du Chien/Jordan aquifer pump-out system consisting of a gradient control pump-out system.

2.2.1 Prairie du Chien/Jordan Gradient Control System

The purpose of the gradient control system is to establish an effective hydraulic barrier located along the TCAAP southwest boundary to intercept contaminants currently migrating from TCAAP source areas within the Prairie du Chien/Jordan aquifer.

2.2.1.1 Prairie du Chien/Jordan Contaminant Capture Zone

The U.S. Army shall design, construct and operate a ground water gradient control pump-out system for the Prairie du Chien/Jordan aquifer. The capture

zone for the gradient control system shall be such that ground water within the Prairie du Chien/Jordan aquifer having contaminant concentrations greater than criteria levels established in Section 3.1 of this Attachment shall be intercepted. The capture zone will extend from TCAAP wells S84 to approximately 500 feet southeast of TCAAP well S2 along the TCAAP southwest boundary. Figure 2.3 illustrates the approximate extent of the Prairie du Chien/Jordan aquifer gradient control containment area.

2.2.1.2 Prairie du Chien/Jordan Extraction Well Locations

The Prairie du Chien/Jordan gradient control extraction wells shall be placed to capture ground water from the contaminant containment area (contaminants in concentrations in excess of criteria levels established in Section 3.1 of this Attachment). Extraction wells shall be screened throughout the entire contaminated saturated thickness of the Prairie du Chien/Jordan aquifer. In addition, each extraction well shall be located and shall maintain a minimum initial pumping rate sufficient to provide an effective hydraulic barrier continious between adjacent extraction wells. Refinement of extraction well location and pumpage shall be based on the results of the IRA Ground Water Monitoring Program (Section 3), and as a result of the Phase IA study performed by the U.S. EPA and MPCA, the U.S. EPA Sewer Line RI, and the TCAAP RI performed by the U.S. Army under this Agreement.

2.2.1.3 Prairie du Chien/Jordan Contaminant Capture Zone Modification

If, after operation of the gradient control system, the concentration in the Prairie du Chien/Jordan capture zone is reduced to below criteria levels in three consecutive quarterly samples from any Prairie du Chien/Jordan

monitoring or extraction well, the U.S. Army may propose a modification of the operation of the gradient control system to exclude the area monitored by that well in accordance with Part XVI of this Agreement. Samples shall be collected from the wells in any excluded area in conformance with Section 3, IRA Ground Water Monitoring Program. Operation of the gradient control system will be adjusted to capture ground water by any well where ground-water samples show a contaminant concentration in excess of criteria levels established in Section 3.1.

The U.S. Army shall propose, in accordance with Part XVI of this Agreement, to the U.S. EPA and MPCA at least thirty (30) days in advance of proposed implementation, any modification to the gradient control capture zone.

2.2.1.4 Prairie du Chien/Jordan Groundwater Gradient Control System Effectiveness Monitoring

The Army shall propose in the IRAP the details of a program to monitor the effectiveness of the Prairie du Chien/Jordan ground water gradient control system. The Prairie du Chien/Jordan ground water gradient control system effectiveness will be monitored by taking water level measurements and analyzing ground water samples from the network of wells specified in Section 3.5, Prairie du Chien/ Jordan Monitoring Program.

2.3 Conditions for IRA

2.3.1 Protection of Long Lake

Any discharge contemplated for Long Lake or Rice Creek upstream of Long Lake shall be evaluated for discharge to Rice Creek downstream of Long Lake. The final decision on the point of discharge shall be justified and subject to the Consistency Test in accordance with part XIV.

Any wastewater discharge to the Rice Creek watershed shall be analyzed for nutrients in addition to toxic pollutants and subject to appropriate limitations in order to protect Long Lake. Rice Creek watershed outfall sampling requirements are given in Table 2.4.

2.3.2 Underground Injection Wells

Under 40 CFR 144.13, (c) and 144.14 wells used to return contaminated ground water that has been treated and is being returned into the same formation from which it was drawn are not prohibited if such an action is approved by U.S. EPA pursuant to RCRA and CERCLA/SARA. No U.S. EPA permits are issued for such Class IV wells. An approval for such wells must be based on the review of the Underground Injection Control Section of U.S. EPA Region V and the recommendations of the Region V, Water Division. U.S. EPA will coordinate its review with the MPCA.

2.4 TCAAP Production Well Reconstruction or Abandonment

The Army shall reconstruct or abandon and seal those TCAAP production wells located within the boundaries of the Hillside Sand contaminant containment area. The Army shall properly reconstruct or abandon and seal in accordance with Chapter 4725 of the Minnesota Department of Health Water Well Code, individual TCAAP production wells to prevent continued contaminant migration from the overlying Hillside Sand to the Prairie du Chien/Jordan aquifer. The proposed schedule for well reconstruction or abandonment shall be submitted in the IRAP.

2.5 IRA Discharge Requirements

2.5.1 Discharge of Effluent Condition

Any discharge of ground water after collection or treatment will meet the discharge criteria and monitoring requirements in Tables 2.4, 2.5, or

2.6. The sampling procedures in the QAPP submitted under Section 3.2 of this Attachment and determined to be consistent under Part XIV of this Agreement shall be used. The current TCAPP outfalls are shown in Figure 2.4.

2.5.2 . Discharge Conditions

The U.S. Army shall notify the Metropolitan Waste Control Commission, MCPA and U.S. EPA if at any time it is necessary to discharge untreated waters to the sanitary sewer including periods of routine shutdowns of treatment systems.

2.5.3 Treatment Efficiences at Building 103

The treatment system for Building 103 (site K) shall achieve an intital removal efficiency of 98 percent as a quarterly average, and 95 percent as a daily minimum. The removal efficiency will be calculated as the ratio of total VOCs removed from the effluent to the total VOCs in the influent. If influent concentrations decrease the removal efficiency requirements may be modified in accordance with Part XVI of this Agreement. In this event the U.S. Army shall demonstrate that optimum efficiency is being achieved for the level of influent being treated. The U.S. Army agrees that daily maximum discharge requirements for individual VOC's or total VOC's may be determined by the U.S. EPA and MPCA after the initial year of operation.

2.5.4. Flow Monitoring and Water Balance

The Army shall monitor the flow at discharge outfalls 20100, 20200, 20300, and 20400, 20500, and 20600.

The Army shall conduct a water balance study at the Gravel Pit (outfall 20600) to determine if soil permeability will accomodate the effluent from the IRA treatment systems and area runoff. A report of the study will be submitted to the MPCA and U.S. EPA for a Determination of Consistency thirty (30) days in advance of proposed discharge.

The Army shall submit an annual, Gravel Pit Water Balance report incorporating meterological and anthropogenic sources and samples (including precipitation, temperature charge in water level and evaporation). The recharge to the aquifer will be measured or estimated. The annual water balance will be submitted concurrently with the IRA Ground Water Annual Monitoring Report, Section 3.7 of this Attachment.

2.6 Implementation of IRA

The U.S. Army shall complete construction of the Hillside Sand and Prairie du Chien/ Jordan extraction wells, the water treatment system and the reconstruction or abandonment of TCAAP production wells as required by the IRAP. The Army shall commence pumping for the Hillside Sand within thirty (30) days of the date the IRAP passes the Consistency Test. The Army shall commence pumping from the Prairie du Chien/Jordan within 150 days of the date the IRAP passes the Consistency Test. The Army shall notify all users of private wells located in or adjacent to the anticipated capture zone prior to the implementation of the Interim Remedial Actions.

3.0 IRA Ground Water Monitoring Program

The Army shall propose a Monitoring Plan which shall be submitted with the IRAP. The Monitoring Plan will incorporate the components listed below and

will comprise the IRA Ground Water Monitoring Program. In addition, the Army shall propose appropriate monitoring to evaluate impacts on private wells located in the capture zone.

The purpose of the IRA Ground Water Monitoring Program shall be to monitor the effectiveness of the ground water pump out systems, define changes in the distribution of contaminant concentrations, and determine when operation of the pump-out systems may be modified. The Army may propose changes in parameters to be analyzed at specific wells based upon two consecutive re-sampling rounds in accordance with Part XVI of this Agreement.

3.1 Analytical Parameter List and Criteria Levels and Schedule

At a minimum, ground water samples collected as part of the IRA Ground Water Monitoring Program shall be sampled and analyzed pursuant to Tables 2.1, 2.2 and 2.3.

The criteria levels shall be proposed in the IRAP and will be based on the most stringent of the current levels in the legally applicable or relevant and appropriate standards, requirement, criteria or limitation, including The Toxic Substances Control Act, The Safe Drinking Water Act, The Clean Air Act, The Clean Water Act, The Solid Waste Disposal Act or any state or Federal standards, requirement, criteria or limitation as specified in SARA § 121. The basis of the Criteria Levels in the IRAP shall be specified for each hazardous substance, pollutant or contaminant and shall include those listed on Tables 2.1., 3.6 and 3.7 (A and B). U.S. EPA and MPCA suggested initial criteria levels and the basis for each are those in Table 3.7 (A and B) of Attachment 3. The criteria levels specified by the U.S. Army will be subject to review by U.S. EPA and MPCA until termination of this Agreement and may

be modified according to Part XVI of this Agreement.

3.2 Quality Assurance Project Plan

Prior to submittal of the QAPP the U.S. Army shall notify the U.S. EPA and MPCA of the laboratory and analysis procedure the U.S. Army intends to utilize the Army for sample analysis. The U.S. EPA (Region V) Quality Assurance Office (QAO) will determine if the laboratory is capable of the intended analysis. The Army shall only use a laboratory deemed capable by the QAO of the necessary analyses. After laboratory acceptance by U.S. EPA, a planning meeting may be scheduled if U.S. EPA's Quality Assurance Office so requests.

After the planning meeting, if any, U.S. Army shall submit a proposed Quality Assurance Project Plan (QAPP) to be utilized in implementing the IRAP and IRA Ground Water Performance Monitoring Program. The proposed QAPP shall be prepared so as to be consistent with the requirements the U.S. EPA's Contract Laboratory Program and EPA's Region V guidance on federal lead QAPPs, U.S. EPA's Interim Guidelines and Specifications for Preparing Quality Assurance Plans (QAMS-005/80) and current guidance.

A sampling Plan will be included in the QAPP that covers all activities to be performed as part of the RI and monitoring programs. The proposed QAPP shall specify the procedures for:

a. field protocol including procedures for chain-of-custody, sample collection and transportation and storage of samples;

b. calibration in terms of accuracy, precision, and references (the QAPP shall also specify the number of times and intervals at which which analysis equipment will be calibrated) for field and laboratory

c. laboratory analytical methods, including methods for ensuring accurate measurements of data in terms of precision, accuracy, completeness, comparability, and lab sample

storage procedures;

d. laboratory sample storage procedures;

e. reporting;

f. internal quality control;

g. audits;

h. preventive maintenance;

i. laboratory corrective action; and

j. routine assessment of data precision, representativeness, comparability, accuracy, and completeness of specific measurement parameters involved.

k. site specific Sampling Plan

l. The objectives of each sampling and analysis procedures

m. The objectives, users, and needs for data collection and the description of how the procedures in the QAPP meet these objectives and data uses.

3.3 Water Level Monitoring

The U.S. Army shall measure water levels to the nearest 0.01 of a foot prior to collection of each ground water sample. In addition, all existing monitoring wells and proposed extraction wells shall be measured for water levels once a month for the first year of monitoring.

3.4 Hillside Sand Monitoring Well Network

The U.S. Army shall, at a minimum, collect and analyze samples from the Hillside Sand aquifer monitoring wells specified on Table 2.2. Table 2.2 identifies the well identification numbers, sampling frequency/type, parameter group and selection criteria.

3.5 Prairie du Chien/Jordan Monitoring Well Network

The U.S. Army shall, at a minimum, collect and analyze samples from the

Prairie du Chien/ Jordan aquifer monitoring wells specified on Table 2.3. Table 2.3 identifies the well identification numbers, sampling frequency/ type, parameter group and selection criteria.

3.6 Monitoring Frequency

Quarterly groundwater monitoring will take place during the months of March, June, September and December with semiannual samples collected and analyzed during March and September.

3.7 IRA Ground Water Monitoring Reports

3.7.1 Quarterly Monitoring Reports

All analytical results and water level measurements shall be submitted to the Project Managers at least fifteen (15) days prior to the next quarterly sampling.

3.7.2 Annual Monitoring Report

By February 15 of each year, an annual monitoring report which documents the results of all the monitoring conducted during the previous calendar year (January 1 - December 31) and any proposed monitoring modifications shall be submitted to the Project Managers.

Each annual report will contain the following information for the previous monitoring year:

a. results of all water level measurements and chemical analyses;

b. water level contour maps for each aquifer showing high and low ground water levels;

c. isoconcentration maps posting the maximum trichloroethene (TCE), 1,1,1 Trichloroethane (TCA), and 1,1 dichloroethene (DCE) concentrations at each well location for each sampling event;

d. a proposed sampling plan for the next monitoring year with an assessment of the monitoring parameters and frequencies and the feasibility for the deletion of monitoring wells or parameters or a decrease in sampling frequency;

e. a discussion and summary of the monitoring year's data in comparison to previous monitoring years data;

f. discussion of IRA's effectiveness, and

g. a proposal of any monitoring modifications.

The Army shall propose in the IRAP the scale to be used of all maps submitted in the Annual Monitoring Report.

3.8 Implementation of IRA Ground Water Monitoring Program

The U.S. Army shall commence the first years IRA monitoring program at the start up date of the IRAs.

ATTACHMENT 2

TABLE 2.1

Analytical Parameter List

Volatile Organic Compounds (Parameter Group 1)

Benzene	Xylene
Toluene	1,1-Dichloroethane
cis-1, 2-Dichloroethylene	1,2-Dichloroethane
1,1,1-Trichloroethane	1,1,2-Trichloroethylene
1,1-Dichloroethylene	Trans-1, 2-Dichloroethylene
1,1,2-Trichloroethane	1,1,2-Trichlorotrifluoroethane
1,1,2,2-Tetrachloroethylene	Chloroform
1,2-Dichloropropane	Vinyl Chloride

Metals (Parameter Group 2)

Arsenic	
Barium	
Cyanide	Mercury
Cadmium	Chromium
Lead	Zinc
Nickel	

Radionuclides (Parameter Group 3)

alpha emitting radionuclides beta emitting radionuclides
gamma emitting radionuclides
Specific radionuclides include: U238, V234, Cs 137 Co60

Polychlorinated Biphenyls (Parameter Group 4)

PCB Scan should specifically include:

Aroclor 1248	Aroclor 1254
Aroclor 1260	Aroclor 1016
Aroclor 1242	

NOTE: Analytical parameter list is derived from a compilation of observed contaminants. Data gathered from (1) STS, Phase 1I, Vol. 1, June, 1984; (2) CDM, POP, December, 1984; (3) MPCA/MDH VOC(465) sample analysis; (4) CRA, VOC Remedial Investigations, Building 502 and Vicinity, March, 1985; (5) CRA, PCB Remedial Investigations, Building 502 and Vicinity, June, 1984 and (6) STS, GRAAA Draft - Final Report, February 1986.

TABLE 2.2 IRA Ground Water Monitoring Program, Hillside Sand Aquifer Well Network

Well ID#	Sampling Frequency/Type Parameter Group	Selection Criteria
PD 1U3	QWQ 1	TCAAP southwest boundary gradient control barrier monitoring
PD 2U3	QWQ 1	
PD 3U3	QWQ 1	
PD 3L3	QWQ 1	
T1 U3	QWQ 1	
T2 M3	QWQ 1	
T2 L3	QWQ 1	
T3 U3	QWQ 1	
T4 U3	QWQ 1	
T5 U3	QWQ 1	
T6 U3	QWQ 1	
T6 M3	QWQ 1	
T6 L3	QWQ 1	
PCA6 U3	QWQ 1	
T9L3	QWQ 1	
S1 U3	QWQ 1	
S1 M3	QWQ 1	
S1 L3	QWQ 1	
S84 U3	QWQ 1	
S84 L3*	QWQ 1	
S77 U3	QWQ 1	
S77 L3	QWQ 1	
S2 U3	QWQ 1	
S2 M3	QWQ 1	
S2 L3	QWQ 1	
S78 U3	QWQ 1	
S78 L3	QWQ 1	

TABLE 2.2 (Continuation)

Well ID#	Sampling Frequency/Type Parameter Group	Selection Criteria
S3 U3	QWQ 1	
S3 M3	QWQ 1	
S3 L3	QWQ 1	
S4 U3	QWQ 1	
S4 M3	QWQ 1	
S4 L3	QWQ 1	
S5 U3	QWQ 1	
S5 M3*	QWQ 1	
S5 L3	QWQ 1	
S21 U3	QWQ 1	
S21 L3	QWQ 1	
S14 U3	QWQ 1 SWQ 2,3,4	TCAAP source control monitoring
S14 L3	QWQ 1 SWQ 2,3,4	source G.
S94 U3	QWQ 1 SWQ 2,3,4	
S94 L3	QWQ 1 SWQ 2,3,4	
S20 U3	QWQ 1	
S20 M3	QWQ 1	
S20 L3	QWQ 1	
S92 U3	QWQ1	
S18 U3	QWQ 1 SWQ 2,3,4	TCAAP source control monitoring
S18 L3	QWQ 1 SWQ 2,3,4	source D.
S17 U3	QWQ 1	
S17 M3	QWQ 1	
S17 L3	QWQ 1	
S93 U3	QWQ 1	
S96 U3	QWQ 1	
S28 U3	QWQ 1 SWQ 2,3,4	TCAAP source control monitoring
S28 L3	QWQ 1 SWQ 2,3,4	source Building 502.
S659 U3	QWQ 1 SWQ 2,3,4	
S29 U3	QWQ 1 SWQ 2,3,4	
S29 L3	QWQ 1 SWQ 2,3,4	
S79 U3	QWQ 1	
S79 L3	QWQ 1	

TABLE 2.2 (Continuation)

Well ID#	Sampling Frequency/Type Parameter Group	Selection Criteria
S27 U3	QWQ 1	
S27 L3	QWQ 1	
S30 U3	QWQ 1	
S80 U3	QWQ 1	
S80 L3	QWQ 1	

Note: Sample Frequency/Type

QWQ = Quarterly Water Quality
SWQ = Semiannual Water Quality

Parameter Group

1 = Volatile Organic Compounds
2 = Metals
3 = Radionuclides
4 = PCBs

*Additional TCAAP plume definition ground water monitoring wells, Attachment 3, Site RI Scope of Work.

Table 2.3

(DELETED)

Table 2.4

Stormwater outfalls[1]

Effluent Characteristics	Monitoring requirements[2]	Limitations
Flow (daily average-m3/day)	4X month	-
Dissolved Oxygen (mg/l)	4X month	-
Phosphorus - total	4X month	-
Phosphorus - ortho	4X month	-
Total suspended solids	4X month	-
PH	-	6 - 9
Oil and other substances	-	No visible color

1. Applies to outfalls number 20100 through 20500 and similar outfalls related to Rice Creek watershed

2. Sampling is four times per month (4X month) for three months and monthly starting in 4th month from effective date of agreement. Two of the 4X month samples should be taken during a storm event of 0.5 inches or more. The first sample should be taken during the onset of storm to represent the first flush and the second taken 24 to 36 hours from the event.

