

INSTALLATION RESTORATION PROGRAM  
FINAL  
NO FURTHER REMEDIAL ACTION PLANNED  
DECISION DOCUMENT  
SITE 10



MINNESOTA AIR NATIONAL GUARD  
148th FIGHTER WING  
DULUTH, MINNESOTA

19980617 014

Prepared For:

Air National Guard  
Andrews AFB, Maryland

March 1998

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**MINNESOTA AIR NATIONAL GUARD**  
**148th FIGHTER WING**  
**DULUTH, MINNESOTA**

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**Andrews AFB, Maryland**

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**Minneapolis, Minnesota**

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## LIST OF ACRONYMS

ug/kg	micrograms per kilogram
ug/L	micrograms per liter
AFB	Air Force Base
ANG	Air National Guard
ARARs	applicable and relevant or appropriate requirements
DDT	Dichlorodiphenyltrichloroethane
DIA	Duluth International Airport
DOD	Department of Defense
FW	Fighter Wing
IRP	Installation Restoration Program
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/l	milligram per liter
Minnesota PCA	Minnesota Pollution Control Agency
NGVD	National Geodetic Vertical Datum
PCA	Pollution Control Agency
PCBs	polychlorinated biphenyls
pCi/g	picocuries per gram
pCi/L	picocuries per liter
RI	Remedial Investigation
SVOCs	semivolatile organic compounds
VOCs	volatile organic compounds

## 1.0 INTRODUCTION

This decision document presents the rationale for the decision of no further remedial action, which is proposed for Site 10 (Low Level Radioactive Waste Disposal) at the Minnesota Air National Guard (ANG) 148th Fighter Wing (Base) located at the Duluth International Airport (DIA) in Duluth, Minnesota. This document is part of the U.S. Department of Defense's (DODs) Installation Restoration Program (IRP).

## **2.0 SITE DESCRIPTION AND HISTORY**

The Base is located in St. Louis County at the DIA approximately seven miles northwest of the City of Duluth. The location of the Base is shown on Figure 1. DIA occupies approximately 2,000 acres of land. ANG facilities are located on lease property at several locations in the vicinity of the east-west runway, but the main Base is located on the east side of the airport property.

The airport has been used for military operations since 1948. From 1948 to 1961, the airport was used by the 179th Fighter Squadron, which was part of the 133rd Fighter Wing (FW) of the Minnesota ANG. From 1961 to 1995, the 148th Fighter Group of the Minnesota ANG was active at the airport. In 1995, the 148th Fighter Group was redesignated as the 148th FW which continues operation at the airport today.