Table 2.5

BUILDING 103[1]

	Frequency	Limitations
Flow m^3/day daily average	continuous	
Influent total VOC	quarterly[2]	- 3
Effluent total VOC	quarterly[2]	- 3 98% removal
Phosphorous - total	monthly	-
- ortho	monthly	-
Lead - total	quarterly	-
Zinc - total	quarterly	-
chromium - total	quarterly	-
Copper - total	quarterly	-
pH		6-9
Floating solids		none
Oil or other substances		no visible color film

1 outfall 20201

2 Sampling frequency is monthly for initial year and quarterly thereafter

3 See Section 2.5.3. of this Attachment

Table 2.6

GRAVEL PIT[1] (Infiltration basin) requirements

	Frequency	Limitations[3]
Flow m^3/day daily total	continuous	-
Trichloroethene	quarterly[2]	2.8 ug/1
Total VOC - effluents	quarterly[2]	-
Total VOC - influent	quarterly[2]	-
Nickel	quarterly[2]	-
Zinc	quarterly[2]	-
Phosphorus - total	quarterly[2]	-
Phosphorus - ortho	quarterly[2]	-
pH		6-9
Solids and foam		no trace
Oil or other substances		no visible color film

1 Outfall Serial number 20600

2 Samples shall be weekly for first month monthly for following eleven months and quarterly thereafter

3 Limitations will be proposed by the U.S. Army

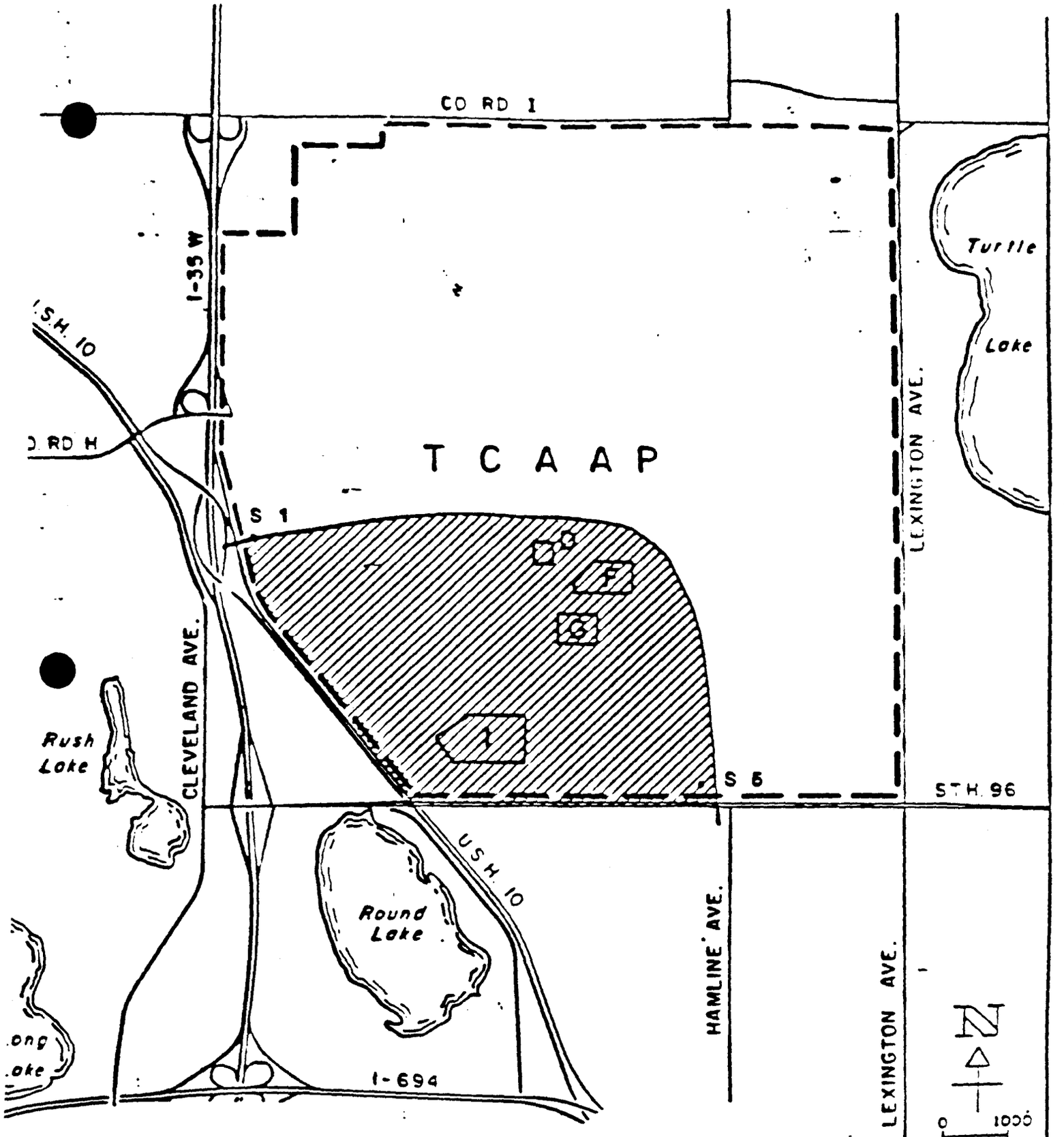


FIGURE 2.1 APPROXIMATE EXTENT OF THE HILLSIDE AND AQUIFER GRADIENT CONTROL CONTAMINANT CONTAINMENT AREA

ATTACHMENT 2

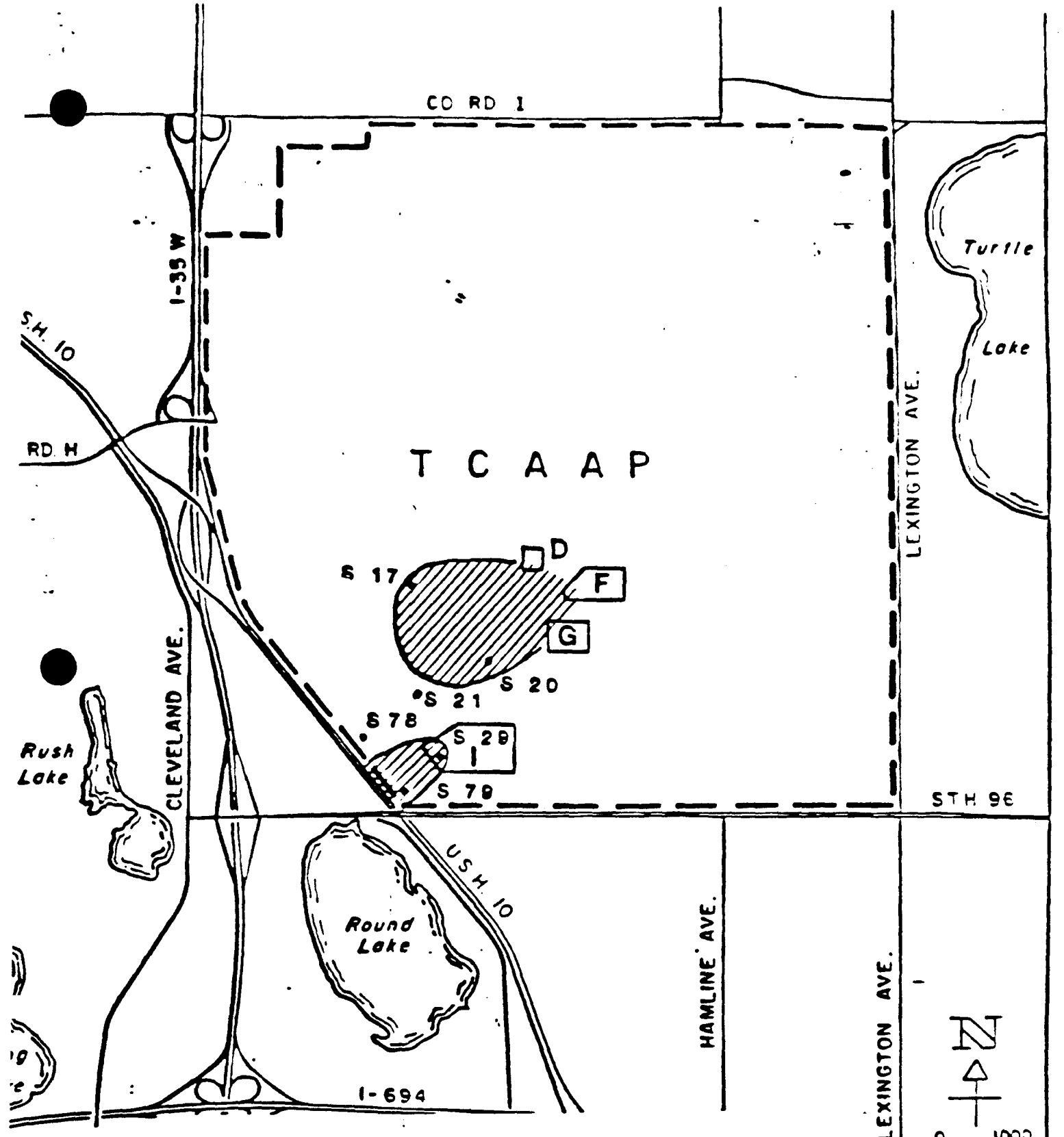


FIGURE 2.2 APPROXIMATE EXTENT OF THE HILLSIDE SAND AQUIFER SOURCE CONTROL CONTAMINANT CONTAINMENT AREAS

ATTACHMENT 2

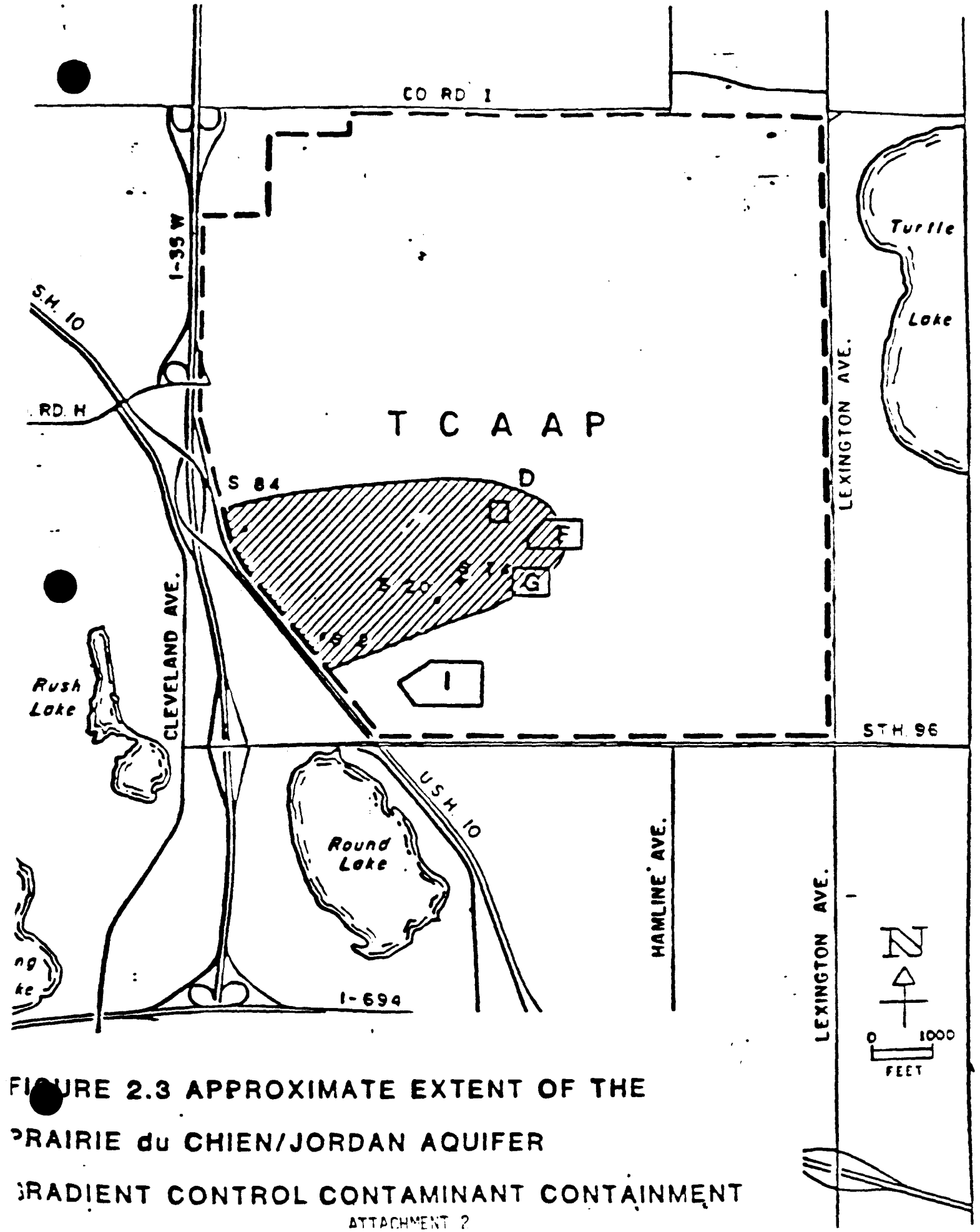
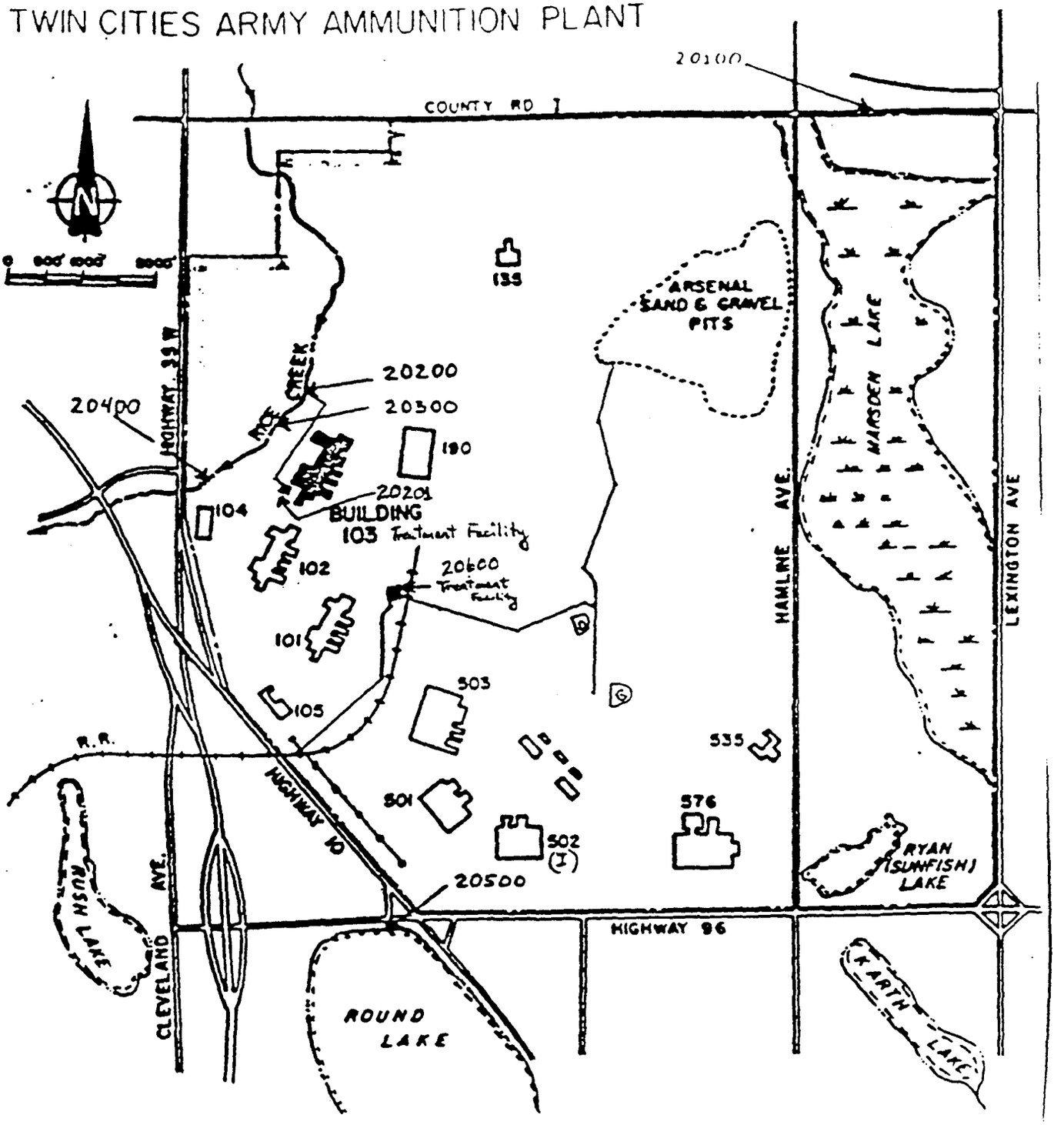


FIGURE 2.3 APPROXIMATE EXTENT OF THE
PRAIRIE du CHIEN/JORDAN AQUIFER
GRADIENT CONTROL CONTAMINANT CONTAINMENT

ATTACHMENT 2



LEGEND

TCAAP PROPERTY BOUNDARY

FIGURE 2.4

TCAAP DISCHARGE OUTFALLS

ATTACHMENT 3

TCAAP REMEDIAL INVESTIGATION SCOPE OF WORK

COMPLETION SCHEDULED BY JULY 15, 1988

The purpose of this Twin Cities Army Ammunition Plant Remedial Investigation (TCAAP RI) Scope of Work is to set forth the minimum specific requirements to complete the remedial investigations to fully determine the nature and extent of the threat to public health, welfare, or the environment caused by the release and threatened released of hazardous substances, pollutants or contaminants at and from the TCAAP. This Scope of Work defines the investigative and Quality Assurance/Quality Control activities necessary to define the extent and magnitude of ground water contamination within the TCAAP and to properly evaluate TCAAP Source Areas A, B, C, D, E, F, G, H, I, J, K, 129-3, 129-5 and 129-15 and any other potential sources located within the TCAAP. The U.S. Army shall submit to the U.S. Environmental Protection Agency (U.S. EPA) and to the Minnesota Pollution Control Agency (MPCA), a TCAAP RI Work Plan which shall incorporate all of the activities outlined within this TCAAP RI Scope of Work as described in this Attachment.

The TCAAP RI Work Plan shall be consistent with the policy, guidance and regulation current at the time of submittal. The TCAAP RI shall be a supplement to and recognize the results of the U.S. EPA and MPCA Phase I and Phase IA Remedial Investigations evaluate and undertake any appropriately identified RI activities.

1.0 TCAAP Evaluation Investigation, Monitoring, and QA/QC Activities

Studies of ground water quality in the cities of Arden Hills, New Brighton, and St. Anthony have shown that volatile organic compounds (VOCs) have been introduced into the local and regional ground water systems. Numerous residential and industrial wells southwest of the TCAAP are contaminated by VOCs including trichloroethene (TCE). Municipal wells at the cities of New Brighton and St. Anthony also have been found to be contaminated with VOCs. The study area for the U.S. EPA and MPCA Phase I and Phase IA RIs roughly conforms to the boundaries of the U.S. Geological Survey (USGS), New Brighton, 7 1/2 minute quadrangle. RI activities performed by the Army shall be performed at areas within the TCAAP and off TCAAP areas as determined by the U.S. EPA and MPCA Director, areas affected by contamination migrating from TCAAP source area A, and investigate wetland and and surface waters (including Round Lake) on and near the TCAPP. Army shall undertake all necessary interim remedial actions resulting from TCAAP activities identified in the Phase IA RI performed by U.S. EPA and MPCA.

In order to fully evaluate the contamination and the potential significant sources that exist within and adjacent to TCAAP, the U.S. Army shall perform necessary RI activities as set as outlined in this Attachment. The objectives of the TCAAP RI activities include:

- Identify and thouroughly characterize all TCAAP source areas;
- Determine the continuity of contaminant plumes that have been identified through previous monitoring;
- Define contamination status of surface waters and sediments potentially affected;
- Provide a final potential source screening to evaluate potential significant sources on TCAAP;

- Provide a list of preliminary remedial alternatives and provide the necessary data to evaluate appropriate response actions;
- Maintain a contaminant source and regional long-term surface and ground water monitoring program;
- Provide any information that is obtained by the U.S. Army that may be useful to the U.S. EPA and MPCA in determining sources of contamination not related to TCAAP activities; and
- Provide for necessary Site Security and Health and Safety procedures required throughout the Site.

Accordingly, the TCAAP RI Scope of Work activities focus on the construction of additional monitoring wells, the collection of additional field data and evaluation of these data. The Army shall identify and propose methods in the monthly reports submitted to U.S. EPA and MPCA for any additional RI activities not included in the TCAAP RI Work Plan as accepted by the U.S. EPA and the MPCA.

The U.S. EPA and MPCA are continuing further studies as described in the Phase I Addendum (Phase IA) work plan (April 25, 1986). This work has been offered to the Army for their performance in proposed agreements and in Request for Response Actions. Since the Army has declined to perform such work, the Army is expected to perform the work described in this Attachment in cooperation and in a manner to make its studies comparable and compatible with the Phase IA work. The Army shall modify the TCAAP RI Work Plan to undertake any additional RI activities outlined in the Phase IA Report and the U.S. EPA Sewer Line RI related to TCAAP activities as determined by the U.S. EPA and MPCA Project Managers.

Within sixty (60) days of the effective date of the Agreement, the Army shall submit to the U.S. EPA and the MPCA Director for review and a Determination of

Consistency in accordance with Part XIV an Evaluation Report, a TCAAP Remedial Investigation Work Plan (TCAAP RI Work Plan) and a Quality Assurance/Project Plan (QAPP) as described in this Attachment. In addition, the Army shall submit a Health and Safety Plan within (60) days of the effective date of this Agreement for review.

The Evaluation Report shall contain the information set forth in Section 2.1. The TCAAP RI Work Plan shall contain the information set forth in Sections 2.2, 3 and 4 of this Attachment. The QAPP shall contain the information set forth in Section 5. A Site Health and Safety Plan consistent with U.S. EPA guidance as set forth in Section 6 of this Attachment will be submitted prior to or in conjunction with the TCAAP RI Work Plan.

2.0 Specific Requirements for TCAAP Evaluation Report, and Work Plan RI

Specific components of TCAAP studies and reports set forth in this Section consist of an Evaluation Report (Section 2.1) and a TCAAP RI Work Plan (Section 2.2).

2.1 Evaluation Report

2.1.1 Site background

The Army shall conduct a thorough historical review of all Army, company operators, and manufacturing tennants files related in any way to TCAAP manufacture, storage transportation and disposal activities. Personnel interviews shall also be conducted as part of this Evaluation Report. The document review procedures and results shall be documented and included within the Evaluation Report. The Evaluation Report shall include a detailed explanation of the operational history, location, pertinent area boundary features,

general physiography, hydrology stratigraphy, and geology of all TCAAP disposal sites including but not limited to source areas A, B, C, D, E, F, G, H, I, J, K, 129-3, 129-5 and 129-15. In addition, the Evaluation Report shall include a detailed discussion of all past activities related to the generation of and release or threatened release and disposal of solid wastes and hazardous substances at all TCAAP source areas including flow and discharge data related to the sewerlines originating at the TCAAP. The Army shall characterize each tennant's solid waste and hazardous substances disposed of at each TCAAP source area and shall include an estimate of each TCAAP tennant's relative contribution of hazardous substances disposed of at each source area.

A narrative coordinated with the site maps prepared under Section 2.1.2, Topographic Survey, shall be prepared describing the stormwater drainage system on the TCAAP, including subwatersheds and points of origin and discharge. Should any stormwater discharge subject to 40 CFR Part 122.26 be identified, the Army shall apply for a NPDES permit for the discharge of such storm water runoff from the TCAAP Site into the surface water and comply with its conditions.

2.1.2 Topographic Survey

The Evaluation Report shall include maps of all TCAAP disposal sites and other sources of hazardous substances, contaminants and pollutants using a one inch to 100 feet scale and a two foot contour interval or other suitable scale. Surface water features, wetlands, buildings, process areas, hazardous waste permitted and unpermitted storage areas, storage tanks, well locations, forested areas, utilities, paved areas, easements, right-of-ways, pipelines (surface/subsurface operative/abandoned/stand by), impoundments and suspected disposal

area boundaries shall be shown. The maps shall be of sufficient detail and accuracy to locate all current or proposed future work at all TCAAP disposal sites. Maps shall delineate all stormwater collection and discharged points and shall indicate all areas outside of the TCAAP affected by storm water flowing from or through the TCAAP.

2.1.3 Bedrock Survey

The purpose of the bedrock survey shall be to compile and evaluate a comprehensive well log, ground water chemistry and water level data base to adequately define the extent of buried bedrock valleys within the Site and to evaluate their effects, if any, on Hillside Sand and Prairie du Chien/Jordan ground water flow and contaminant migration.

The Army shall summarize the results of previous bedrock valley surveys in the Evaluation Report. Any necessary further work shall be described in the Evaluation Report and proposed in the TCAAP RI Work Plan.

2.1.4 Degreasing Operations Inventory

The purposes of the degreasing operations inventory shall be to locate and describe all TCAAP solvent degreasing operations, including waste disposal methods, dates of use, tennants involved and to determine if there are any impacts on the local or regional ground water system and associated soils due to their operation.

The Army shall summarize the results obtained during the TCAAP Inventory of Solvent Degreasing Operations and proposed any required additional degreasing operation inventory activities in the Evaluation Report.

The Army shall submit within the TCAAP RI Work Plan a proposed plan to conduct additional degreasing operation inventory activities to adequately determine adverse environmental impacts due to their operation. Specifically, the Army shall describe any necessary field investigations and data collection, to thoroughly evaluate all TCAAP degreasing operations.

2.1.5 TCAAP Farmstead Well Inventory

The purpose of the TCAAP farmstead well inventory shall be to identify farmsteads which may have been used as disposal sites and to locate, inventory, test and properly abandon all farmstead wells as directed in MDH Water Well Code, Chapter 4725. Furthermore, additional RI activities along with necessary remedial actions shall be identified in the Evaluation Report.

The Army shall summarize the results obtained during the previous TCAAP Farmstead Well Inventory and any necessary additional activities performed as part of the TCAAP RI.

The Army shall submit within the TCAAP RI Work Plan a proposed plan to conduct any required additional TCAAP farmstead well inventory activities to adequately identify farmsteads used as disposal sites and to locate, inventory, test and abandon any farmstead wells not in use. Specifically, each well shall be cleared of obstacles and debris, sampled for parameters listed on the Analytical Parameter List (Table 3.6) , and abandoned as necessary in accordance with MDH Water Well Code 4725.

2.1.6 History of remedial or removal actions

The Evaluation Report shall include a summary of any previous response actions conducted at all TCAAP disposal sites. This summary shall include

field inspections, sampling surveys, cleanup activities, and other reports or technical investigations as well as any removal or remedial action taken at all TCAAP areas.

2.1.7 - Sewer Line and TCAAP Sumps Investigation

The purposes of the U.S. EPA Sewer Line RI are to determine if there are adverse environmental impacts due to leakage from TCAAP 18 and 24-inch diameter force mains, 36-inch diameter gravity line, along with identifying any potential adverse environmental impacts on the regional ground water system.

The Evaluation Report shall contain a summary of any prior TCAAP Sumps and Sewer Line Projects and describe any proposed additional TCAAP sewer line and sump activities. The summary shall include historical flow data and known discharge characterization as well as an assessment of probable generators. The extent of investigation shall be dependent on the results of the ongoing TCAAP force main investigation being conducted by U.S. EPA and any Army investigations.

The Army shall submit within the TCAAP RI Work Plan a proposed plan to conduct additional sewer line and TCAAP sump investigations to adequately determine adverse environmental impacts due to leakage from TCAAP 18 and 24-inch diameter force mains, 36-inch diameter gravity line and TCAAP sumps. Specifically, the Army shall prescribe the necessary additional field investigations, and data collection, if any, to thoroughly evaluate TCAAP 18 and 24-inch diameter force mains and 36-inch diameter gravity line.

2.1.8 Column Leaching Tests - Sites D and G

The purpose of the column leaching tests will be to estimate contaminant

mass loading to the Hillside Sand aquifer from TCAAP source areas D and G and to calculate an acceptable VOC soil cleanup level for TCAAP source areas D and G.

The Army shall summarize the results obtained during the current column leaching tests and shall propose additional column leaching tests required to meet the purpose of the tests in the Evaluation Report.

2.2 Site Remedial Investigation Work Plan

The Army shall submit a TCAAP RI Work Plan which, upon implementation: (1) shall provide for the complete characterization of the TCAAP source areas and its potential hazard to public health, welfare and the environment; (2) shall produce sufficient data and information to allow a satisfactory Remedial Investigation Report; (3) shall produce data of sufficient quantity and adequate technical content to assess the possible alternative response actions during the Site Feasibility Study to be performed by the Army incorporating both the Phase I and Phase IA RI of U.S. EPA/MPCA, the U.S. EPA Sewer Line RI, and the TCAAP RI performed by the Army under this Agreement; and (4) shall address investigative requirements pursuant to RCRA outlined in Attachment 6.

At a minimum, the TCAAP RI Work Plan shall include proposed methodologies to accomplish the RI activities outlined below and meet the objectives in Part of this Agreement and shall also include proposed dates and/or time intervals for initiation and completion of each of the RI activities. The Army may use previous studies and investigations to develop an effective and efficient TCAAP RI Work Plan. The Army shall submit a RI Report outline within the proposed TCAAP RI Work Plan for a Determination of Consistency in accordance with Part XIV of this Agreement.

2.2.1 Well Construction

Ground water monitoring wells shall be constructed by the Army in order to:

- Determine the continuity of presently identified VOC ground water plumes,
- Enhance ground water monitoring for remedial action performance evaluation and potential significant source monitoring; and
- Provide the necessary hydrogeologic data to adequately identify, assess and screen potential significant sources on TCAAP.
- The U.S. Army shall submit detailed well construction plans and drilling protocol tothe MDH, MPCA and U.S. EPA at least thirty (30) days prior to construction.

2.2.2 TCAAP Plume Definition Wells

Additional TCAAP plume definition wells are necessary to adequately determine the extent and magnitude of ground water contamination, vertically and horizontally, of the presently identified plumes in the Hillside Sand (Unit 3) and Prairie du Chien/Jordan (Unit 4) aquifers migrating from TCAAP, and to enhance the existing ground water monitoring network to evaluate Unit 3 and Unit 4 ground water remedial actions. These wells can also be incorporated into the IRA Ground Water Monitoring Program described in Attachment 2.

Table 3.1 and Figure 3.1 list and locate the additional TCAAP plume definition well identification numbers, types and selection criteria that shall be installed by the Army.

2.2.3 TCAAP Source Monitoring Wells

Additional ground water monitoring wells are necessary to enhance the monitoring well networks within the TCAAP to adequately evaluate the existing

or future contaminant releases from potential TCAAP source areas A, B, C, D, E, F, G, H, I, J, K, 129-3, 129-5 and 129-15.

Table 3.2 and Figure 3.2 list and locate the additional potential source control well identification numbers, types and selection criteria that shall be installed by the Army.

2.2.4 (SECTION DELETED)

2.2.5 Well Drilling Logs

The Army shall prepare detailed geologic and well construction logs and water well records. Water well logs shall be submitted to the MPCA, U.S. EPA and Minnesota Department of Health (MDH) no later than thirty (30) days after well construction is complete.

The well installation procedures shall be documented by the Army. These reports shall be, upon completion of the well, be submitted prior or with TCAAP RI report and shall include;

- A complete list of construction materials and supplies including the name of the manufacturer, for the items listed below:

  a. casing
  b. well screens
  c. gravel pack
  d. sand pack
  e. grout
  f. caps and locking covers
  g. centralizers
  h. drilling fluids
  i. sample bags

- The source and location of potable water supply, written authorization of the suppliers, method of transporting and containing the potable water. The City of New Brighton, the City of St. Anthony municipal and the TCAAP production water systems will not be acceptable as a source of potable water unless accompanied by a representative VOC sample analyses indicating no VOC contamination.

- The method and location of drilling fluid and cuttings disposal.
- Shop drawings for the protective steel cover.
- Material samples of the gravel pack and sand cap.
- During drilling of each well, the Army will maintain a complete log on the well site setting forth the following:
  - The reference point for all depth measurements.
  - The depth at which each change of formation occurs.
  - The identification of the material of which each stratum is composed.
  - The depth interval from which formation samples were taken.
  - The depth at which hole diameters (bit sizes) change.
  - The total depth of the completed well.
  - The depth or location of any lost drilling fluid, drilling materials, or tools.
  - The depth of the outer casing seal.
  - The nominal hole diameter of the well bore above and below the outer casing seal.
  - The amount of cement (number of bags) used for the seal.
  - The depth and description of the well casing.
  - The complete description (including length, diameter, slot sizes, etc.) of any well screens.
  - The as built well schematic indicating appropriate material and lithologic types.
  - Location of well or pilot soil boring with assigned UTMS coordinates.
  - Other pertinent data requested by the U.S. EPA and MPCA.
- During drilling of each well, a daily detailed driller's report will be maintained by the Army and submitted as requested. The report will give a complete description of:
  - The formations encountered.
  - The number of feet drilled.

- The number of hours on the job.
- The shutdown due to breakdown.
- The feet of casing set.
- Other pertinent data requested by the U.S. EPA and MPCA.
- All lithologic samples including split spoon and shelby tube samples will be clearly and indelibly labeled with the following information: During the drilling of each well lithologic samples shall be collected by the Army at 5 foot vertical intervals or at changes in lithologies, whichever occurs first. In the case where more than one well will be installed at a single location, lithlogic samples can be collected from only the deepest of the well. All samples will be retained by the Army and made avallable to the U.S. EPA and MPCA:
- Location of sample.
- Name or number of well or pilot soil boring.
- Depth interval represented by the sample.
- Date taken.

The above well construction information shall be summarized in the TCAAP RI Report.

2.2.6 Ground Water Potentiometric Survey

The objective of the ground water potentiometric survey is to provide a time equivalent survey of the potentiometric surfaces in the water table, Hillside Sand and Prairie du Chien/Jordan aquifers. These measurements will aid in understanding ground water flow and contaminant transport patterns within and from the TCAAP and provide a calibration target for the MPCA/U.S. EPA computer flow model developed within the Phase IA RI.

2.2.6.1 Select Survey Wells

The Army shall propose monitoring wells for inclusion in the ground water potentiometric survey. The objective is to provide a thorough representation

of the water table, Hillside Sand and Prairie du Chien/Jordan aquifers throughout the TCAAP. A list of wells proposed for inclusion in the survey shall be included in the TCAAP RI Work Plan. The list shall include unique well number, location, aquifer, construction details, and well depth. A map shall accompany the list, locating each survey well.

2.2.6.2 Measure Selected Wells

Each of the selected wells included in the ground water potentiometric survey shall be surveyed by the Army to the top-of-casing. If wells have already been surveyed in previous investigations the U.S. Army may use those measuring point elevations. Each measuring point elevation shall be reported in feet above mean sea level (MSL), also the measuring point shall be clearly marked on well casing riser. Water level measuring protocol shall be outlined by the Army in the QAPP (Section 5). To the extent possible, all water level measurements shall be conducted in conjunction with the Phase IA water level measurements. The U.S. EPA and MPCA will give the Army at least a fourteen (14) day advance notice of the start of the Phase IA water level measurements. The Army in all cases, shall give U.S. EPA and MPCA at least fourteen (14) days advance notice of the start of water level measurements to be taken by the Army.

2.2.6.3 Data Reduction

The ground water potentiometric survey information shall be reduced by the U.S. Army to provide the ground water potentiometric elevation at each of the monitoring sites. This information shall be provided in both a tabular and posted map format with contours. Potentiometric surface maps shall be

generated by the Army for the water table, Hillside Sand and Prairie du Chien/ Jordan aquifers.

2.2.7 Water Quality Survey

The objective of the water quality survey is to provide a time equivalent survey of the ground water chemistry of the water table, Hillside Sand and Prairie du Chien/Jordan aquifers beneath the TCAAP RI study area. These analytical sample results will be used to ascertain the continuity, extent and magnitude of VOC plumes identified in the U.S. EPA/MPCA RI Reports and to evaluate the significance of other potential significant sources. To the extent possible the water quality survey shall be conducted in conjunction with the U.S. EPA/MPCA Phase IA Water Quality survey. The U.S. Army shall provide, at a minimum, fourteen (14) days advance notice of the start of the water quality survey shall be given to the U.S. EPA and MPCA.

2.2.7.1 Select Survey Wells

A total of approximately 100 wells shall be selected for inclusion in the water quality survey. A list of wells proposed for inclusion in the survey will be included in the TCAAP RI Work Plan.

2.2.7.2 Sample and Analysis

Field and laboratory protocol shall be set forth by the U.S. Army in the QAPP (Section 5 of this Attachment). All surface and ground water quality samples will be collected within a three week period simultaneous with the potentiometric survey. To the extent possible scheduling the survey and water quality samples will be obtained within the timeframe used by U.S. EPA/MPCA to improve comparability with the U.S. EPA and MPCA Phase IA efforts. Analysis methods shall be sufficient to detect criteria levels discussed in Section 3.7. of this Attachment. The

U.S. EPA and MPCA shall be allowed to collect confirmation samples upon request. In all cases the U.S. Army shall give U.S. EPA and MPCA at least fourteen (14) days notice of sample collection or water level measurements.

2.2.7 Data Reduction

Analytical results shall be provided in both a tabular and posted map format with contours. Isoconcentration maps shall be generated by the Army for the water table, Hillside Sand and Prairie du Chien/Jordan aquifers. In addition, a statistical analysis of contaminant ratio within the observed plumes and a discussion of the horizontal and vertical extent of contamination shall be summarized within the TCAAP RI Final Report.

2.2.8 Data Collection/Management

The objective of data collection/management is to develop a comprehensive data base from all the RI activities outlined in the TCAAP RI Scope of Work. The data shall include well attribute and water quality information generated as part of the TCAAP RI. The data shall be used in conjunction with the information generated by the U.S. EPA and MPCA in the Phase IA study to determine an understanding of the contamination problem. U.S. EPA, MPCA, and the Army shall exchange data upon request in accordance with Part XXII of this Agreement.

2.2.8.1 Well Attribute Database

The Well attribute database shall be composed of separate data files which shall be unique for each well and shall include:

Well Attributes

° Minnesota Unique Number

- Location by Public Land Survey (PLS), Universal Transverse Mercator (UTM) and Latitude-Longitude.
- Description including driller, owner, date completed, elevation (MSL), depth, aquifer and well use.

Well Construction

- Minnesota Unique Number
- Casing type and material, diameter(s), starting and ending depths.
- Screen type and material, diameter, slot size, starting and ending depths.
- Pump test data including date, pumping rate, duration, drawdown.

Stratigraphy

- Minnesota Unique Number
- Primary, Secondary and Minor lithologies, color, hardness/ N-value, starting and ending depths.

Water Levels

- Minnesota Unique Number
- Measuring point elevation, stick-up.
- Date, depth to water, water level elevation, measurement method.

2.2.8.2 Water Quality Data

Water quality data shall be composed of a single data file which shall be unique for each sample and shall include:

Water Quality

- Minnesota Unique Number
- Collection date, parameter code, lab sample number, lab blank number, lab code, detection limit, value, units and method.

2.2.9 Source Assessment Screening

The objective of the source assessment screening is to assess potential significant sources within the TCAAP that may be contributing to the regional contamination other than those screened in the U.S. EPA/MPCA Phase IA RI. The Army assessment shall be based upon a review and evaluation of information concerning historical land use, waste disposal activities and hydrogeology. The screening procedure shall be identical to the screening procedure presented in the MPCA/U.S. EPA Phase IA RI. The screening shall be updated based on hydrogeologic data generated as part of the TCAAP RI as well as other area investigations including the Phase IA RI performed by the U.S. EPA and MPCA.

2.2.10.1 Potential Significant Source Inventory

The Army shall conduct an inventory on those potential significant sources identified in the MPCA/U.S EPA Phase I RI in Table 5-1, found within the TCAAP RI study area, or as redefined by the U.S. EPA and MCPA based on results of Phase IA study, U.S. EPA Sewer Line RI, or the TCAAP RI activities. In addition, TCAAP source area 129-3, 129-5 and 129-15 and any additional potential significant sources found during the TCAAP RI Evaluation Report activity shall be inventoried and included in the screening. The potential significant source inventory shall include a review of each source area's historical operations, disposal histories and waste characteristics. Hazardous substance quantities, times of disposal, disposal locations and chemical and physical properties of the substances shall be documented. Information searches shall include personnel interviews, and review of external and internal TCAAP related files. The information search procedures, document review and results shall be presented within the TCAAP RI Final Report.

2.2.10.2 Final Potential Significant Source Screening

The Army shall report the conclusions of the final potential significant source screening in the TCAAP RI Report. The final screening shall identify those potential significant sources due to TCAAP activities.

The screening procedure that the U.S. Army shall use its outlined below and shall incorporate field and laboratory data. Each potential significant source within the TCAAP shall be screened regardless of the ability to identify the presence or absence of contaminants.

The U.S. Army shall use an analytical model to estimate the rate of migration through the Twin Cities Till underlying each site. This migration estimate will be calculated using a one-dimension, advection-dispersion equation for vertical flow. The equation given below is the complementary error function equation presented in MPCA/U.S. EPA Phase I RI.

$$\frac{C}{Co} = \frac{1}{2}\left[\operatorname{erfc}\left(\frac{(l - vt)}{(2(Dlt)\cdot 5)}\right) + EXP\left(\frac{(vl)}{(DT)}\right)\operatorname{erfc}\left(\frac{(l + vt)}{(2(Dlt)\cdot 5)}\right)\right]$$

with,

$$v = \frac{K\left\langle\frac{dh}{dz}\right\rangle}{N}$$

where the values of the variables below are identical to those determined in the U.S. EPA and MPCA Phase IA Report and;

C = concentration at the bottom of the Twin Cities Till

Co= concentration at the top of the Twin Cities Till

$\left(\frac{C}{Co}\right) = 0.1$

l = Twin Cities Till thickness

Dl= dispersion coefficient, (dependent on till thickness approximated using Gelhar, et al, 1985)

v = average vertical velocity through the Twin Cities Till,

t = travel time,

k = vertical hydraulic conductivity of the Twin Cities Till, calculated from laboratory permeability tests,

N = effective porosity,

$\frac{dh}{dz}$= vertical hydraulic gradient across the Twin Cities Till.

In application of this equation, the following assumptions are made: (1) the contamination was introduced at the ground surface at the beginning of operation at the TCAAP; (2) if there is no information on when operations (if any) took place at the site, a 40-year period of operations is assumed; (3) migration through the surficial deposits to the Twin Cities Till surface occurs in a negligible amount of time; (4) migration through the till is governed by the advection-dispersion process; and (5) a break-through of contamination is assumed to occur when the 0.1 isopleth $(\frac{C}{C_o})$ reaches the lower boundary of the till layer.

The Army shall provide a list of the potential significant sources break-through times. These sources shall be identified on a Source Assessment Screening map. Those sites that have an estimated break-through time prior to 1981 will be identified on the Source Assessment Screening map and shall remain on the potential significant sources list for further screening as identified below.

In addition, assuming that contamination of the Hillside Sand aquifer occurs prior to contamination of the Prairie du Chien/Jordan aquifer, only

those sites which have break-through times prior to 1981 and are located within the known area of Hillside Sand contamination need remain as potential significant sources to the regional contamination and shall be identified on the Source Assessment screening map.

A final potential significant sources list shall be generated by the Army in the TCAAP RI Report and include significant sources in the Phase IA RI.

2.2.11 Alternative Remedial Action Evaluation

The objectives of the alternative remedial action evaluation are to provide a preliminary listing of alternative remedial actions on the basis of environmental effectiveness, engineering technology and economic criteria, and to provide an initial screening of these alternatives. This evaluation shall address alternatives compatible with the regional MPCA/EPA Phase IA RI conclusions. The purpose of this evaluation shall be to provide an assessment of alternative remedial actions for the TCAAP and to determine whether additional RI activities are warranted on TCAAP.

2.2.11.1 Develop Potential Alternatives List

Based on the results of the Phase IA and TCAAP RI activities and an assessment of health and/or environmental hazards that exist, the Army shall generate a list of potential alternative remedial actions. Existing recreational uses of the Long Lake and Rice Creek watershed shall be incorporated in the development of remedial action alternatives. The no-action alternative shall be included as a baseline comparison.

2.2.11.2 Develop Screening Criteria and Conduct Initial Screening

Screening criteria shall be developed by the Army and applied to identify

the potential remedial action alternatives. The criteria that shall be utilized to evaluate each alternative in conducting the initial screening activities shall include the following:

Environmental

For each remedial action alternative, an assessment shall be made regarding adverse environmental effects associated with the alternative or its implementation; and whether the alternative is likely to effectively mitigate and minimize threats to the public health, welfare or the environment. Preference will be given to permenant solutions in accordance with §121 of CERCLA/SARA.

Effectiveness

A preliminary analysis as to whether each evaluated alternative is likely to effectively abate or minimize the release or threatened release and/or minimize the threat of harm to the public health, welfare and the environment.

Engineering

A site-specific assessment shall be made regarding the technical feasibility of the alternative, applicability toward correcting the problem, and reliability of the proposed action. The U.S. EPA and MPCA will use the model developed during Phase IA to evaluate the technical feasibility of the remedial action alternatives proposed by Army.

Economic

Capital and operation and maintenance cost ranges shall be estimated, and a present worth range will be determined to define significant cost differences to install or implement each evaluated alternative.

2.2.12 RI Report

The Army shall summarize the results obtained during the TCAAP RI in a RI Final Report and shall submit the RI Final Report for a Determination of Consistency in accordance with Part XIV of this Agreement.

3.0 Identified Contaminant Source Investigation and Monitoring Program (A, B, C, D, E, F, G, H, I, J, K, 129-3, 129-5 and 129-15)

3.1 Purpose and Objectives

Current hydrogeologic data indicates that TCAAP source areas (D, G, and I) have contributed to regional ground water and soil contamination at TCAAP. This contamination is migrating within the local and regional aquifers to the westsouthwest and has migrated across the TCAAP boundaries. TCAAP source areas A, B, C, E, F, H, J, 129-3, 129-5 and 129-15 have been inadequately investigated, presenting an unknown potential to contributing VOC or other contamination to local and/or regional ground water or surface water contamination. In addition TCAAP Source Areas D, G, I and K remain known potential source for regional contamination of groundwater.

Table 3.4 summarizes the available data on the individual disposal sites, dates of operation, type of materials disposed, and soil and ground water contaminant levels. Figure 3.4 illustrates the approximate location of the documented identified TCAAP source areas.