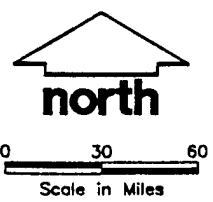
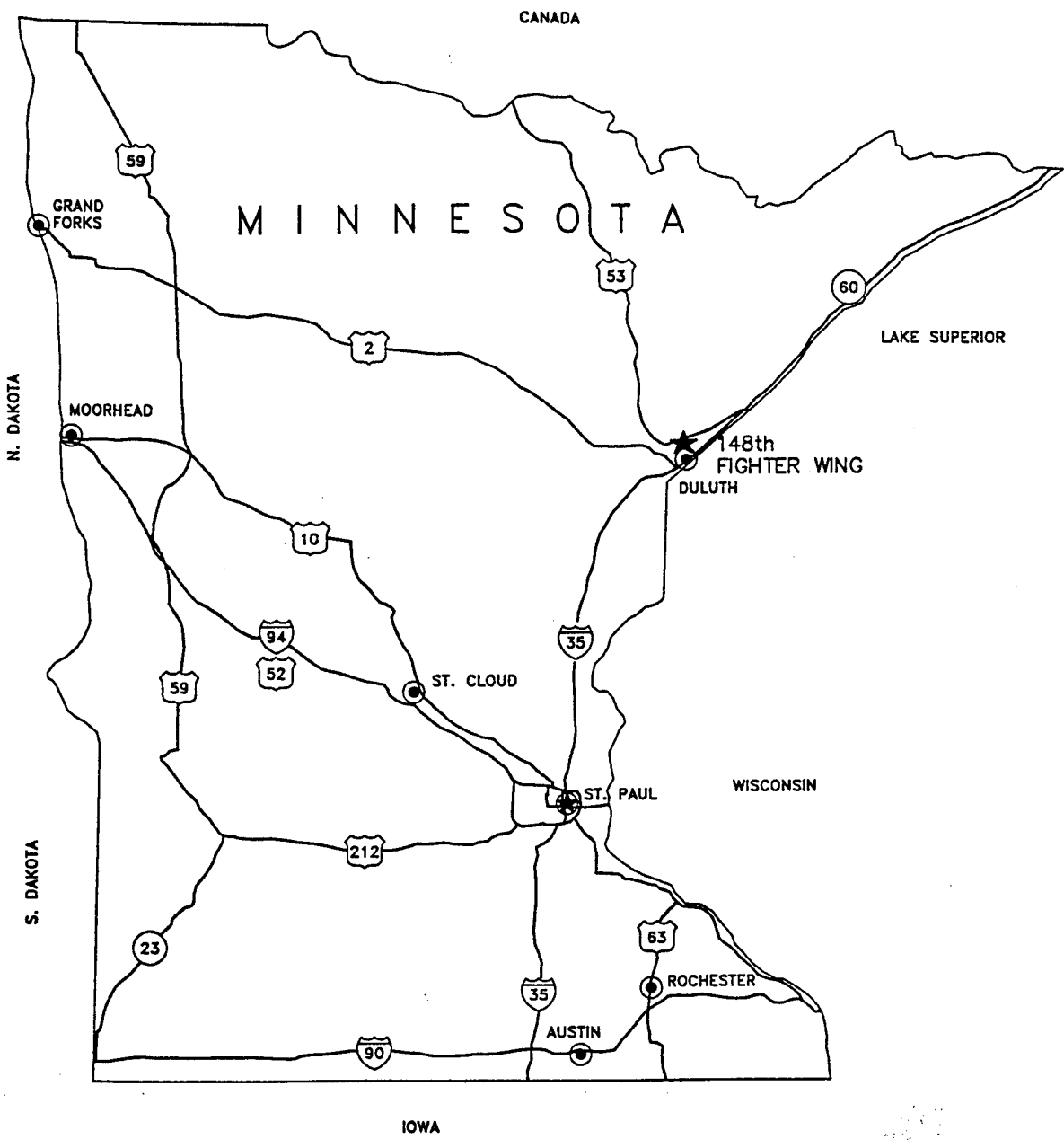
This section presents a site description and history for Site 10, Low Level Radioactive Waste Disposal, at the Base in Duluth, Minnesota. Figure 2 shows the location of Site 10 on the Base.

### **2.1 DESCRIPTION**

Site 10 is approximately 15 acres in size and is approximately 1,410 feet in altitude above National Geodetic Vertical Datum (NGVD). Site 10 lies north of the airport perimeter road, south of the security fence that surrounds Buildings 511 and 513, and immediately east of a drainage ditch which flows into Beaver Creek. The area is vegetated with grasses and some trees. There are no facilities located at the Site 10.

### **2.2 HISTORY**

From 1952 until 1960, Site 10 was used to dispose of low-level radioactive materials (e.g., cathode ray tubes, oscilloscopes, and radioluminescent dials). These waste materials were disposed at the site in a 15-foot-deep, 40-foot-long trench and were covered with general refuse and local soil material.



SOURCE: RAND McNALLY ROAD ATLAS, 1992.