The Army shall implement the Contaminant Source Investigation and Monitoring Program within (30) days of the Determination of Consistency of the TCAAP RI work plan. The purpose of the contaminant source monitoring program

is two-fold. One function of the program is to develop a TCAAP source monitoring network for surface and ground water which will provide the necessary long term water quality and water level data to detect the presence and characteristics of contamination migrating from TCAAP source areas A, B, C, D, E, F, G, H, I, J, K, 129-3, 129-5 and 129-15 and to provide hydrogeologic data necessary to evaluate removal and remedial action alternatives. The second function is to develop a program to assess the contamination of soils at TCAAP source areas as well as to use the associated data for any necessary response actions.

3.2 Ground Water Monitoring Network

A monitoring well network shall be developed by the Army and shall be used to establish a long term ground water monitoring network at the TCAAP source areas and to enhance the present Unit 1, Unit 3 and Unit 4 ground water monitoring. The proposed ground water monitoring network shall be included in the proposed TCAAP RI Work Plan. The wells within the network shall be used in conjunction with action criteria levels described in Section 3.7 to evaluate the necessity for any future TCAAP RI actions or remedial actions.

The Army shall monitor those wells on Table 3.5. Table 3.5 lists the well identification numbers, sampling frequency/type, parameter group, selection criteria for TCAAP source areas A, B, C, D, E, F, G, H, I, J, K, 129-3, 129-5 and 129-15, and represent the source monitoring network.

3.3 Surface Water Source Monitoring Network

A surface water source monitoring network shall be developed by the Army which will provide the appropriate water quality data to adequately detect the presence of hazardous substances migrating from individual TCAAP source areas, to provide surface water data necessary to evaluate contingent RI actions and determine the impact of hazardous substances to the surface water on and downstream of the TCAAP, on TCAAP Wetlands and on Round Lake. The proposed surface water monitoring network will be included in the TCAAP RI Work Plan and shall establish a long term monitoring network of surface waters which are or have the potential to be impacted by individual TCAAP source areas or remedial actions. Sediment samples shall be collected from each water body on at least one occasion. The surface water monitoring network will be used in the conjunction with action criteria set forth on Tables 3.7 (A and B) to evaluate the necessity for future TCAAP RI or remedial actions.

The monitoring plan must also characterize the impact of stormwater run-off on surface water quality. The monitoring plan shall include storm event monitoring, and shall specify the storm intensity trigger level. The monitoring plan shall also give the location description and tasks of all proposed stormwater and specified interval monitoring stations. The storm water monitoring plan shall be consistent with the requirement outlined in Table 2.4 in Attachment 2.

3.4 Soil Sampling Program

A soil sampling program shall be developed by the Army to determine the extent of soil contamination at each TCAAP source area. The proposed soil sampling program shall be included in the proposed TCAAP RI Work Plan.

The soil monitoring program will be used to evaluate action necessary for assessment, clean-up or any other future TCAAP actions. Analysis of soils for dioxin and furans shall be performed at one representative location at each identified TCAAP source area.

The soil sampling program shall include a sampling plan and soil sampling protocol for soil borings and soil trenching to adequately characterize each source area. Sampling protocol shall identify boring depths chemical and stratagraphic intervals, drilling protocol/drilling records and specify for analyses the appropriate parameters, from Table 3.6.

Samples at each boring shall be collected down to the water table. The Army shall inform the U.S. EPA and the MPCA of all activities to be performed at least fourteen (14) days in advance of proposed initiation of activities.

3.5 Sampling Program

3.5.1 Initial Sampling

Initial water, soil and sediment samples shall be analyzed for the parameters used in the U.S. EPA Contract Laboratory Program (CLP). In addition, soil samples for dioxin and furans will be taken as indicated in Table 3.5. As new wells are installed for the TCAAP RI, performance monitoring or any other reason, an initial ground water sample shall be taken by the U.S. Army within fourteen (14) days of final well development. A confirmation sample of groundwater from the new well(s) and surface water will be collected within two weeks after the initial analyses are completed to verify the prior analytical results. Within thirty (30) days of the Notice of Consistency and acceptance by the U.S. EPA and MPCA Director of the surface water monitoring

network, initial samples will be collected.

3.5.2 Subsequent Sampling

Quarterly and semiannual sample analyses will be performed on individual ground water and surface water samples for at least those parameters listed on Table 3.6 and other parameters as determined by U.S. EPA and MPCA based on investigative results.

3.6 Monitoring Frequency

Quarterly water monitoring will take place during the months of March, June, September with semiannual ground water samples collected and analyzed during March and September. December quarterly monitoring will not require analytical analysis.

Water level monitoring shall include the measurement of water levels to the nearest 0.01 of a foot on a quarterly basis. Water level measurements shall be taken prior to the collection of each ground water sample.

3.7 Action Criteria Exceedance

Tables 3.7 (A and B) presents the initial action criteria to be used in conjunction with the analytical parameter list on Table 3.6. The action criteria levels in Tables 3.7 (A and B) may be modified or additional parameters added by the U.S. EPA and MPCA. If any of these criteria are exceeded in any of the ground water, surface water, soil or sediment samples U.S. EPA and MPCA shall be notified in writing within fourteen (14) calendar days of any exceedance of criteria (initial or confirmation sample).

3.8 Reporting

All monitoring reports will be submitted to the U.S. EPA and MPCA Project Managers.

Quarterly Monitoring Reports will be submitted to the Project Managers at least fifteen (15) days prior to the next quarterly sampling. These Quarterly Monitoring Reports shall include:

a. water level measurements for each aquifer for the 3 months of the previous quarter;

b. all laboratory reporting sheets for chemical analyses of samples collected the first month of the quarter;

c. sample dates and times;

d. a discussion of any problems encountered; and

e. a table listing those samples which exceed the action criteria and their concentrations from the previous quarterly sampling.

By February 15 of each year, an annual report which documents the results of all the monitoring during the previous calendar year (January 1 - December 31) will be submitted to the U.S. EPA and MPCA Project Managers. The annual report will include the following information for each aquifer monitored:

a. Results of all water level measurements and chemical analyses presented in tables identified by Minnesota unique number and common well identification number.

b. A water level contour map for each aquifer, for each measuring period with elevations (MSL) labeled at each well (maps at a scale of 1:12,000);

c. A water chemistry isoconcentration map for each aquifer, for each sampling event with concentrations of total VOC's, metals and radionuclides. Individual concentrations should be labeled by the location of each well (logrithmic contour intervals for VOC's at same scale as item b);

d. A discussion of the groundwater quality and water level monitoring results with respect to those action criteria outlined in listed on Tables 3.7 (A and B). A table listing those wells which exceeded the action criteria and their concentrations for each sampling event should be generated and supplied with the discussion. Annual hydrographs illustrating water levels vs. time shall also be prepared and presented for selected wells,

e. A table listing those surface water samples which exceeded the action criteria and their concentrations for each sampling event, and

f. A proposal of any monitoring modifications.

3.9 Modification to the Identified Contaminant Source Investigation and Monitoring Program

The contaminant source monitoring program is based on the present extent of knowledge and the present physical conditions at the TCAAP source areas A, B, C, D, E, F, G, H, I, J, K, 129-3, 129-5 and 129-15. The conditions may change in the future due to additional accumulation of hydrogeologic data and as a result of a thorough document review in the Evaluation Report, TCAAP RI, Phase IA RI and U.S. EPA Sewer line RI; therefore, the contaminant source monitoring program may be modified by the U.S. EPA and MPCA in accordance with Part XVI of this Agreement

In accordance with Part XVI of this Agreement, the U.S. EPA and MPCA Director may modify the monitoring network, monitoring frequency, the analytical parameters and the action criteria. Any modification to the source monitoring program will be given to the Army in writing and shall be incorporated in the next quarterly sampling. If the next quarterly sampling is within thirty (30) days of the notice to modify the sampling program, the U.S. EPA and MPCA will waive the modification until the following quarterly sampling.

The Army may submit to the U.S. EPA and MPCA proposed modifications to the monitoring well network, monitoring frequency, and analytical parameters in accordance with Part XVI of this Agreement. The proposal must be written and include the justification for the proposed modifications.

Only the U.S. EPA and the MPCA Director can modify the action criteria. Action criteria modification shall be submitted in writing to the Army by the U.S. EPA and MPCA following the determination of the need for a new criteria level by the U.S. EPA and MPCA Director. The Army must apply the new criteria to the current quarterly sampling.

3.10 Cessation

The source monitoring program shall be continued until the U.S. EPA and MPCA Director informs the Army, in writing, that the monitoring may cease. The Army may propose cessation of the monitoring program or of analysis for a particular parameter in accordance with Part XVI of this Agreement. This cessation proposal shall include information on the mitigation of the individual TCAAP source areas that could introduce contamination to the ground water.

3.11 Source Remedial Actions

This section describes those procedures and actions that shall be initiated by the Army when source monitoring well samples or surface water samples have contaminant concentrations that exceed the criteria described in Section 3.7. In cases where the action criteria is exceeded, a confirmation sample shall be collected by the Army within fourteen (14) days after receiving the analytical results of the routine sample.

No other actions except routine monitoring are required, if the result of the confirmation sample is below the action criteria. However, if confirmation sample results indicate contamination at or above the action criteria level, the Army shall notify the U.S. EPA and MPCA within fourteen (14) days. The Army shall propose a plan to pursue further action directed at defining the

source, charateristics and a proposal to pursue removal or remedial actions. The Army shall submit to the U.S. EPA and MPCA, within thirty (30) days of the confirmation sample, a Work Plan for the specific TCAAP source area. Should surface water monitoring demonstrate degradation or an exceedance of surface water action criterial discussed in Section 3.7 attributable to TCAAP, appropriate controls shall be implemented to correct the situation.

SECTION 4. (DELETED)

5.0 Quality Assurance Project Plan

Prior to or at the time of submittal of the TCAAP RI Work Plan a Quality Assurance Project Plan (QAPP) shall be submitted. Prior to the submittal of the QAPP, the Army shall notify U.S. EPA and MPCA of the laboratory it intends to utilize for sample analysis and the type analysis expected to be performed at the laboratory. The U.S. EPA Quality Assurance Office will determine if the laboratory is capable of performing the analysis, possibly through performance evaluation results and/or an inspection. The Army shall not use a laboratory deemed incapable of performing the necessary analysis.

After laboratory approval is obtained a planning meeting with U.S. EPA's Quality Assurance Office may be scheduled if requested. After the planning meeting, the Army shall prepare a QAPP that conforms to the specifications in the User's Guide to the U.S. EPA's Interim Guidelines and Specifications for Preparing Quality Assurance Plans (QAMS-005/80) and Region V Guidance for Preparation of Quality Assurance Project Plans. The QAPP shall be submitted to the U.S. EPA and MPCA for determination of consistency, review and approval. A minimum of forty-five (45) days will be necessary for QAPP approval.

The QAPP shall at a minimum, include:

- Project Organization and data management
- Sampling Objectives, and Users data needs
- Sampling Protocol and equipment
- Chain of Custody
- Field Equipment Calibration/maintenance
- Decontamination Procedures
- Quality Control Procedures (duplicates and blanks)
- Quality Assurance Audits
- Non Conformance/Corrective laboratory action
- Site Specific Sampling Plan
- Methods of Analysis (laboratory procedures)
- Numerical Calculation and Peer Review
- Routine Assessment of Data Precision, Representativeness, comparability, Accuracty and Completeness of Specific Measurement Parameters Involved.
- A description of how the procedures in the QAPP meet the objectives and needs at the data users.

6.0 Site Security Health and Safety Plan

The Site Security and Safety Plans are the responsibility of the U.S. Army. The Army shall prepare and submit to the U.S. EPA and the MPCA for comment; (1) a Site Security Plan to limit and control the general public's access to the TCAAP and off-post work sites and (2) a Site Safety Plan to protect the health and safety of personnel involved in implementing the RI/FS.

The Site Security and Safety Plans shall be submitted at the same time that the proposed TCAAP RI Work Plan is submitted. At a minimum, the Site

Safety Plan shall incorporate and be consistent with the requirements of:

1. Section 111(c)(6) of CERCLA -- Protection of Employees;
2. EPA Order 1440.3 -- Respiratory Protection;
3. EPA Order 1440.2 -- Health and Safety Requirements for Employees Engaged in Field Activities;
4. EPA Occupational Health and Safety Manual;
5. OSHA Requirements (29 CFR 1901 and 1910);
6. Interim Standards Operating Safety Guide (Revised September, 1982) by the Office of Emergency and Remedial Response.

Site security and safety are the responsibility of the Army. The U.S. EPA and MPCA may comment on the Site Security and Safety Plans but will neither approve nor disapprove those plans.

TABLE 3.1

Additional TCAAP Plume Definition Ground Water Monitoring Wells

Well ID#	Well Type	Selection Criteria
S84L3	Lower Unit 3	N.W. lateral fringe of northwestern plume
S5M3	Middle Unit 3	Fringe of southeastern Unit 3 and 4 plume

TABLE 3.2

Additional TCAAP Source Ground Water monitoring Wells

Well ID#	Type	Selection Criteria
S122U1	Unit 1	TCAAP Source Area control area B.
S77U1	Unit 1	TCAAP Source Area control area J, along southwest TCAAP boundary.
S116U1*	Unit 1	
S78U1	Unit 1	TCAAP Source Area control area J, near wells S53AU1, S54AU1 and S64U1.
S79U1	Unit 1	
S91U3	Unit 3	TCAAP Source Area control area 129-15.
**	Unit 3	Up Gradient of TCAAP Source Area E.
**	Unit 3	Up Gradient of TCAAP Source Area H.
**	Unit 3	Up Gradient of TCAAP Source Area 129-5

* May require redesignation of well ID #

** Well ID to be determined

TABLE 3.3

(DELETED)

TABLE 3.4 Summary Data of TCAAP Source Areas

TCAAP Disposal Site	Activity	Type	Soil (ppb)	Unit 1 (ppb)	Unit 3
A	1942 - 66	Burn/Burial Area	Zn, Cr, Pb	Cd, Cr, Hg, TCLEE	-
B	1942 - 66	Pre-TCAAP Building Site Sewage Sludge Disposal	Zn, Cr, Pb	Cr, Hg	-
C	1945 - 49	Demolition Debri/Open Burn	Zn, Cr,	-	-
D	1950 - 60	Leaching Pits/Open Burn	TCE 7,000,000, Total VOC 8,280,000, Ba, Cr, Pb, PCB, Phenols	N/A	TCE 20,000
E	1942 - ??	Unknown Chemical Burial	Zn, Cr	N/A	TCE 10
F	1950's - ??	Chemical Burial/Open Burn	Pb	N/A	TCE 5,000
G	1950 - 1970's	Chemical Landfill/Dump	TCE 400,000, Total VOC 960,000, Cd, Cr, Pb, Phenols, Leachate Gross Beta, 680 pci/1	N/A	TCE 10,000
H	1912 - 1967	Demolition Landfill/Dump	Zn, Cr	-	TCE 30
I	1942 - Present	Industrial Manufacturer	Ni, Cd, Cr, TCE 46,000	Ni 40, T12DCE 3,500	Ni 31, TCE 18,400
J	1942 - Present	Sewer Line	Zn, Cr, Pb	TCE 2,000, Cd, Cr	-
K	1950's - Present	Industrial Manufacturer	-	TCE 367,000, Cr, Zn	TCE 2
129-3	1970 - 1975	Leaching Pits/Open Burn	Zn, Cr	N/A	TCE 2
129-5	1945 - 1950's	Leaching Pits/Open Burn/ Disposal Area	Zn, Cr	-	TCE 20
129-15	1970's - Present	Demolition & Chemical Landfill/ Dump	-	N/A	-

NOTE: Data sources include STS Phase II, Bol. I, 1984; Weston Phase III, Bol. I and USATHAMA Report 129, 1978; STS TCAAP Bedrock Survey, Vol. I, 1985; CRA Supplemental RI/FS TCAAP Building 103, 1984; CRA VOC Remedial Investigation, Building 502 and Vicinity, 1985; MDH Analytical Results of MPCA/Army Splits, 1985 and 1986; USATHAMA Quarterly Monitoring Results (October 15, 1986).

SOURCE MONITORING WELL NETWORK

Table 3.5

Well ID #	Sampling Frequency/Type Parameter Group		Selection Criteria
S34U1	INIT	AWQ 1,2,3	TCAAP Source area
S36U1	INIT	AWQ 1,2,3	control areas A and
S103U1	INIT	AWQ 1,2,3	B; along northern
S108U1	INIT/5	AWQ 1,2,3	TCAAP boundary
S101U1	INIT	AWQ 1,2,3	
S115U1	INIT	QWQ 1 AWQ 2,3	
S117U1	INIT	QWQ 1 AWQ 2,3	
S122U1*	INIT	QWQ 1 AWQ 2,3	
S102U1		AWQ 1,2	
S103U1		AWQ 1,2	
S104U1		AWQ 1,2	
S105U1		AWQ 1,2	
S108U1		SWQ 1 AWQ 2	
S116U1		QWQ 1 AWQ 2	
S118U1		QWQ 1 AWQ 2	
S119U1		QWQ 1 AWQ 2	
S120U1		QWQ 1 AWQ 2	
S23U3		AWQ 1,2	
S35U1		AWQ 1,2	
S37U1		AWQ 1,2	
S38U1		AWQ 1,2	
S39U1		AWQ 1,2	
S11U1		AWQ 1,2	
S11U3		AWQ 1,2	
S22U1		AWQ 1,2	
S22U3		AWQ 1,2	
S67U1		AWQ 1,2	
S41U1		AWQ 1,2	
S40U1		AWQ 1,2	
S63U3		AWQ 1,2	
S107U1		AWQ 1,2	
S109U1		AWQ 1,2	
S110U1		AWQ 1,2	
S100U1		AWQ 1,2	
S43U1	INIT/5	AWQ 1,2	TCAAP Source Area
S46U1	INIT	AWQ 1,2	control area C
S85U1	INIT	AWQ 1,2	
S45U1		AWQ 1,2	
S24U3		AWQ 1,2	
S25U3		AWQ 1,2	
S31U3		AWQ 1,2	
S83U3		AWQ 1,2	

TABLE 3.5 (Con't)

Well ID #	Sampling Frequency/Type Parameter Group		Selection Criteria
S18U3	INIT/5		TCAAP Source Area D
S17M3	INIT		
S91U3	INIT		
S93U3	INIT		
Routine monitoring is outlined on Table 2.2, Attachment 2.			
S15U3	INIT	QWQ 1 AWQ 2	Potential source
S88U3	INIT/5	QWQ 1 AWQ 2	control area E
S89U3	INIT	QWQ 1 AWQ 2	
Installation of an upgradient Hillside Sand monitoring well shall be proposed in TCAAP RI Work Plan.			
S114U3	INIT/5	QWQ 1 AWQ 2	TCAAP Source Area
S26U3	INIT	SWQ 1 AWQ 2	control area F
S113U3	INIT	SWQ 1 AWQ 2	
S112U3		QWQ 1 AWQ 2	
S113L3		SWQ 1 AWQ 2	
SF1		QWQ 1 AWQ 2	
S121U3		QWQ 1 AWQ 2	
S90U3		QWQ 1 AWQ 2	
S92U3		SWQ 1 AWQ 2	
S14U3	INIT/5		TCAAP Source Area G
S14L3	INIT		
S94U3	INIT		
S19U3	INIT		
Routine monitoring is outlined on Table 2.2, Attachment 2.			
S99U3	INIT/5	QWQ 1 AWQ 2	TCAAP Source Area
S60U1	INIT	SWQ 1 AWQ 2	control area H
S98U1		SWQ 1 AWQ 2	
Installation of an upgradient Hillside Sand monitoring well shall be proposed in the TCAAP RI Work Plan.			
S29U3	INIT/5		TCAAP Source Area I
S659U3	INIT		
S79U3	INIT		
S30U3	INIT		
Routine Monitoring is outlined on Table 2.2, Attachment 2.			
S527U1	INIT/5	QWQ 1 AWQ 2	TCAAP Source Area
S79U1	INIT		control area J, along
S554U1	INIT		southwest TCAAP
S525U1		QWQ 1 AWQ 2	boundary

TABLE 3.5 (Con't)

Well ID #	Sampling Frequency/Type	Parameter Group	Selection Criteria
S524U1		QWQ 1 AWQ 2	
S62U1		QWQ 1 AWQ 2	
S51U1		QWQ 1 AWQ 2	
S50U1		QWQ 1 AWQ 2	
S77U1*		QWQ 1 AWQ 2	
S78U1		QWQ 1 AWQ 2	
OW111 INIT		QWQ 1 AWQ 2	TCAAP Source Area control area K
S72113 INIT		QWQ 1 AWQ 2	
S76113 INIT		QWQ 1 AWQ 2	
OW101		QWQ 1 AWQ 2	
OW103		QWQ 1 AWQ 2	
OW104		QWQ 1 AWQ 2	
OW105		QWQ 1 AWQ 2	
OW117		QWQ 1 AWQ 2	
OW118		QWQ 1 AWQ 2	
OW119		QWQ 1 AWQ 2	
S87U3	INIT/5	QWQ 1 AWQ 2	Potential source control area 129-3
S521U3	INIT	QWQ 1 AWQ 2	
S72U1	INIT/5	AWQ 1,2	Potential source control area 129-5
S97U3	INIT	QWQ 1 AWQ 2	
S111U3		QWQ 1 AWQ 2	

Installation of an upgradient Hillside Sand monitoring well shall be proposed in TCAAP RI Work Plan.

S91U3	INIT/5	QWQ 1 AWQ 2	Potential source control area 129-15
S32U3	INIT	QWQ 1 AWQ 2	
S90U3	INIT	QWQ 1 AWQ 2	

Note: Sample Frequency/Type

QWQ = Quarterly Water Quality
SWQ = Semiannual Water Quality
AWQ = Annual Water Quality
INIT= Initial sample (CPL)

Parameter Group

1 = Volatile Organic Compounds
2 = Metals
3 = Radionuclides
4 = PCBs
5 = Dioxins and Furans

* Additional Source Monitoring Wells Section 2.2.2

TABLE 3.6

Analytical Parameter List

Initial Parameters

(For Soil, Sediments, Surface water, and Ground water as appropriate).