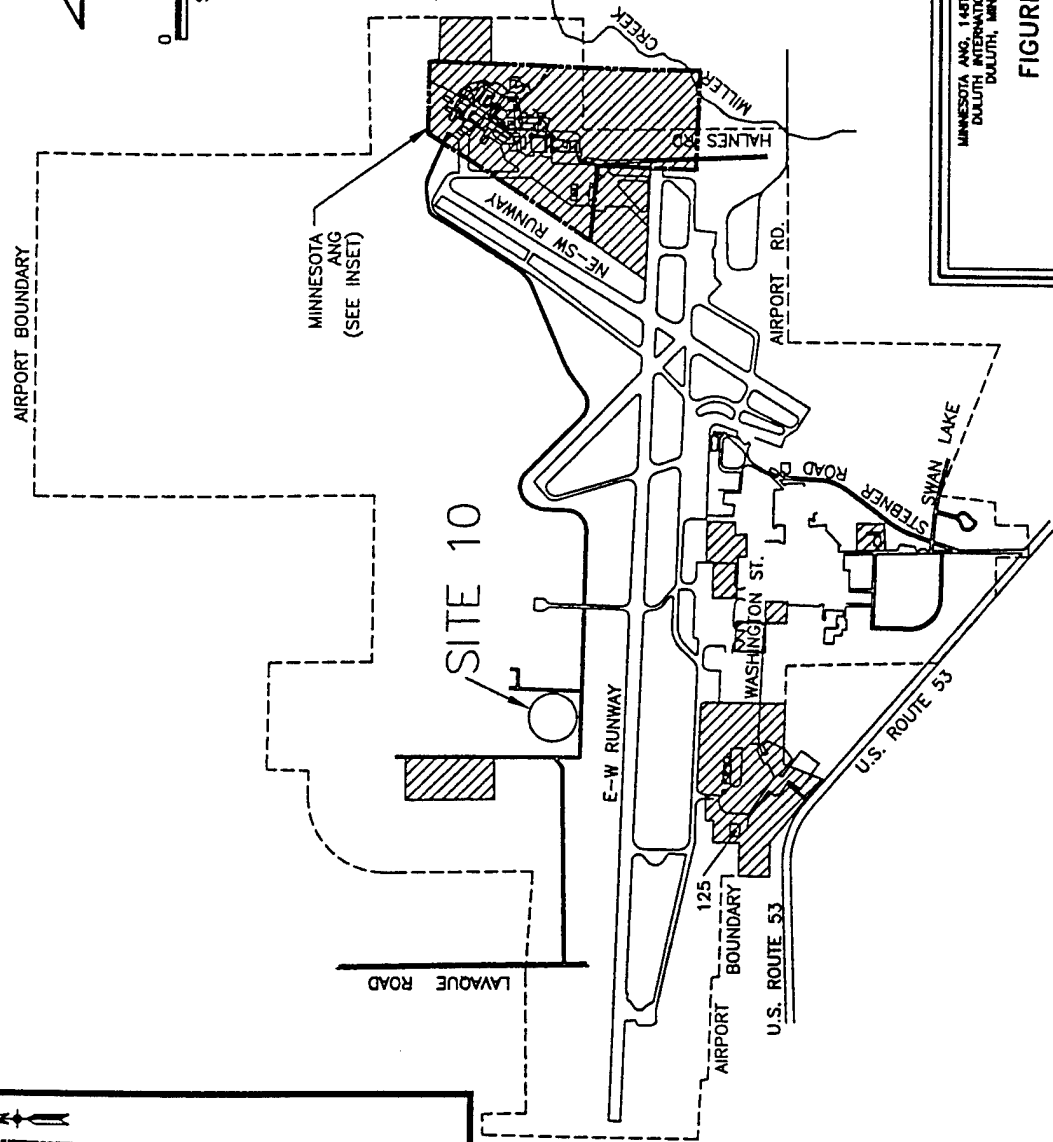
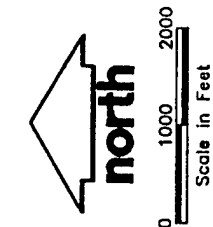
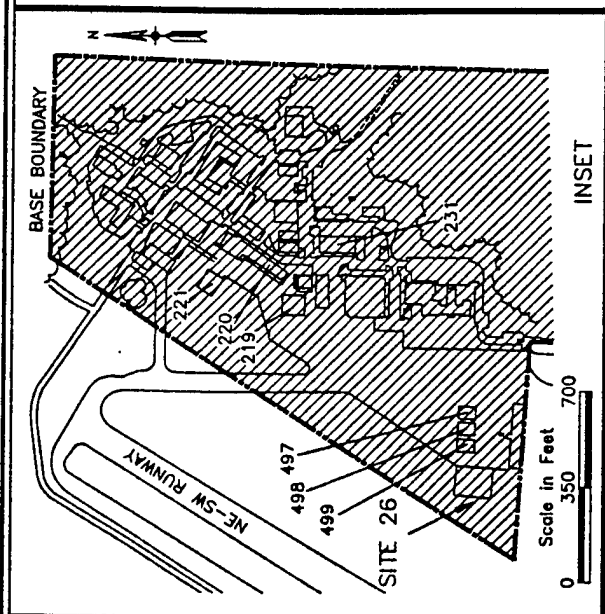
MINNESOTA ANG, 148TH FIGHTER WING  
 DULUTH INTERNATIONAL AIRPORT  
 DULUTH, MINNESOTA