U.S. EPA Contract Laboratory List (CLP)
Dioxin and Furans (soils only)
Extraction Procedure (EP) Toxicity, (soils only)
All Specific Parameters below.

Specific Parameters

(May be modified for specific media or locations based on prior sampling).

Volatile Organic Compounds (Parameter Group 1)

Benzene
Toluene
cis-1, 2-Dichloroethylene
1,1,1-Trichloroethane
1,1-Dichloroethylene
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethylene
1,2-Dichloropropane
Xylene
1,1-Dichloroethane
1,2-Dichloroethane
1,1,2-Trichloroethylene
Trans-1, 2-Dichloroethylene
1,1,2-Trichlorotrifluoroethane
Chloroform
Vinyl Chloride

Metals (Parameter Group 2)

Arsenic
Barium
Cyanide
Cadmium
Chromium
Lead
Nickel
Mercury
Selenium
Silver
Zinc

Radionuclides (Parameter Group 3) (may be modified for specific locations known not to contain radionuclides including radon and radium).

Alpha emitting radionuclides
Beta emitting radionuclides
Gamma emitting radionuclides
specific radionuclides of U238, U234, Cs137, Co60

TABLE 3.7A

Ground Water Action Criteria Level for Additional TCAAP Investigations
(based on 10^{-6} risk factor unless specified)

Volatile Organic Compounds (ppb)

Benzene 0.70 (10^{-6})
Toluene 2000 (MCLgP)
cis-1,2-Dichloroethene 70 (MCLgP)
1;1,1-Trichloroethane 22 (10^{-6})
1,1-Dichloroethene .24 (10^{-6})
1,1,2-Trichloroethane 6.1 (RAL)
1,1,2,2-Tetrachloroethene .7 (-10^{6})
1,2-Dichloropropane 6 (10^{-6})
Xylene 440 (MCLgP)
1,1,-Dichloroethane
1,2-Dichloroethane 0.4 (10^{-6})
1,1,2-Trichloroethene 2.8 (10^{-6})
Trans-1,2-Dichloroethene 70 (MCLgP)
1,1,2-Trichlorotrifluroethane
Chloroform 0.19 (10^{-6})
Vinyl chloride .015 (10^{-6})

Metals (ppb)

Arsenic 50 (PDWS)
Barium 1000 (PDWS)
Cyanide 200 (PDWS)
Cadmium 5 (RAL)
Lead 20 (MCLg)
Nickel 150 (RAL)
Mercury 2 (PDWS)
Chromium (Total) 50 (PDWS)
Zinc 5000 (SMCL)

Radionuclides (5 pcCi/l)

Alpha emitting radionuclides
Beta emitting radionuclides
Gamma emitting radionuclides
specific radionuclides of U238, U234, Cs137, Co60

Polychlorinated Biphenyls (ppb)

PCB - Total 0.008 (10^{-6})

(MCL) - Maximum Contaminant Level
(MCLg) - Maximum Contaminant Level Goal
(MCLgP)- Maximum Contaminant Level Goal - Proposed

U.S. EPA, 1985, National primary drinking water regulations; volatile synthetic organic chemicals; final rule and proposed rule, 50 FR 46888-46933, November 13, 1985. Pages 46900-46901 contain amendments to 40 CFR, part 141, and they change the title of part 141 to "National primary drinking water regulations."

U.S. EPA, 1985, National primary drinking water regulatiions; fluoride, final rule and proposed rule, 50 FR 47141-47171, November 14, 1985.

(SMCL) Secondary maximum contaminant level.
Page 47155 contains an amendment to 40 CFR, part 141.

TABLE 3.7A (Continued)

(RAL) Recommended Allowable Limits for Drinking Water, prepared by the Minnesota Department of Health (MDH), Section of Health Risk Assessment, Release No. 1, February 1986.

PDWS U.S. EPA 148.1 Primary Drinking Water Standards

(SDWS) U.S. EPA, 1984, National secondary drinking water regulations, 40 CFR, Part 143, revised as of July 1, 1984.

TABLE 3.7B

Surface Water Action Criteria for Additional TCAAP Investigations

VOCs	(ppb or ug/1)
benzene	6.6 (CA)
toluene	14300 (IW)
cis-1,2-dichloroethylene	*
1,1,1-trichloroethane	18000 (A)
1,1-dichloroethylene	0.33 (CA)
1,1,2-trichloroethane	6.0 (CA)
tetrachloroethylene	8.0 (CA)
1,2-dichloropropane	5700 (C)
xylene	*
1,1-dichloroethane	*
1,2-dichloroethane	9.4 (CA)
1,1,2-Trichloroethene	*
trans-1,2-dichloroethylene	*
1,1,2-trichlorotrifluoroethane	*
chloroform	1.9 (CA)
vinyl chloride	.015 (C)

METALS		(ppb or ug/1)
Cyanide (Free **)		5.2 (C)
Cadmium	$e^{(0.7852[\ln(\text{hardness})]-3.490)}$	(C)
Lead	$e^{(1.266[\ln(\text{hardness})]-4.661)}$	(C)
Nickel		13.4 (IW)
Mercury		0.144 (IW)
Chromium (+3)	$e^{(0.8190[\ln(\text{hardness})]-1.561)}$	(C)
(+6)		11 (C)
Zinc		47 (C)

POYLCHLORINATED BIPHENYLS	(ppt or ng/1)
PCB (Total)	0.79 (CA)

BASIS

* No Water Quality criteria available. Adopt group action criteria of 15 pbb.

** Free cyandide is the sum of cyanide present as HCN and CN^- expressed as CN.

(A) U.S. EPA water quality criteria for the protection of aquatic life - acute effects.

TABLE 3.7B (Continued)

(C) U.S. EPA water quality criteria for the proteciton of aquatic life - chronic effects.

(CA) U.S. EPA water quality criteria for the protection of human health - cancer. Exposure by ingestion of cotnaminated aquatic organisms and water, 10^{-5} risk level.

(W) U.S. EPA water quality criteria for the protection of human health toxic effects. Exposure by ingestion of contaminated aquatic organisms and water.

The surface water monitoring results shall be evaluated for additive effects based on the previously defined criteria and the following equation:

$$T = \frac{[X_1]}{[C_1]} + \frac{[X_2]}{[C_2]} + \ldots \frac{[X_n]}{[C_n]}$$

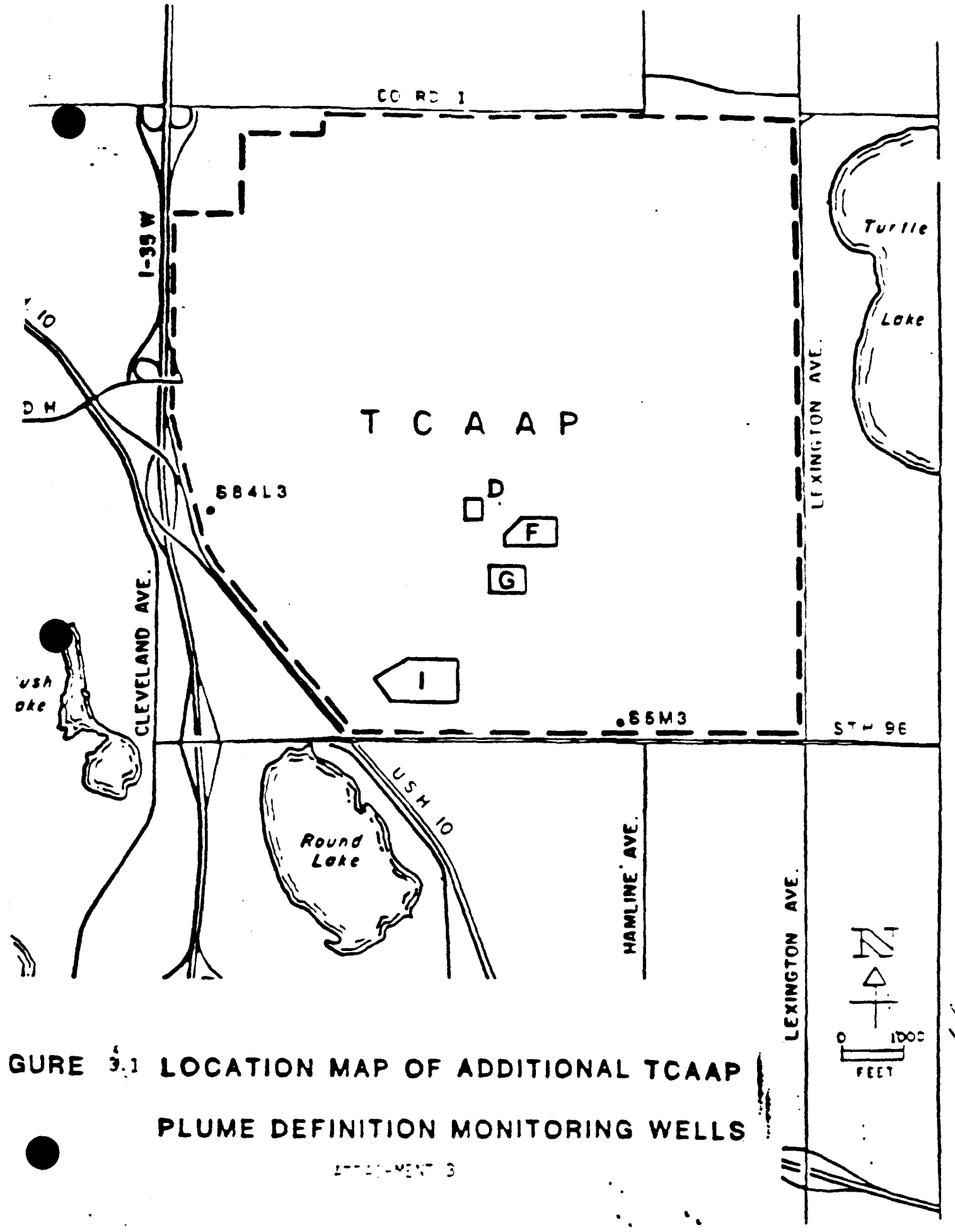
Where

T = For a given toxic endpoint (i.e., aquatic life acute or chronic effects, or human health cancer or toxicity as listed in Surface Water Action Criteria table), additive toxicity of hte chemicals in the water as a fraction of an additive effects criterion;

$[X_i]$ = Concentration of the ith chemical detected for which water quality criteria for a given endpoint exist, i=1 through n; and

$[C_i]$ The water quality criterion identified in the surface water action criteria table for the ith chemical with a given toxic endpoint for a given toxic endpoint, i=1 through n.

Decision rule: The additive effects criterion for a given toxic endpoint is violated and contingency actions initiated if $T > 1$.



GURE 3.1 LOCATION MAP OF ADDITIONAL TCAAP

PLUME DEFINITION MONITORING WELLS

ATTACHMENT 3

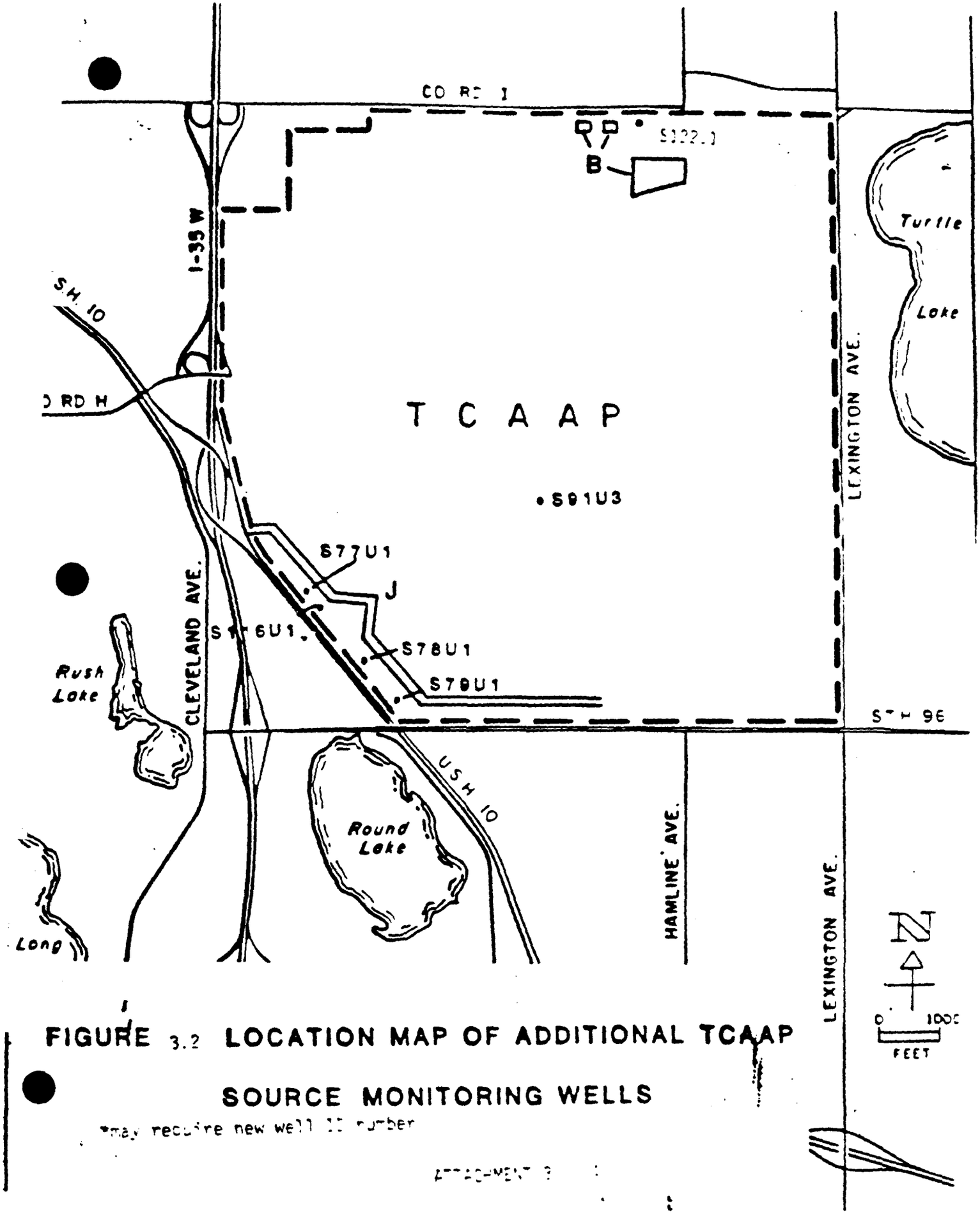


FIGURE 3.2 LOCATION MAP OF ADDITIONAL TCAAP SOURCE MONITORING WELLS

*may require new well ID number

ATTACHMENT 3

FIGURE 3.3

(DELETED)

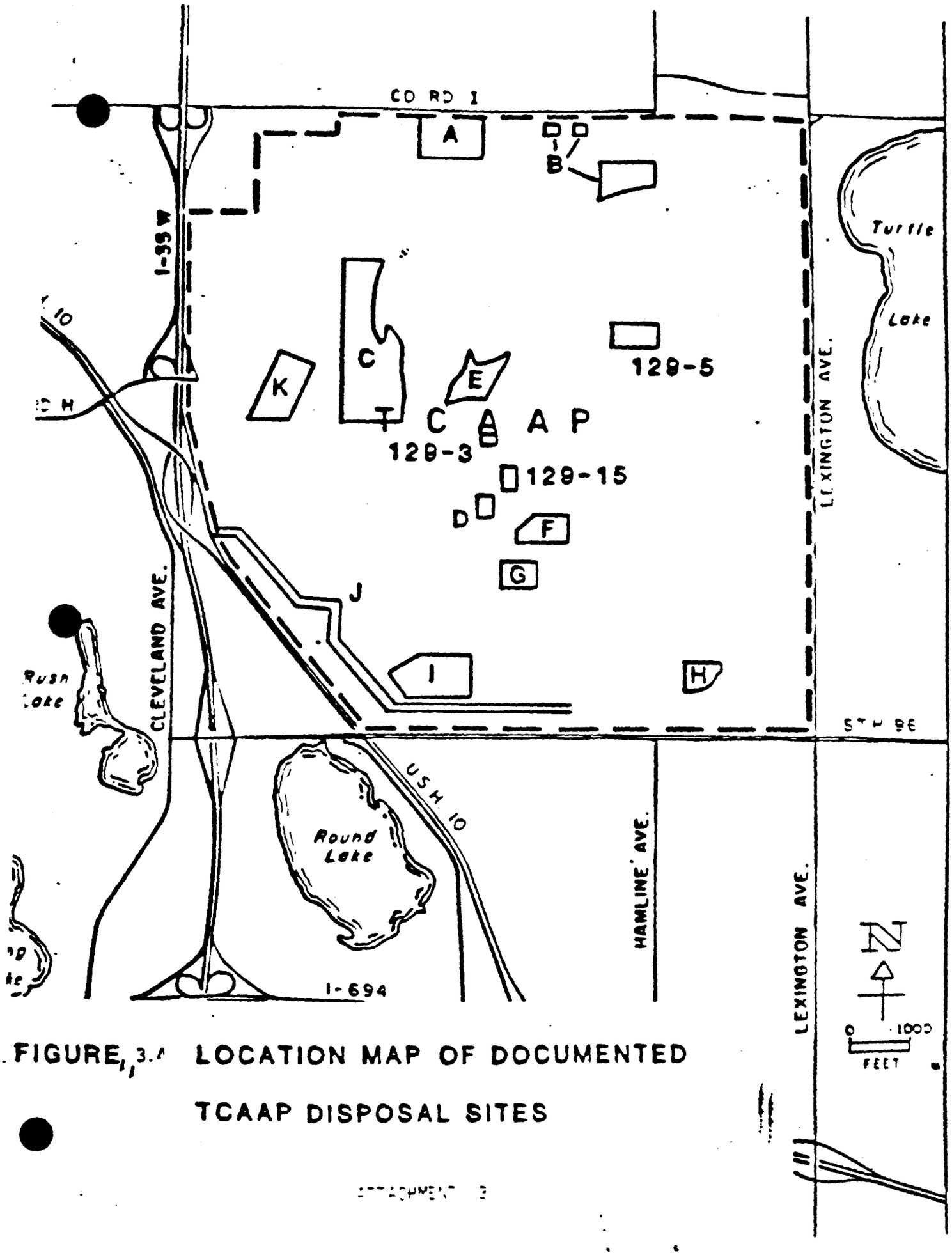


FIGURE 3.4 LOCATION MAP OF DOCUMENTED TCAAP DISPOSAL SITES

ATTACHMENT 3

ATTACHMENT 4

SITE FEASIBILITY STUDY

SCOPE OF WORK

The Army shall conduct a Site Feasibility Study and submit a report consistent with the requirements of this Agreement. The Feasibility Study shall be conducted so as to result in a report that allows U.S. EPA to make a choice of remedy consistent with §121 of SARA and all provisions of the Resource Conservation and Recovery Act as amended by the Hazardous Waste Amendments of 1984 (RCRA). The U.S. Army shall conduct an FS for all on and off TCAPP areas affected by contamination originating from TCAPP. The Study area shall be determined by the U.S. EPA and MPCA at completion of the Phase IA RI.

The Site Feasibility Study will be accomplished in two phases, a Preliminary Feasibility Study and a Site Feasibility Study. The Preliminary Feasibility Study Report is an interim work product for U.S. EPA and MPCA review to ensure progress and maintain technical continuity.

The purpose of the Site Feasibility Study (FS) is to provide a detailed evaluation of the feasibility and effectiveness of implementing alternative Response Actions to prevent, mitigate or abate the release of hazardous substances, pollutants or contaminants at or from the TCAAP, including regional groundwater contamination the protection of the Rice Creek water shed (including Long Lake) or any impacts identified in the Phase IA RI study and the

Site Endangerment Assessment performed by the U.S. EPA/MPCA, and the TCAAP RI. The FS shall contain sufficient information and analyses for the U.S. EPA and MPCA to make the determination of the appropriate extent of remedy. The FS shall use and build upon the information generated by the Phase I RI, Phase IA RI and Endangerment Assessment studies performed by U.S. EPA and MPCA U.S. EPA Sewer line RI, and the TCAAP RI performed by the Army under this Agreement. The Feasibility Study will consist of the Preliminary Feasibility Study and the Site Feasibility Study. In accordance with Part XIV of this Agreement the Army shall submit to the U.S. EPA and MPCA a workplan for preperation of the Preliminary Feasibility Study Report and Site Feasibility Report within sixty (60) days of the Notice of Consistency for the TCAAP RI Report.

1.0 Preliminary Feasibility Study Report

Upon receipt of the TCAAP RI Report, and completion of the Phase IA study the U.S. EPA and the MPCA will review the evaluated alternatives and will reject any of the evaluated alternatives that are clearly not feasible or effective. The U.S. EPA and MPCA may also incorporate additional alternatives not included in the TCAAP RI Final Report for review and evaluation in the Site FS.

Any response action for the Site regional ground water contamination problem shall meet the following objectives: (1) protect the public health, welfare and the environment; (2) meet the requirements of the National Oil and Hazardous Substances Contingency Plan; and (3) meet the requirements of any other applicable or any relevant and appropriate Federal or State laws, standards and guidelines including CERCLA/SARA and RCRA.

In evaluating each alternative the U.S. EPA and MPCA will consider the extent to which each alternative meets each of the objectives stated above and will use the following criteria:

Environmental effects

Evaluated alternatives that inherently present significant environmental effects will be excluded from further consideration.

Effectiveness of Environmental Protection

Evaluated alternatives that do not satisfy the response action objectives and do not contribute significantly to the protection of public health, welfare or the environment will be rejected. Alternatives which meet the minimization of volume, toxicity and mobility criteria of section 121 of SARA will be favored. Any on-site hazardous substance control alternatives must achieve adequate control of the hazardous substances in terms of abating or minimizing the release or threatened release of the Substances. Off-site alternatives must minimize or mitigate the threat of harm to public health, welfare or the environment, or they will be excluded from further consideration. Offsite alternatives must be consistent with U.S. EPA Policy and CERCLA as amended by SARA.

Technical Feasibility and Implementability

Evaluated alternatives that may prove extremely difficult to implement, require great degree of long term maintenance or unreliable will generally be excluded from further consideration where equal environmental protection can be obtained from other alternatives.

Cost

Alternatives, whose estimated costs far exceed those of other evaluated alternatives in relation to the benefits which the evaluated alternatives and

produce will be eliminated, unless the U.S. Army explicitly desires their retention.

The Army shall submit a Preliminary Feasibility Study Report to the U.S. EPA and the MPCA on all the evaluated alternatives not rejected by the U.S. EPA in accordance with Part XIV of this Agreement. The Preliminary Feasibility Study Report shall present the above elements for the evaluated alternatives and identify the alternatives to be further evaluated in the Site Feasibility Study.

2.0 Site Feasibility Study Report

Within thirty (30) days of the Notice of Consistency in accordance with Part XIV of this Agreement of the Preliminary Feasibility Study Report, the Army shall prepare and submit a Site Feasibility Study Report to the U.S. EPA and the MPCA Director. The Site Feasibility Study Report shall present the following elements for the remaining evaluated alternatives (i.e., evaluated alternatives that are not rejected).

2.1 Detailed Description

At a minimum, a detailed description shall include for each remaining evaluated alternative:

a. a description of the appropriate treatment and disposal technology for each remaining evaluated alternative;

b. a description of the special engineering considerations required to implement each remaining evaluated alternative (e.g., for a pilot treatment facility, any additional studies that may be needed to proceed with the final response action design);

c. a description of operation, maintenance, and monitoring requirements for each remaining evaluated alternative;

d. a description of off-site disposal needs and transportation plans for each remaining evaluated alternative;

e. a description of temporary storage requirements for each remaining evaluated alternative;

f. a description of safety requirements associated with implementing each remaining evaluated alternative, including both on-site and off-site health and safety considerations;

g. a description of how any of the other remaining evaluated alternatives could be combined with this evaluated alternative and how any of the combinations could best be implemented to produce significant environmental improvements or cost savings;

h. a description of on-site or off-site treatment or disposal facilities for each remaining evaluated alternative which could be utilized to ensure compliance with applicable requirements of the Resource Conservation and Recovery Act (RCRA), the MCPA hazardous waste rules, and the U.S. and Minnesota Department of Transportation rules, and

i. a description of each remaining alternative in relation to other regional sources and remedies within the site.

2.2 Environmental Assessment

At a minimum, an environmental assessment shall include an evaluation of the environmental effects, an analysis of measures to mitigate the adverse effects, the physical or legal constraints, and the compliance with Federal and State regulatory requirements for each remaining evaluated alternative.

Each remaining evaluated alternative shall be assessed in terms of the extent to which it will mitigate damage to, or protect public health, welfare and the environment, in comparison to the other remaining evaluated alternatives.

2.3 Cost Analysis

A cost analysis shall include a detailed breakdown of the present value capital costs and annualized capital costs of implementing each remaining evaluated alternative (and each phase of each remaining evaluated alternative) as well as the present value annual operating and maintenance costs. The costs shall be presented as both a total cost and an equivalent annual cost.

2.4 Recommended Evaluated Alternative(s) and Conceptual Design

The Site Feasibility Study Report (FS Report) shall include recommendation for which remaining evaluated alternative (or combination of remaining evaluated alternatives) should be installed or implemented to remedy or mitigate regional ground water contamination associated with the Site. The computer ground water flow and transport model used in the Phase IA report shall be used to evaluate alternatives. The recommended alternatives shall be described to the U.S. EPA and MPCA prior to submittal of the Feasibility Study to minimize conflicts to in producing of the Site FS Report.

The Army shall include in the Site Feasibility Study Report a conceptual design for the recommended evaluated alternative (or combination). The purpose of preparing a conceptual design is to illustrate all aspects of the recommended evaluated alternative (or combination) in sufficient detail to enable the U.S. EPA and MPCA to fully evaluate the recommended alternative

(or combination). The conceptual design for the recommended evaluated alternative (or combination) shall include, but not be limited to, the elements listed below. Information which is to be included in the conceptual design, and which has been prepared earlier as part of this agreement may be included by reference.

- A conceptual plan view drawing of the overall site, showing general locations for project actions and facilities.
- Conceptual layouts (plan and cross sectional views where required) for the individual facilities, other items to be installed, or actions to be implemented.
- Conceptual design criteria and rationale.
- A description of types of equipment required, including approximate capacity, size and materials of construction.
- Process flow sheets, including chemical consumption estimates and a description of the process.
- An operational description of process units or other facilities.
- A description of unique structural concepts for facilities.
- A description of operation and maintenance requirements.
- A discussion of potential construction problems.
- Right-of-way requirements.
- A description of technical requirements for environmental mitigation measures.
- Additional engineering data required to proceed with design.
- A discussion of permits that are required pursuant to environmental and other statutes, rules and regulations.
- Order-of-Magnitude implementation cost estimate.
- Order-of-Magnitude annual O&M cost estimates.
- Estimated implementation schedule.

3.0 Approval of Site Feasibility Study

The Army shall submit the Site Feasibility Study Report for a Determination of Consistency in accordance with Part XIV of this Agreement.

ATTACHMENT 5

SITE REMEDIAL DESIGN AND REMEDIAL ACTION - PLAN AND IMPLEMENTATION

1.0 Preparation and review of submittals

The Army shall submit in accordance with Part XII and Part XIV of this agreement to the U.S. EPA and MPCA all reports, detailed plans and specifications, work plans, well placement and construction plans, quality assurance project plans, and other submittals required by this attachment for Remedial Design and Remedial Action (RD and RA). All submittals shall be subject to a Consistency Test in accordance with Part XIV except that the Security and Site Safety Plans are not required to pass the Consistency Test. All submittals and actions (i.e. workplans and Remedial Action implementation) shall be consistent with the document Superfund Remedial Design and Remedial Action Guidance (EPA February 1985) or any succeeding guidance current at the time of submittal.

2.0 Site Security and Safety Plans

The Army shall prepare and submit to the U.S. EPA and the MPCA for comment (1) a Site Security Plan to limit and control the general public's access to the TCAAP and off-post work sites (2) a Site Safety Plan to protect the health and safety of personnel involved in implementing the RA's.

The Site Security and Safety Plans shall be submitted at the same time that the proposed RD/RA workplan is submitted. At a minimum, the Site Safety Plan shall incorporate and be consistent with the requirements of:

1. Section 111(c)(6) of CERCLA -- Protection of Employees;
2. EPA Order 1440.3 -- Respiratory Protection;
3. EPA Order 1440.2 -- Health and Safety Requirements for Employees Engaged in Field Activities;
4. EPA Occupational Health and Safety Manual;
5. OSHA Requirements (29 CFR 1901 and 1926);
6. Interim Standards Operating Safety Guide (Revised September, 1982) by the Office of Emergency and Remedial Response.

Site security and safety are the responsibility of the Army. The U.S. EPA and MPCA may comment on the Site Security and Safety Plans but will not apply the Consistency Test.

The Army shall implement the Site Security and Safety Plans, taking into account the comments of the U.S. EPA and MPCA, if any, when it implements the RA's. The Army shall ensure that no lapse in Site security or safety occurs in the time interval between completion of remedial investigation/feasibility study actions at the Site and the implementation of this site security and safety plan.

3.0 Quality Assurance Project Plan

Prior to or at the time of submittal of the RD/RA Work Plan a Quality Assurance Project Plan (QAPP) shall be submitted. Prior to the submittal of the QAPP, the Army shall notify U.S. EPA and MPCA of the laboratory it intends to utilize for sample analysis and the analysis expected to be performed at the laboratory. The U.S. EPA Quality Assurance Office will determine if the laboratory is capable of performing the expected analysis, possibly through performance evaluation results and/or an inspection. The Army shall not use a laboratory deemed incapable of performing the necessary analysis.

After laboratory approval is obtained a planning meeting with U.S. EPA's Quality Assurance Office (QAO) may be scheduled if requested by QAO. After the planning meeting the Army shall prepare a QAPP that conforms to the specifications in the User's Guide to the U.S. EPA's Interim Guidelines and Specifications for Preparing Quality Assurance Plans (QAMS-005/80) and Region V Guidance The draft plan shall be submitted to the U.S. EPA and MPCA for review and approval approval. A minimum of (45) days will be necessary for QAPP approval.

The QAPP shall at a minimum, include:

- Project Organization and Data Management
- Sampling Objectives
- Sampling Protocol and Equipment
- Chain of Custody
- Field Equipment Calibration/Maintenance
- Decontamination Procedures
- Quality Control Procedures (duplicates and blanks)
- Quality Assurance Audits
- Non Conformance/Corrective Laboratory Action
- Site Specific Sampling Plan
- Methods of Analysis (laboratory procedures)
- Numerical Calculation and Prior Review
- Routine Assessment of Data Precision, Representativeness, Comparability, Accuracy and Completeness of Specific Measurement Parameters Involved.

4.0 Site RD/RA Work Plan

Following the Notice of Consistency of the Site Feasibility Study and within

thirty (30) days of selection of final remedy by U.S. EPA and signing by U.S. EPA of the Decision Document (EDD/ROD), the Army shall prepare and submit to the U.S. EPA and the MPCA for a Site RD/RA Work Plan for a Consistency Test according to Parts XIV and of this Agreement. The RD/RA Work Plan shall, at a minimum, specify all of the work products which must be produced and subjects which must be addressed in the RD/RA in order to perform the response action(s) At a minumum. the Site RD/RA Work Plan shall include proposed methodologies and time schedules for all subjects which are listed in this attachment.

5.0 Remedial Action Plan

The Army shall prepare a proposed Site RD/RA Plan (RAP) which accomplishes the purposes and meets the requirements of this Attachment. The proposed plan shall be prepared in accordance with the methodologies and time schedules in the RD/RA Work Plan, and be submitted to the U.S. EPA and MPCA for a Consistency Test, within sixty (60) days of the notice of approval or modification of the Site RD/RA Work Plan. The purpose of the Site RAP is to provide a detailed design of Site RA(s) which, upon implementation, will protect the public health, welfare, and the environment from the threatened or actual release of hazardous substances, pollutants or contaminants associated with the Site. The proposed Site RAP shall consist of the following sections:

5.1 Site Remedial Design

As part of the proposed Site RAP, Army shall submit a proposed remedial design for the Site for RA(s) selected by the U.S. EPA in its Decision Document following a Final Site Feasibility Study Report and Public Comment Period. The purpose of the remedial design is to specify detailed methods and time

schedules for the approved RA(s) at the Site. The remedial design shall include, but not be limited to, construction plans and specifications, disposal methods, necessary permits, closure and post-closure plans, a plan to assess the effectiveness of remedial actions and contingency plans, and expected duration of operation and maintenance activities.

5.2 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) is required for any proposed monitoring or the collection of design data. The QAPP, if required, will be consistent with Section 3.0 of this Attachment.

5.3 Site Response Action Monitoring Plan

As part of the proposed Site RAP, the Army shall submit a proposed remedial action monitoring plan (Monitoring Plan) for the Site. The purpose of the Monitoring Plan is to specify all short and long term monitoring of air, surface water, soils, ground water which are necessary to determine the status and effectiveness of the RA(s) to be implemented at and near the Site. The Monitoring Plan shall, at a minimum, contain the following:

- Analytical parameter list;
- Monitoring well design;
- Water level monitoring;
- Soils removal and verification monitoring
- Regional ground water monitoring;
- Surface water and storm water monitoring;
- Discharge monitoring; and,
- Reporting.

6.0 Determination of Consistency of the Site RAP

The U.S. EPA and the MPCA shall apply the Consistency Test to the RAP in accordance with Part XIV of this Argreement.

7.0 Response Action Implementation

The Army shall implement the Site RA(s) specified in the Site RAP in a manner which accomplishes the purposes and meets the requirements of this Agreement. The requirements for Site RA implementation are set forth in the three Tasks below.

Task A. Conduct Site RA(s)

Within thirty (30) days of receipt of the U.S. EPA's and MPCA Director's Notification of Consistency of the Site RAP, the Army shall initiate implementation of the Site RA(s). The Army shall implement the Site RA(s) in accordance with the methodologies and time schedules set forth in the RAP. The Site RA implementation shall be conducted in accordance with all federal, state, and local laws, rules, regulations and ordinances.

Task B. Report Results of Site RA Implementation

In accordance with Part XIV of this Agreement and within thirty (30) days of the completion of the implementation of the Site RA(s) specified in the Site RAP, Army shall prepare and submit to the U.S. EPA and the MPCA an Site RA Final Report which includes the following:

(1) the data and results of the Site RA implementation;

(2) the follow-up actions, if any, which will be taken in the following ten (10) year period or the expected duration of operation whichever is longer;

(3) a certification that all work plans, specifications and schedules have been implemented and completed in accordance with the Site RAP as approved by the U.S. EPA with MPCA; and

(4) an identification of difficulties encountered during the Site RA implementation which may impair or otherwise reduce the effectiveness of the Site RA implementation to minimize or mitigate the release or threatened release of hazardous substances from the Site, or which may require unanticipated operational or maintenance actions to maintain the effectiveness of any of the implemented Site RA's.

Task C. Approval of the Site RA Final Report

The U.S. EPA and the MPCA shall review the Site RA Report submitted pursuant to Task B above, determine whether the Army obligations have been satisfactorily completed, and notify the Army. If the U.S. EPA and MPCA Director, determines that the Army's obligations under this Agreement have not been satisfactorily completed, the Army shall correct any deficiencies and resubmit the RA Site Report within thirty (30) days of the Determination.

If the U.S. EPA and MPCA Director determine that related and follow-up actions, which were not specified in the approved Site RAP including monitoring and periodic submittal of status reports, are necessary at the Site, the Army shall perform the follow-up actions as directed by the U.S. EPA and MPCA Director.

8.0 Operation and Maintenance of Site Remedial Actions and Cessation

The Army shall continue operation and maintenance at the site in accordance with and for the duration approved by U.S. EPA and MPCA in the Site RAP, unless a different period of time is required pursuant to this Agreement.

ATTACHMENT 6

RCRA Closure Requirements

The purpose of this Attachment is to set forth the requirements necessary to close TCAAP disposal Sites F and G and the waste pile at disposal Site D at the TCAAP facility. These requirements are in addition to those set forth in the TCAAP RI Scope of Work presented in Attachment 3. The Army shall close sites D, F, and G in accordance with current interim status rules set forth in Minnesota Rules pts. 7045.0594 - 7045.0618 (1986), or if the Minnesota closure rules are amended before the time of closure, in accordance with the rules as amended.

Closure will be accomplished in two phases, investigation activities and final closure activities. The Plan of Investigation for Closure shall include a proposal for conducting investigations to determine the extent and magnitude of contamination resulting from the release and threatened release of hazardous substances, pollutants, and contaminants at each site.

The final Closure Plan shall detail the work required to close the sites in a manner that minimizes the need for future maintenance and controls or eliminates all releases of hazardous constituent, leachate, and other contaminants into the environment. A Final Closure Plan shall include sampling and testing procedures criteria to be used for evaluating the extent and level of contamination, removal of any remaining waste, compliance with other steps needed to remediate the contamination, and a time schedule for actual closure. The final closure document shall also include a discussion of all past activities at each site.

1.0 Site D Waste Pile

1.1 Plan of Investigation for Closure

RCRA closure requirements apply only to the waste pile at Site D and the ground water or soils that it may affect. All references made to Site D in this Attachment are intended for the waste pile and all soils in contact with the waste pile.

Within sixty (60) days of the effective date of this Agreement, the Army shall submit for the MPCA review and approval a Plan of Investigation for Closure at Site D. This investigation plan shall include a procedure for determining if there has been any contaminant migration or release from the waste pile as well as a schedule for implementing proposed activities. If the MPCA Director determines that the requirements of the TCAPP RI Work Plan (see Attachment 3) satisfy RCRA requirements at Site D, the RI Work Plan can be utilized in lieu of the Plan of Investigation for Closure at Site. D. If the RI Work Plan does not satisfy all RCRA requirements at Site D, within thirty (30) days of receipt of the MPCA Director's approval the Army shall implement the Plan of Investigation.

1.2 Investigation Report

Within thirty (30) days of the completion of the Plan of Investigation, the Army shall prepare and submit to the MPCA Director, for review and approval, a report summarizing the results obtained during the investigation.

1.3 Final Closure Plan

Within thirty (30) days following approval of the Investigation Report by the MPCA Director, or review and approval of the RI Final Report by the

U.S. EPA and MCPA Director, the Army shall submit a Final Closure Plan for the waste pile at Site D for MPCA Director approval. This plan should include a time schedule for actual closure. Upon approval from the MPCA Director, the Army shall undertake and complete final closure activities at Site D in accordance with the approved plan. Upon completion of final closure activities, the Army shall have the closure certified by an independent professional engineer and submit the certification to the MPCA.

2.0 Site F

2.1 Plan of Investigation for Closure

On June 19, 1986, the U.S. Army submitted to the MPCA a Plan of Investigation for Closure of Site F. The MPCA is currently reviewing additional information regarding the Plan of Investigation received from the Army on December 19, 1986. Within thirty (30) days of receipt of the MPCA Director's approval, the Army shall implement the Plan of Investigation.

2.2 Investigation Report

Within thirty (30) days of completion of the Plan of Investigation, the Army shall prepare and submit to the MPCA Director, for review and approval, a report summarizing the results obtained during the investigation.

2.3 Final Closure Plan

Within thirty (30) days following approval of the Investigation Report by the MPCA Director, the Army shall submit a Final Closure Plan for Site F for MPCA Director review and approval. This Plan should include a time schedule for actual closure. Upon approval from the MPCA Director, the Army shall undertake and complete final closure activities at Site F in accordance with

applicable State hazardous waste rules. Upon completion of final closure activities, the Army shall have the closure certified by an independent professional engineer and submit the certification to the MPCA.

3.0 Site G

3.1 Plan of Investigation for Closure

Within sixty (60) days of the effective date of this Agreement the Army shall submit for the MPCA Director's review and approval, a Plan of Investigation for Closure at Site G. This Investigation Plan shall include a time schedule for the investigation. If the MCPA Director determines that the requirements of the TCAPP RI Work Plan (see Attachment 3) satisfy RCRA requirement at Site G, the RI Work Plan shall be utilized in lieu of the Plan of Investigation for Closure at Site G. If the RI Work Plan does not satisfy all RCRA requirements at Site G, within thirty (30) days of receipt of the MPCA Director's approval, the Army shall implement the Plan of Investigation.

3.2 Investigation Report

Within thirty (30) days of the completion of the Plan of Investigation, the Army shall prepare and submit to the MPCA Director for review and approval, a report summarizing the results obtained during the investigation.

3.3 Final Closure Plan

Within thirty (30) days following approval of the Investigation Report by the MPCA Director, or review and approval of the RI Final Report by the U.S. EPA and MPCA Director, the Army shall submit a Final Closure Plan for Site G for MPCA Director review and approval. This plan should include a time schedule for actual closure. Upon approval from the MPCA Director,

Army shall undertake and complete final closure activities at Site G in accordance with applicable State hazardous waste rules. Upon completion of final closure activities, the Army must have the closure certified by an independent professional engineer and submit the certification to the MPCA.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V
AND THE
MINNESOTA POLLUTION CONTROL AGENCY

IN THE MATTER OF:	)	
	)	**AMENDMENT NO. 1 TO**
The U.S. Department	)	**FEDERAL FACILITY**
of Defense's Twin Cities Army	)	**AGREEMENT UNDER**
Ammunition Plant, Arden Hills	)	**CERCLA SECTION 120**
Minnesota and Impacted Environs	)	
	)	Administrative
	)	Docket Number:

WHEREAS, the United States Environmental Protection Agency, Region V ("EPA"), the Minnesota Pollution Control Agency ("MPCA"), and the U.S. Department of the Army ("Army") entered into a Federal Facility Agreement in 1987 addressing the Twin Cities Army Ammunition Plant ("TCAAP").

WHEREAS, the Federal Facility Agreement provided for reimbursement by the Army of MPCA costs incurred in performing oversight of the Agreement.

WHEREAS, the MPCA and the Department of Defense ("DOD") entered a Defense State Memorandum of Agreement (DSMOA) dated June 25, 1991, addressing reimbursement of MPCA oversight expenses at several DOD sites in Minnesota, including TCAAP.

WHEREAS, the DSMOA provides that upon execution of a Cooperative Agreement (CA) for transfer of funds from DOD to MPCA, the MPCA reimbursement provisions of the Federal Facility Agreement are to be superseded by the terms of the DSMOA and the CA.

NOW, THEREFORE, pursuant to Section XXX (Amendment) of the Federal Facility Agreement, it is agreed:

1. That upon the effective date of the CA between DOD and MPCA to implement the DSMOA, Section XXIX, paragraphs G-J, of the Federal Facility Agreement are suspended to the extent they provide for MPCA submission to the Army of cost estimates and accountings, Army payment of MPCA accountings, and resolution of disputes over MPCA accountings.

2. That the suspension of the Federal Facility Agreement reimbursement provisions for MPCA costs shall apply to all costs incurred by the MPCA on or after October 1, 1990, and reimbursement of such costs shall be governed by the DSMOA and the CA between MPCA and DOD.

3. That upon termination of either the DSMOA or the CA between MPCA and DOD, Section XXIX, paragraphs G-J, of the Federal Facility Agreement shall again govern reimbursement of MPCA costs relating to TCAAP.