FIGURE 1  
 BASE LOCATION MAP

**MONTGOMERY WATSON**

FIG1.DWG REVISED 3/98

FIG2.DWG (REVISED 3/98)



- LEGEND**
- MINNESOTA ANG BOUNDARY
  - - - AIRPORT BOUNDARY
  - ▨ ANG LEASED PROPERTY
  - 125 BUILDING/BUILDING NUMBER
  - ~ TREE LINE

SOURCE: ENGINEERING-SCIENCE, INC., REMEDIAL INVESTIGATION REPORT, JANUARY 1990.

MINNESOTA ANG, 148TH FIGHTER WING  
DULUTH INTERNATIONAL AIRPORT  
DULUTH, MINNESOTA

FIGURE 2  
SITE 10 LOCATION



### 3.0 SUMMARY OF INVESTIGATIONS

This section summarizes investigations conducted at Site 10. Investigation results are discussed in Section 4 of this decision document. Site 10 was identified in a Phase I - Records Search that was completed in March 1982. No work was conducted at Site 10 during the subsequent Phase II, Stage 1 Investigations at the Base (Roy F. Weston, 1984). A Phase II, Stage 2 Investigation was conducted at Site 10 in 1986 and 1987 (Dames & Moore, 1987). During this investigation, a geophysical field survey was conducted and three monitoring wells were installed at Site 10. Water level measurements were obtained and one groundwater sample was collected from each monitoring well. Samples were analyzed for gross alpha, gross beta, radium 226, and radium 228.

A Remedial Investigation (RI) was conducted at Site 10 from 1988 through 1989 (Engineering-Science, 1990). Groundwater samples were collected in September 1988 and February 1989 from each of the three monitoring wells installed during the Phase II, Stage 2 Investigation. Samples were analyzed for gross alpha, gross beta, radium 226, radium 228, and tritium.

An additional RI was completed for Site 10 in 1992. Nine additional monitoring wells were installed at the site and soil, groundwater, surface water, and sediment samples were collected. Samples were analyzed for radiologicals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals.

A long-term groundwater monitoring program consisting of three rounds of sampling over a period of one year was initiated in Fall 1996. Water levels were obtained and groundwater samples were collected from each of the twelve monitoring wells at Site 10. Samples were analyzed for gross alpha and gross beta. The first sampling event was conducted on November 20 and 21, 1996. The second and third sampling events were conducted on June 12 and August 19-20, 1997, respectively (Montgomery Watson, 1998).