U.S. DEPARTMENT OF THE ARMY

By: Lewis D. Walker Date: 5/1/92

Lewis D. Walker
Deputy of Environment, Safety
and Occupational Health
Office of the Assistant
Secretary to the Army
(Installation and Logistics)

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION V

By: David A. Ullrich Date: May 26, 1992

for Valdas V. Adamkus
Regional Administrator

STATE OF MINNESOTA
MINNESOTA POLLUTION CONTROL AGENCY

By: Patricia A. Bloomquist Date: March 2, 1992
Charles W. Williams
Commissioner

MINNESOTA ATTORNEY GENERAL

HUBERT H. HUMPHREY, III

By: Stephen Shakman Date: Feb 26, 1992
Stephen Shakman
Special Assistant Attorney General

.BY8

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V
AND THE
MINNESOTA POLLUTION CONTROL AGENCY

IN THE MATTER OF:
The U.S. Department of Defense's Twin Cities Army Ammunition Plant, Arden Hills, Minnesota and Impacted Environs

AMENDMENT TO
FEDERAL FACILITIES AGREEMENT
UNDER CERCLA SECTION 120

WHEREAS, the Minnesota Pollution Control Agency (MPCA) issued to the U.S. Army (Army) and Alliant Ammunition Systems Company LLC a Hazardous Waste Storage Facility Permit in March 2003 (Permit) for storage of hazardous waste at the Twin Cities Army Ammunition Plant (TCAAP) Site; and

WHEREAS, the Permit requires completion of closure of the permitted units and implementation of corrective actions for areas where hazardous waste has been released, which are referred to under Minnesota Hazardous Waste Rules as Solid Waste Management Units; and

WHEREAS, the Permit provides that investigation and cleanup of releases of hazardous substances or pollutants or contaminants under the Federal Facilities Agreement (FFA) will constitute compliance with the corrective action requirements of the Permit for any identified Solid Waste Management Unit or Area of Concern; and

WHEREAS, the TCAAP Site is no longer being used for the storage of hazardous waste, and the Army and Alliant Ammunition Systems Company LLC have completed the closure requirements for the permitted hazardous waste storage units; and

WHEREAS, during ground water monitoring, field investigations, environmental audits, removal of buildings or by other means, the Army may discover new releases of hazardous substances or pollutants or contaminants, including releases of hazardous waste or hazardous constituents from solid waste management units; and

WHEREAS, the Permit requires the Army to notify the MPCA of any newly discovered releases, and the U.S. Environmental Protection Agency (US EPA) and the MPCA desire to continue this requirement so that corrective action for such releases can be addressed under the FFA.

NOW THEREFORE, Part XX (Notification) of the FFA is amended to add the following paragraph:

C. If the Army discovers new releases of hazardous substances or pollutants or contaminants at the TCAAP Site during the course of ground water monitoring, field investigations, environmental audits, removal of buildings or by other means, it shall notify the MPCA and US EPA in writing of the release within 15 days of discovery. Investigation and remediation of the release will be addressed pursuant to Part XVI (Additional Work or Modification to Work) of the FFA.

IT IS SO AGREED:

U.S. ARMY

By: _____

Addison D. Davis, IV
Deputy Assistant Secretary of the Army
Environment, Safety & Occupational Health

Date: FEB 26 2008

U.S. ENVIRONMENTAL PROTECTION AGENCY

By: _____

Bharat Mathur
Deputy Regional Administrator
U.S. Environmental Protection Agency, Region V

Date: 3/07/08

MINNESOTA POLLUTION CONTROL AGENCY

By: Kathryn Sather

Kathryn Sather
Director, Remediation Division
Minnesota Pollution Control Agency

Date: 3/19/08

Change #1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF:
5HS-11

OCT 18 1990

Mr. Martin R. McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant
New Brighton, Minnesota 55112-5000

Dear Mr. McCleery:

As we agreed during the Technical Review Committee meeting of September 11, the Annual Monitoring Report will no longer be submitted to the United States Environmental Protection Agency (U.S. EPA) and Minnesota Pollution Control Agency (MPCA) Project Managers on a calendar year basis (January 1-December 31) as required by the FFA (Attachment 3, p.28). Henceforth it will be submitted on the basis of the federal fiscal year (October 1-September 30), beginning with the report for 1991.

This change will facilitate meeting the February 15 deadline for submittal. In addition, it should simplify the process that the Army must implement in contracting for the monitoring work.

If you have any questions please contact Tom Barounis at (312) 353-5577 or Mark Schmitt at (612) 296-7776.

Sincerely,

Thomas Barounis

Thomas Barounis
Remedial Project Manager
U.S. EPA
Region V

Thomas Barounis
for Mark Schmitt, Ph.D
Project Manager
MPCA
Responsible Party Unit 1
Site Response Section
Ground Water and Solid Waste
Division

cc: Majid Chaudhry, PRC

Concur. Martin R. McCleery

Martin R. McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant

Change #2

Minnesota Pollution Control Agency

520 Lafayette Road, Saint Paul, Minnesota 55155-3898
Telephone (612) 296-6300

Mr. Martin McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant
New Brighton, Minnesota 55112-5700

Dear Mr. McCleery:

RE: Federal Facility Agreement Modifications

The purpose of this letter is to document minor modifications to the Federal Facility Agreement (FFA) for the Twin Cities Army Ammunition Plant (TCAAP). These minor modifications were discussed at our meeting of June 5, 1991, and are hereby enacted in accordance with Section XXI of the FFA. The minor modifications are enclosed as Exhibit 1.

These modifications do not alter the intent or objectives of the FFA. They merely change specific details regarding sampling, monitoring, and reporting requirements. These modifications are necessary because current data requirements for the TCAAP remedial project have changed significantly from those originally envisioned when the FFA was drafted in 1987.

If you have any questions regarding this matter, please contact Mark Schmitt of the Minnesota Pollution Control Agency at (612) 296-7776 or Thomas Barounis of the U.S. Environmental Protection Agency at (312) 353-5577.

Sincerely,

Mark Schmitt

Mark D. C. Schmitt, Ph.D.
Project Leader
Minnesota Pollution Control Agency
Response Unit I
Site Response Section
Ground Water and Solid Waste Division
Date: February 5, 1992

Thomas Barounis

Thomas Barounis
Remedial Project Manager
U.S. Environmental Protection Agency
Region V
Date: February 5, 1992

Concur.

Martin R. McCleery

Martin R. McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant
Date: February 12, 1992

MDCS:pk

Enclosure

EXHIBIT 1

FEDERAL FACILITY AGREEMENT MINOR MODIFICATIONS

Twin Cities Army Ammunition Plant

A. Attachment 2

1. Section 3.1, page 13, 4th line from bottom: The wording "on Tables 2.1, 3.6, and 3.7 (A and B)" is hereby replaced by "the applicable or appropriate ROD."

2. Section 3.3, page 15: Insert a new sentence to the end of the paragraph reading, "Reporting of water level measurements to a minimum of a tenth (0.10) of a foot will be acceptable."

3. Section 3.6, page 16: All wording is hereby replaced by "Monitoring will be conducted in accordance with the approved monitoring plan."

4. Section 3.7.1, page 16: All wording is hereby replaced by "Monitoring reporting will be conducted in accordance with the approved monitoring plan. Quarterly reports shall be submitted to the Project Managers at least 15 days prior to the next quarterly sampling."

5. Section 3.7.2, pages 16-17: All wording is hereby replaced by "Monitoring reporting will be conducted in accordance with the approved monitoring plan. By February 15th of each year, an annual report which documents the results of monitoring during the previous fiscal year (October 1 through September 30) shall be submitted to the Project Managers."

6. Tables 2.1, 2.2, and 2.4: All contents in each of these three tables is hereby replaced by "Monitoring will be conducted in accordance with the approved monitoring plan."

7. Tables 2.4, and 2.5: All contents in these tables are hereby replaced by "The surface discharge monitoring program will be in accordance with the NPDES permit." Table 2.6 "The surface discharge monitoring will be in accordance with the annual monitoring plan."

B. Attachment 3

1. Section 3.5.2, page 27: All wording is hereby replaced by "Monitoring will be conducted in accordance with the approved monitoring plan."

2. Section 3.6, page 27: The first paragraph is hereby replaced by "Monitoring will be conducted in accordance with the approved monitoring plan." Insert a new sentence to the end of the second paragraph reading "Reporting of water level measurements to a minimum of a tenth (0.10) of a foot will be acceptable."

EXHIBIT 1
(continued)

FEDERAL FACILITY AGREEMENT MINOR MODIFICATIONS

Twin Cities Army Ammunition Plant

3. Section 3.8, pages 27-29: All wording is hereby replaced by: "Monitoring reporting will be conducted in accordance with the approved monitoring plan. Quarterly reports shall be submitted to the Project Managers at least 15 days prior to the next quarterly sampling. By February 15th of each year, an annual report which documents the results of monitoring during the previous fiscal year (October 1 through September 30) shall be submitted to the Project Managers."

Change #3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

HSRM-6J

Mr. Martin R. McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant
New Brighton, Minnesota 55112-5700

Re: Federal Facility Agreement Attachment 4, Proposed Modifications

Dear Mr. McCleery:

The purpose of this letter is to clarify the position of the U.S. EPA and the MPCA regarding the requirements of Attachment 4 of the Federal Facility Agreement (FFA) in light of our discussions during and subsequent to the December, 1991 and January, 1992 Project Managers' meetings. This clarification, along with the proposed wording change, shall supersede the recommendation regarding the wording of Attachment 4 proposed in my letter of October 7, 1991.

The **Preliminary Feasibility Study Report** specified in Attachment 4 was intended as "an interim work product for U.S. EPA and MPCA review to insure progress and maintain technical continuity." (attachment 4, page 1, paragraph 2). Current U.S. EPA guidance for the preparation of a feasibility study does not call for the submittal of a preliminary report. Rather, it outlines the specific steps necessary to develop and screen remedial alternatives and to perform a detailed analysis of alternatives retained for further consideration (**Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA**, U.S. EPA, 1988).

Rather than requiring the submittal of an additional deliverable document that essentially calls for a formal presentation of only the development and screening of alternatives, U.S. EPA and MPCA will waive the FFA requirement for the submission of a **Preliminary Feasibility Study Report.** Attachment 4, Section 1.0 requirements for the **Preliminary Feasibility Study Report** will now be considered requirements of the **Site Feasibility Study Report.** In addition, "...to ensure progress and maintain technical continuity" the U.S. EPA and MPCA will require a monthly update of progress made towards the completion of the Site Feasibility Study Report.

With the above understanding, we propose to modify the present wording of Attachment 4, Section 2.0 of the FFA as follows:

Present Wording

[2.0 **Site Feasibility Study Report**

Within thirty (30) days of the Notice of Consistency in accordance with Part XIV of this Agreement of the Preliminary Feasibility Study Report, the Army shall prepare and submit a Site Feasibility Study Report to the U.S. EPA and the MPCA Director. The Site Feasibility Study Report shall present the following elements for the remaining evaluated alternatives (i.e., evaluated alternatives that are not rejected).]

Proposed Wording

[2.0 **Site Feasibility Study Report**

The Army shall prepare and submit a Site Feasibility Study Report on the date established in the schedule of the approved Feasibility Study Workplan. The Site Feasibility Study Report shall be prepared according to the **Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, EPA/540/G-89/004.**]

As this change constitutes a minor modification to the requirements of the Federal Facility Agreement, the concurrence of the Project Managers shall be deemed sufficient for its incorporation into the Agreement. Please indicate your concurrence with the provisions of this letter and the proposed change to Attachment 4, Section 2 by signature below.

Tom Barounis
Remedial Project Manager
U.S. EPA
Region V

Mark D.C. Schmitt
Project Manager
MPCA
Responsible Party Unit I
Site Response Section
Ground Water and Solid Waste Division

concur. Martin R. McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant
3 March 1992

cc: Mark Schmitt, MPCA
Frank Rollins, U.S. EPA
Tim Thurlow, ORC
Majid Chaudhry, PRC

Marty
Change #4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

HSRM-6J

NOV 23 1993

Mr. Martin R. McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant
New Brighton, Minnesota 55112-5700

Subject: Federal Facility Agreement, Attachment 5 Requirements for Preparation of the Site Remedial Design/Remedial Action (RD/RA) Work Plan and Remedial Action Plan.

Dear Mr. McCleery:

This is in response to the October 28, 1993 letter from Mike Fix, regarding the subject requirements of the Federal Facility Agreement. The U.S. Environmental Protection Agency (U.S. EPA) and the Minnesota Pollution Control Agency (MPCA) agree that the requirement for the preparation and submittal of a RD/RA Work Plan within thirty (30) days of the signing of the Record of Decision (ROD), as set forth in Attachment 5, Paragraph 4.0, Site RD/RA Work Plan, is not realistic for Operable Unit 1 (OU1). The date for submittal of the OU1 RD/RA Work Plan shall, by agreement among the Project Managers for U.S. EPA, MPCA, and U.S. Army, be the date established in the current Installation Restoration Program (IRP) schedule. Specifically, U.S. EPA and MPCA will expect to receive a draft OU1 RD/RA Work Plan by 4 January 1994.

With regard to Attachment 5, Paragraph 5.0, Remedial Action Plan (RAP), U.S. EPA and MPCA also agree that the time specified for the submittal of the RAP (i.e. "...within sixty (60) days of the notice of approval or modification of the Site RD/RA Work Plan.") is overly short. As noted in your letter, the current IRP schedule for submitting a draft OU1 Remedial Action Plan is 17 November 1994. U.S. EPA and MPCA concur with this date as the latest date for the submittal of the draft OU1 RAP. This concurrence is provided with the understanding that reasonable efforts will be made to accomplish this task before 17 November 1994 and that the draft OU1 RAP will include the prefinal (90% or greater) design documents.

Subsequent to Consistency Test approval of the RD/RA Work Plan and prior to the submittal of a draft OU1 RAP, Army shall submit an intermediate (from 30% to 60%) OU1 remedial design for review and approval by U.S. EPA and MPCA.

Our experience with the OU3 remedial design indicates that the IRP schedule for the OU1 RD/RA Work Plan and RAP submittals provides sufficient time for intermediate design review and approval.

Finally, U.S. EPA and MPCA agree that future changes to the schedule for RD/RA Work Plans and Remedial Action Plans are best made in the context of TRC meetings and discussions among the Project Managers.

If you have any questions or require additional information, please contact Tom Barounis at (312) 353-5577 or Dagmar Romano at (612) 296-7776.

Sincerely,

Tom Barounis

Tom Barounis
Remedial Project Manager
U.S. Environmental Protection Agency
Region V

Tom Barounis for

Dagmar Romano
Project Leader
Minnesota Pollution Control Agency

cc: Larry Schmitt, U.S. EPA
Tim Thurlow, ORC
Majid Chaudhry, PRC

DEPARTMENT OF THE ARMY
TWIN CITIES ARMY AMMUNITION PLANT
NEW BRIGHTON, MINNESOTA 55112-5700

REPLY TO
ATTENTION OF

October 28, 1993

SMCTC-EV (200-1b)

SUBJECT: Operable Unit 1 (OU1) Remedial Design/Remedial Action (RD/RA) Work Plan and Remedial Action Plan

U.S. Environmental Protection Agency
Region V
ATTN: Mr. Thomas Barounis
HSRM-6J
77 W. Jackson Blvd.
Chicago, Illinois 60604

Dear Sir:

References:

a. Federal Facility Agreement, Attachment 5, Site Remedial Design and Remedial Action - Plan & Implementation, paragraphs 4.0 and 5.0, respectively.

b. Technical Review Committee (TRC) Meeting, 5 October 1993.

The purpose of this letter is to point out Federal Facility Agreement (FFA) Attachment 5 requirements for preparation of the Site Remedial Design/Remedial Action (RD/RA) Work Plan and Remedial Action Plan; to note the unrealistic schedule requirements in the FFA per many discussions between Army, EPA and MPCA project managers (PMs); and to identify the approach to be used by the PMs to schedule these activities.

Paragraph 4.0 Site RD/RA Work Plan of the FFA states in part that ***"Following the Notice of Consistency of the Site Feasibility Study and within thirty (30) days of selection of final remedy by U.S. EPA and signing by U.S. EPA of the Decision Document (EDD/ROD), the Army shall prepare and submit to the U.S. EPA and the MPCA for a Site RD/RA Work Plan for a Consistency Test according to Parts XIV and of this Agreement."*** Per past discussion with EPA and MPCA PMs and at the referenced Technical Review Committee (TRC) meeting, it was understood by Army, EPA, and MPCA PMs that the 30-day requirement set forth in the FFA was not realistic. The current Installation Restoration Program (IRP) schedule for submitting a draft OU1 RD/RA Work Plan is 4 January 1994.

DEPARTMENT OF THE ARMY
TWIN CITIES ARMY AMMUNITION PLANT
NEW BRIGHTON, MINNESOTA 55112-5700

REPLY TO
ATTENTION OF

October 28, 1993

SMCTC-EV (200-1b)

SUBJECT: Operable Unit 1 (OU1) Remedial Design/Remedial Action (RD/RA) Work Plan and Remedial Action Plan

Minnesota Pollution Control Agency
ATTN: Ms. Dagmar Romano, Project Leader
Superfund Unit, Site Response Section
Division of Solid and Hazardous Waste
520 Lafayette Road
St. Paul, Minnesota 55155

Dear Ms. Romano:

References:

a. Federal Facility Agreement, Attachment 5, Site Remedial Design and Remedial Action - Plan & Implementation, paragraphs 4.0 and 5.0, respectively.

b. Technical Review Committee (TRC) Meeting, 5 October 1993.

The purpose of this letter is to point out Federal Facility Agreement (FFA) Attachment 5 requirements for preparation of the Site Remedial Design/Remedial Action (RD/RA) Work Plan and Remedial Action Plan; to note the unrealistic schedule requirements in the FFA per many discussions between Army, EPA and MPCA project managers (PMs); and to identify the approach to be used by the PMs to schedule these activities.

Paragraph 4.0 Site RD/RA Work Plan of the FFA states in part that ***"Following the Notice of Consistency of the Site Feasibility Study and within thirty (30) days of selection of final remedy by U.S. EPA and signing by U.S. EPA of the Decision Document (EDD/ROD), the Army shall prepare and submit to the U.S. EPA and the MPCA for a Site RD/RA Work Plan for a Consistency Test according to Parts XIV and of this Agreement."*** Per past discussion with EPA and MPCA PMs and at the referenced Technical Review Committee (TRC) meeting, it was understood by Army, EPA, and MPCA PMs that the 30-day requirement set forth in the FFA was not realistic. The current Installation Restoration Program (IRP) schedule for submitting a draft OU1 RD/RA Work Plan is 4 January 1994.

Paragraph 5.0 Remedial Action Plan of the FFA states in part that ***"The Army shall prepare a proposed Site RD/RA Plan (RAP) which accomplishes the purposes and meets the requirements of this Attachment. The proposed plan shall be prepared in accordance with the methodologies and time schedules in the RD/RA Work Plan, and be submitted to the U.S. EPA and MPCA for a Consistency Test, within sixty (60) days of the notice of approval or modification of the Site RD/RA Work Plan."*** Per many past discussions with EPA and MPCA PMs and at the referenced TRC meeting, it was understood by Army, EPA, and MPCA PMs that the 60-day requirement set forth in the FFA was not realistic. The current IRP schedule for submitting a draft Remedial Action Plan is 17 November 1994.

It is Army PM's understanding that the schedule dates for the OU1 RD/RA Work Plan and the OU1 Remedial Action Plan as revised are consistent with the current procedure being used by Army, EPA and MPCA PMs to set other schedule activities. That is, the schedule for the activities are reviewed and updated by the PMs at monthly TRC meetings. It is Army's understanding that future changes to the schedule for RD/RA Work Plans and Remedial Action Plans will be made at or around future TRC meetings.

It is requested that you provide written concurrence in the use of the current procedure for scheduling these activities and the IRP dates established for the OU1 RD/RA Work Plan and RD/RA Plan (RAP).

If you have any questions or need additional information, please contact Mr. Martin R. McCleery or Mr. Michael R. Fix, SMCTC-EV, (612) 633-2301, ext. 651 or 661.

Sincerely,

Michael R. Fix
Commander's Representative

Copies Furnished:

Cdr, AMCCOM, ATTN: AMSMC-EQ, Mr. Rick McNulty
Cdr, U.S. Army Environmental Center, ATTN: SFIM-AEC-IRA
Cdr, U.S. Army Environmental Hygiene Agency, ATTN: HSHB-ME-SR, Mr. Keith Williams
U.S. Army Corps of Engineers, Omaha District, ATTN: CEMRO-MD-HA, Mr. Larry Woscyna
Alliant Techsystems Inc.,
ATTN: Mr. Frank D. Kvam/MN29-3616
Mr. Steve Roberts/MN50-2400
Mr. Doug Fullen/MN29-3553
Montgomery Watson, Walnut Creek Office, ATTN: Mr. Robert K. Marinai
Montgomery Watson, Wayzata Office, ATTN: Mr. Jeff LeBlanc
Plt Mgr, FCC-TCAAP, New Brighton, MN

DEPARTMENT OF THE ARMY
TWIN CITIES ARMY AMMUNITION PLANT
4700 HWY 10 - SUITE A
ARDEN HILLS, MN 55112-3928

REPLY TO
ATTENTION OF

January 9, 1998

SIOTC-EV (200-1b)

SUBJECT: Federal Facility Agreement, Attachment 5 Requirements for Preparation of the Site Remedial Design/Remedial Action (RD/RA) Work Plan and Remedial Action Plan

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Minnesota Pollution Control Agency
ATTN: Ms. Dagmar Romano, Project Leader
Superfund Unit, Site Response Section
Division of Solid and Hazardous Waste
520 Lafayette Road
St. Paul, MN 55155

U. S. Environmental Protection Agency
Region V
ATTN: Mr. Thomas Barounis, SRF-5J
77 W. Jackson Blvd.
Chicago, IL 60604

Dear Ms. Romano and Mr. Barounis:

Reference letter, USEPA/MPCA letter, January 5, 1998, SAB.

Thank you for the referenced letter which clarifies subject requirements. Please find enclosed our concurrence to referenced letter.

The POC is Mr. Marty McCleery, Remedial Project Manager, 612/633-2301, ext. 1651.

Sincerely,

Michael R. Fix
Commander's Representative

Enclosure

Copies Furnished:

HQ, IOC, ATTN: AMSIO-EQ, Ms. Rebecca Goetzke (w/encl)
AMSIO-GCE, Mr. Thomas G. Jackson (w/encl)
Cdr, U.S. Army Environmental Center, ATTN: SFIM-AEC-ERO, Mr. Pete Rissell (w/encl)
Cdr, U.S. Army Center for Health Promotion and Preventive Medicine,
ATTN: MCHB-DE-HR, Mr. Dennis Druck (w/encl)
U.S. Army Corps of Engineers, Omaha District, ATTN: CENWO-PM-H, Mr. Jay Hodges (w/encl)
Alliant Techsystems Inc., ATTN: Mr. Robin Rockney/MN24 (w/encl)
Mr. Jim Persoon/MN24 (w/encl)
Mr. Dave Gosen/MN11-2115 (w/encl)
SIOTC-CO, Mr. Michael Fix (w/encl)
SIOTC-EV, Mr. Marty McCleery (w/encl)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:
SRF-5J

January 5, 1998

Mr. Martin R. McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant
4700Hwy 10 - Suite A
Arden Hills, Minnesota 55112-3928

Subject: Federal Facility Agreement, Attachment 5 Requirements for Preparation of the Site Remedial Design/Remedial Action (RD/RA) Work Plan and Remedial Action Plan.

Dear Mr. McCleery:

This letter is in response to the issues raised regarding the remedial design/remedial action (RD/RA) requirements set forth in Attachement 5 of the TCAAP Federal Facility Agreement.

Specifically, Army questioned the FFA schedule for the RD/RA Work Plan and the proposed Site RD/RA Plan (RAP). In response, the U.S. Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA) have reviewed Attachement 5, Paragraphs 4.0 and 5.0 in particluar. Paragraph 4.0 states, in part, that *"Following the Notice of Consistency of the Site Feasibility Study and within thirty (30) days of selectiof of final remedy by U.S. EPA and signing by U.S. EPA of the Decision Document (EDD/ROD), the Army shall prepare and submit to the U.S. EPA and the MPCA for a Site RD/RA Work Plan for a Consistency Test according to Parts XIV and of this Agreement."* Paragraph 5.0 states, in part, that *"The Army shall prepare a proposed Site RD/RA Plan (RAP) which accomplishes the purposes and meets the requirements of this Attachment. The proposed plan shall be prepared in accordance with the methodologies and time schedules in the RD/RA Work Plan, and be submitted to the U.S. EPA and MPCA for a Consistency Test, within sixty (60) days of the notice of approval or modification of the Site RD/RA Work Plan."*

EPA and MPCA have determined that, given the nature of the OU2 ROD (i.e., multiple media, multiple contaminants, multiple remedies), the schedules set forth in Paragraphs 4.0 and 5.0 of Attachment 5 for the submittal of a Site RD/RA Work Plan and a Remedial Action Plan are not practical. Experience with both investigative and remedial activities at the Site indicates that the Installation Restoration Program (IRP) Network Schedule is a useful and appropriate method for establishing a realistic schedule for the submittal of the necessary RD/RA documents. Therefore, it is the position of the EPA and the MPCA that the schedule of remedial design and remedial action deliverables, including all necessary OU2 RD/RA Work Plans and Remedial Action

Plans, shall be that agreed to by EPA, MPCA and Army at the technical review committee meetings and documented in the IRP Network Schedule.

If you have any questions or require additional information, please contact Tom Barounis at (312) 353-5577 or Dagmar Romano at (612) 296-7776.

Sincerely,

Tom Barounis

Tom Barounis
Remedial Project Manager
U.S. Environmental Protection Agency
Region V

Dagmar Romano

Dagmar Romano
Project Leader
Minnesota Pollution Control Agency
Site Response Section
Ground Water and Solid Waste Division

CONCUR:

MARTIN R. McCLEERY
Remedial Project Manager
Twin Cities Army Ammunition Plant

Date: 9 January 1998

DRAFT

UNDERSTANDINGS OF INTERPRETATION PROPOSED BY PROJECT MANAGERS

"Legal Portion"

Page 12- An understood correction Part VII item 2; The thirty-six inch overflow line is no longer an active connection between TCAAP and Round Lake.

Page 17 item 24 -Army believes announcement occurred on June 14, 1985.

Page 18 item 26-Army believes a period should be added at the end of the second line and the third line deleted.

Attachment 2

Page 4 Part 2.1.1.2- Second paragraph, fourth paragraph should be understood to mean the extraction well should be screened through out the contaminated portion of the entire saturated thickness.

Page 12- First paragraph first sentence-Army believes this sentence should be changed to reflect actuality i.e. " A report of the study will be submitted to the MPCA and U.S. EPA for a determination of consistency within thirty (30) days after initiation.

Page 13, Section 3.1 first paragraph "Table 2.3" should be omitted-Table 2.3 was omitted from the agreement.

Page 13, Section 3.1 2nd sentence-Army believes Tables 3.6 and 3.7 should be omitted as they are referenced in the next sentence as suggestions of acceptable values.

Page 15, Section 3.3-Army believes that 2nd section should refer to at least those on Table 2.2 as opposed to all wells.

Page 15 Section 3.4 first sentence (2nd line)-Army believes should read "Monitoring wells specified in a ground water monitoring plan submitted for consistency test."

Page 16, Section 3.6-Project managers have agreed that monitoring will occur in April, July, October, and January instead of months indicated (move one month later).

Page 16, First line on page-Army believes should read "at least those shown on Table 2.3."

Table 2.1-Specific radionuclides should read U238, U234, CS137, C060.

Attachment 3

Page 7, last sentence of Section 2.1.5-Army believes phrase "on the analytical Parameter Test (Table 3.6)" should read "in the approved work plan" to be consistent with actuality.

Page 26, Section 3.5.1 third line-Army believes should read "soil samples for dioxin and furans will be taken at representative areas at each of the potential burning sub sites" to match the approved work plan.

Page 27, Part 3.6 first paragraph-Project managers have agreed to shift one month later.

Page 27, Section 3.7 last sentence-Project managers have agreed only the first exceedance need be reported as some wells are always contaminated.

Page 31, first line-Misspell "characteristics" and a proposal should read to mean "and/or."

Table 3.7 a-Changes as marked.

3-8-90
called Art, on this he will provide letter

Attachment 4 page 2 last line top paragraph-It is understood by project managers the work plan should be submitted within 60 days of either the TCAAP RI or the Phase IA RI which ever is later. However, at this point it is also understood an approved schedule may be the enforced part.

AKleinrath:bb:MN/OH Unit 1 (Legal.po) 1/11/90/1/

Minnesota Pollution Control Agency

June 30, 1998

Admin Record Reports
Change from Quarterly to when
change actually occur

Mr. Martin McCleery
Remedial Project Manager
Twin Cities Army Ammunition Plant
4700 Highway 10, Suite A
Arden Hills, Minnesota 55112-3928

Mr. Dave Gosen
Alliant Techsystems Inc.
600 Second Avenue Northeast
Hopkins, Minnesota 55343

RE: Areas for Streamlining Oversight at the Twin Cities Army Ammunition Plant, New Brighton, Minnesota

Dear Mr. McCleery and Mr. Gosen:

Minnesota Pollution Control Agency (MPCA) staff and U.S. Environmental Protection Agency (U.S. EPA) have reviewed "Army and Regulator Suggested Areas for Streamlining Oversight" dated February 3, 1998, as well as the minutes of the streamlining oversight meeting held on March 3, 1998, which were transmitted to you from Jim Persoon on March 4, 1998.

MPCA staff and U.S. EPA concur with the majority of items outlined in the March 4, 1998, memorandum.

However, please note the following:

1. **Monthly Reporting:**

   a The following sentence at the end of the paragraph is unclear: "For sites A and K, threshold values will be proposed to the regulators by the Army and Alliant for key analytical parameters that are indicative of system performance." Based on our discussion, the regulators requested to be notified if/when pumping rates fall below a required level or, alternatively, do not meet Record of Decision requirements.

   b MPCA staff discussed the reporting frequency for the Site K Substantive Requirements Report with Caroline Voelkers. Ms. Voelkers indicated that the report will continue to be required on a quarterly basis as per the substantive requirements document.

2. **Incident Shutdown Report:** The sentence should read as follows: "It was agreed that the reports will only be submitted if the shutdown is for more than two weeks and a notation of all shutdowns will be made in the Annual Performance Report."

3. **FFA Administrative Record Reporting:** The regulators agree that the quarterly reporting requirements for the Administrative Record can be deleted and that only actual changes to the Administrative Record need to be reported to the regulators. It is assumed that this letter will document this change and that no further correspondence from the regulators is required.

4. **During RD/RA:** Please note that the regulators will still need to review as applicable redlined/strike out pages and change pages prior to providing approval for final reports. Also note that U.S. EPA and MPCA staff have been working together on their comments prior to submitting them to Army/Alliant. While the regulators strive to provide consistency on Army deliverables in a timely manner, we cannot guarantee that this will always happen.

We are pleased to have participated with you in discussions on streamlined oversight at the Twin Cities Army Ammunition Plant and support ongoing efforts to make the project as environmentally sound and resource efficient as possible.

Please contact us if there are questions or you require additional information.

Sincerely

Dagmar Romano
Project Manager
Site Response Section
Ground Water and Solid Waste Division

for Tom Barounis
Remedial Project Manager
U.S. Environmental Protection Agency

DR/TB:ch

File _____

Page # _____ Reviewer ASP

Minnesota Pollution Control Agency

May 12, 1988

Mr. Theodore E. Schulte
Commander's Representative
Twin Cities Army Ammunition Plant
Arden Hills, Minnesota 55112

Dear Mr. Schulte:

RE: Site G Closure Certification

Based upon the information submitted on March 25, 1988, and April 4, 1988, by the Department of the Army, it appears that Site G is not subject to Resource Conservation and Recovery Act closure requirements. In accordance with Part XIII of the Federal Facilities Agreement, and based on the information you have submitted, the Minnesota Pollution Control Agency (MPCA) approves the October 20, 1987, Site G certifications by the Department of the Army, Federal Cartridge Company and Honeywell, Inc. References to closure at Site G in the Twin Cities Army Ammunition Plant draft permit will be deleted prior to the June public notice date.

If any future information indicates that hazardous materials were disposed of at Site G after November 19, 1980, by the Department of the Army, Federal Cartridge Company, or Honeywell, Inc., the MPCA reserves the right to nullify this approval and to initiate any necessary enforcement action. If you have any questions regarding the above information, please contact Anita Pederstuen of my staff at 612/296-7791.

Sincerely,

Gerald L. Willet

Gerald L. Willet
Commissioner

GLW:cj

cc: See Attached List

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF:

February 27, 1989

Mr. Clarence Oster
Twin Cities Army Ammunition Plant
New Brighton, Minnesota 55112

Dear Mr. Oster:

Re: PCB Contaminated Soil Waste Pile at Site D

This letter is to present to you the determinations of the U.S. Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA) regarding activities proposed for the polychlorinated biphenyl (PCB) contaminated soil wastepile at Site D. In short, it is requested that the Army: 1) follow the technical requirements of state hazardous waste rules and Toxic Substance Control Act (TSCA) regulations, per Attachment 1; 2) provide data to allow analysis of the Health Risk Evaluation by EPA and MPCA; 3) revise pages from the Remedial Action Plan/Closure Plan (RAP/CP) pursuant to your July 14, 1988, letter and 4) submit polychlorinated dibenzodioxin (PCDD) and polychlorinated dibenzofurans (PCDF) operational data from similar units of the same approximate size (100 tons per day). These items are further discussed below.

The proposed thermal treatment system has been judged adequate to perform as expected. Further, because the intended use of the infrared thermal treatment unit is to treat wastes specifically mentioned in the Federal Facility Agreements under Section 120 of CERCLA, and will be performed entirely within the National Priorities List Site, the waiver of permit requirements in Section 121 (e) of CERCLA applies. Hence no permit for the thermal treatment system is required. However, there are state hazardous waste rules (Minn. Rules pts. 7001.0630; 7045.0135, subp. 5, item E; and 7045.0542) and TSCA substantive requirements applicable to thermal treatment of the PBC contaminated soil waste pile at Site D. Attachment 1 summarizes the TSCA substantive requirements of the treatment system which are applicable in a CERCLA interim remedial action or removal.

In order to demonstrate the anticipated safety of the system an endangerment assessment/risk assessment should be performed. The risk evaluation dated June 30, 1988 was reviewed by the MPCA Air Quality Division and modification is necessary. EPA will provide this modified analysis. EPA and MPCA invites the Army to participate and review this assessment.

In addition, MPCA and EPA staff have reviewed your July 14, 1988, letter which responds to the MPCA's comments on Twin Cities Army Ammunition Plant's (TCAAP) Remedial Action Plan/Closure Plan for Site D. Based upon the responses presented in your letter, the MPCA and EPA approve all written comments and proposed changes. However comment 1 regarding the secondary chamber temperatures has lead to the following developments.

On June 29, 1988, a meeting was conducted at the MPCA offices to discuss the proposed Army/FCC response to MPCA comments on the Site D plan. During that meeting, it was determined that MPCA and EPA staff should contact the Office of Toxic Substances (OTS) staff to clarify the temperature issue. During subsequent discussions conducted by MPCA, EPA and OTS staff, ECOVA, and other EPA Region 5 staff familiar with the incineration process, it was determined that the temperature issue was resolvable, but that issues existed regarding: 1) the scale up from a 1 ton per day unit to a 100 tons per day unit, and 2) the attempt to perform a demonstration test (trial burn) for the purpose of obtaining a national permit for use outside TCAAP.

Consequently, on October 5, 1988, a meeting between MPCA management and staff was held. It was determined that the process outlined in the RAP/Closure Plan and the letter dated July 14, 1988, is acceptable. Results from the January and May 1987 pilot tests should be scaled up to a 100 tons per day system. EPA and MPCA staff will be contacting you regarding needed input for an assessment to be performed by EPA and MPCA staff.

It is understood that ECOVA Corporation will maintain a 1200 ± 100 °C secondary chamber combustion temperature as originally proposed, and will shut down after initial monitoring of all operation requirements. The MPCA and EPA staffs will obtain and review all initial monitoring data to determine if all required performance standards are met prior to continuing thermal treatment of the soil. Since laboratory analysis of the PCDD and PCDF will not be available for review until the burn is complete, the MPCA and EPA staffs will receive PCDD and PCDF data from previous ECOVA Corporation operational burns of similar wastes and similar unit design.

Note that similar wastes implies similarity in physical and chemical characteristics such as type (soil, aggregate, liquid), approximate heating values, hazardous constituents, PCB contamination level, and ash content. However, similar unit design implies allowable variance including: 1) ± 20% combustion zone volumes and cross sectional area, 2) ± 10% linear dimensions, 3) ± 10% air/waste feed ratios, 4) ± 100 °C combustion zone temperatures, 5) residence time should be not more than 5% less and no more than 100% greater, 6) ± 10% solid/ash retention time, and 7) ± 20% liquid/gas ratios for air pollution control devices. Once all initial monitoring and similar PCDD and PCDF data has been accepted and approved by the MPCA and EPA, all remaining site and soil may be thermally treated.

Attachment 2 are extracted sections from the current guidance which may help you in determining acceptable requirements. EPA and MPCA staff will work with you in determining appropriate data requirements. Neither an individual project permit nor a national permit is required. However, if ECOVA Corporation desires to use TCAAP Site D as a demonstration test (trial burn) to obtain a national permit, separate coordination between the Army, EPA, OTS, and ECOVA Corporation will be necessary.

It is requested that the Army submit a schedule for the submittal of 1) the revised pages of the Site D plan pursuant to your July 14, 1988, letter; and 2) PCDD and PCDF operational data from similar units of approximately 100 tons per day capacity.

Administrative requirements will be those related to any CERCLA/SARA actions and called for under Part XXXV of the TCAAP Federal Facility Agreement. A public notice including a minimum of 30 day comment period is appropriate. Because this action has already been the topic of two or more meetings, unless public attention demands a meeting, no public meeting need be scheduled.

Because of the extensive discussions with various programs within EPA and MPCA, we suggest a single Record of Decision to be signed by both EPA and the Army be produced to document the decision and the performance requirements and operating parameters. EPA Region 5 and MPCA staff offers any help you request in producing the Record of Decision.

If you have any questions, feel free to call Mark Schmitt (612/296-7776) of MPCA or Art Kleinrath (312/886-7254) of EPA.

Sincerely,

Michael Robertson

for Gerald L. Willet
Commissioner

Deputy

Arthur Kleinrath
TCAAP Project Manager
U.S. Environmental Protection Agency

GLW:ds

cc: Tim Thurlow, ORC
Steve Shakman, AG

31 August 1987

FEDERAL FACILITY AGREEMENT

Corrections & Typos

Page

7 Para 0 - Capitalize Timetables (beginning of sentence).

8 V. Line 2 - Groundwater. Spelled both as one and two words throughout Agreement. Is it OK to have it both ways?

14 Para 9, Line 4 and Para 11, Line 1 - Groundwater

15 Para 16, Line 5 - Groundwater

16 Para 18, Line 5 - Groundwater

17 Para 22, Line 6 - Groundwater
Line 7 - Hyphenate under-taken
Para 24, Lines 2, 3, 4 - Groundwater
Line 7 - Hyphenate clean-up.

18 Para 26, Line 2 - Groundwater
Para 28, Line 4 - Hyphenate ground-water.

Attachment #2

1 Para 1, Line 5 & 6 - Groundwater

2 Para 3, Line 5 - Groundwater
Para 2.0, Line 1 & 2 - Groundwater

3 Lines 10 & 15 - Groundwater

4 Para 2, Line 5 - Groundwater
Para 2.1.1.3, Line 4 - Should read: well, the (comma not period, small t)
Line 8 & 9 - Groundwater

5 7, 8, 9, 14, 16, 20, 23 - Groundwater

6 Lines 9, 12, 14, 25 - Groundwater

7 Lines 1, 2, 9, 11, 22 - Groundwater

8 Lines 1, 10, 17 - Groundwater
Line 16 - continuous

9 Lines 5, 6, 15, 16, 18 - Groundwater

10 Lines 7 & 24 - Groundwater

11 - Para 2.5.3 - Efficiencies
Para 2.5.3, Line 1 - initial

12 Para 2, Line 2 - 2 meteorological
5 - Groundwater
Para 3.0, Line 1 - Groundwater

Lines 1,4,5,11 - Groundwater
Line 5 - Hyphenate pump-out

14 Line 5 - ?? the Army - should that be deleted? Doesn't read right.
Line 12 - Groundwater
b., Line 3 - ?? at which which analysis - does that sound OK?
Would at which the analysis sound better?

Attachment #4

Page

2 Line 10 - preparation
Line 20 - groundwater

3 Para 4, Line 2 - Hyphenate long-term

6 Para 2.4, Lines 4 & 5 - groundwater

Attachment #5

5 Para 5.3, Line 3 - Hyphenate long-term
Lines 4 & 11 - groundwater

Attachment #6

2 Para 1.1, Line 2 - groundwater

31 August 1987

COMMENTS ON THE FEDERAL FACILITY AGREEMENT

1. Page 12, para 2, under discussion of the sewer lines. Suggest that the last sentence read: A 36" overflow line used to connect TCAAP to nearby Round Lake as an alternative to discharge to Rice Creek during forcemain breakdown periods.

2. Page 17, Item 24. The date should be June 14, 1985.

The last sentence in that paragraph should read: The plan also identified Honeywell as the contractor of the TCAAP Groundwater Extraction/Treatment Program.

3. Attachment #2, page 4, 2nd paragraph, 2nd sentence. The sentence reading Each extraction well shall be screened throughout the entire saturated thickness of the Hillside Sand Aquifer should be deleted. All six extraction wells have already been installed and this was not accomplished.

4. 2.5.1 Discharge of Effluent Condition. Table 2.4 should be deleted from the 1st sentence so that it reads: monitoring requirements in Tables 2.5 or 2.6.

5. Attachment #2, page 11, 2.5.4 Flow Monitoring and Water Balance. Outflow # 20201 should be added to make a complete monitoring picture.

6. Attachment #2, page 12, 1st paragraph. The last sentence should read: A report of the study will be submitted to the MPCA and U.S. EPA for Determination of Consistency within thirty (30) days after the initiation of operation.

7. Attachment #2, page 13, under 3.1. The end of the 1st sentence should read: shall be sampled and analyzed pursuant to Tables 2.1 and 2.2. Delete and 2.3.

8. Attachment #2, page 13, under 3.1., 2nd paragraph under this section, 9th line in this paragraph where it starts out: on Tables 2.1. Delete 3.6 and 3.7 (A and B). U.S. EPA and MPCA suggested initial criteria levels and the basis for each are those in Table 3.7 (A and B) of Attachment 3.

9. Attachment #2, page 15, under 3.3 Water Level Monitoring. Second sentence should read: In addition, all existing monitoring wells (Table 2.2) and proposed extraction wells should be measured for water levels once a month for the first year of monitoring.

10. Attachment #2, page 15. 3.5 Prairie du Chien/Jordan Monitoring Well Network. This whole section should be deleted.

11. Attachment #2, page 16, section 3.6 Monitoring Frequency Quarterly groundwater monitoring will take place during the months of April, July, October and January with semiannual samples collected and analyzed during April and October rather than the stated months. This allows for better sampling times during the winter months and better results to be obtained.

12. Table 2.6 for effluent limitations to the gravel pit. Trichloroethene limitations should be 5 ug/l.

13. Attachment #3, page 7, 4th para, 6th sentence, should be revised as follows: sampled for parameters listed in the TCAAP Farmstead Well Report and abandoned as necessary, etc.

14. Attachment #3, page 26, 3.5.1 Initial Sampling, 3rd sentence: soil samples for dioxin and furans will be taken as indicated in Table 3.6 rather than 3.5.

15. Attachment #3, page 27, 3.6 Monitoring Frequency. The months for sampling should be April, July, October, with semiannual groundwater samples collected and analyzed during April and October. January quarterly monitoring will not require analytical analysis.

16. Attachment #3, page 27, 3.7 Action Criteria Exceedance. The last sentence in this paragraph should be changed to: The first time any of these criteria are exceeded in any of the groundwater, etc., etc.

17. Attachment #3, Table 3.7A. The vinyl chloride has been changed to 0.18. The PCB total has been changed to .08 ppb. Similar changes to Table 3.7B for the vinyl chloride and the polychlorinated biphenyls.