## 4.0 CONTAMINATION ASSESSMENT

This section discusses the nature and extent of contamination at Site 10, potential human and environmental receptors, and exposure pathways. Table 1 presents the contaminants of concern for soil, groundwater and sediment, their concentrations, and the associated applicable and relevant or appropriate requirements (ARARs).

Results of the Phase II, Stage 2 Investigation showed that concentrations of gross alpha, radium 226, and radium 228 detected in groundwater samples collected at the site were above action levels. The report concluded that the radioactivity appeared to be migrating with the groundwater downgradient in a westerly direction and would eventually be discharged into Beaver Creek with the groundwater. The report recommended additional investigation for Site 10 (Dames & Moore, 1987).

Gross alpha and gross beta radiation concentrations detected in groundwater samples collected at the site during the RI exceeded action levels; however, the RI Report concluded that insufficient data for the site existed and that additional investigation should be conducted at the site (Engineering-Science, 1990).

The additional RI conducted for Site 10 showed that except for chromium and gross alpha, concentrations of chemical contaminants in groundwater, surface water, sediment, and soil samples collected at the site were below action levels. Chromium was detected in surface water at a maximum concentration of 5,800 micrograms per Liter (ug/L) which is above the action level of 210 ug/L. Gross alpha was detected in surface water at a maximum concentration of 153 picocuries per liter (pCi/L) which exceeds the action level of 15 pCi/L. All other contaminants were either not detected or detected below the action levels.

No VOCs, SVOCs, pesticides, PCBs, mercury, or silver were detected in groundwater or surface water samples collected at Site 10. Chromium was detected at maximum concentrations of 11.8 ug/L and 5,800 ug/L in groundwater and surface water samples, respectively. Gross alpha and gross beta radiation were detected below action levels at maximum concentrations of 6.8 pCi/L and 7.2 pCi/L, respectively, in groundwater samples, and at 153 pCi/L and 7.7 pCi/L, respectively in surface water samples. In addition, radium 226, radium 228, strontium 90, tritium, and uranium were also detected in groundwater samples at maximum concentrations of 2.3 pCi/L, 0.9 pCi/L, 0.5 pCi/L, 1,830 pCi/L, and 3.9 ug/L, respectively. Radiological

TABLE 1

CONTAMINANTS OF CONCERN AT SITE 10  
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Selected Analytes	Maximum Detected Concentration	Background Concentration	Potential ARAR	Source of ARAR	ARAR Exceeded
<u>Groundwater</u>					
Arochlor 1260	ND	ND	0.5 ug/L	MCL	No
Chromium	11.8 ug/L	2.6 mg/L	100 ug/L	MCL	No
DDT	ND	ND	*	*	*
Gross Alpha	6.8 pCi/L	5.5 pCi/L	15 pCi/L	MCL	No
Gross Beta	7.2 pCi/L	11 ±4 pCi/L	50 pCi/L	MCL	No
Radium 226	2.3 pCi/L	0.4 pCi/L	5 pCi/L	MCL	No
Radium 228	0.9 pCi/L	NA	*	*	*
Strontium 90	0.5 pCi/L	NA	*	*	*
Tritium	1,830 pCi/L	NA	20,000 pCi/L	MCL	No
Uranium	3.9 ug/L	NA	*	*	*
<u>Soil</u>					
Arochlor 1260	0.500 mg/kg	ND	*	*	*
Chromium	41.7 mg/kg	42.2 mg/kg	1.0 mg/kg	AL	Yes
DDT	0.016 mg/kg	ND	0.02 mg/kg	AL	No
Gross Alpha	30.8 pCi/g	ND	*	*	*
Gross Beta	61.4 pCi/g	ND	*	*	*
Radium 226	2.0 pCi/g	ND	*	*	*
Radium 228	4.2 pCi/g	ND	*	*	*
Strontium 90	1.1 pCi/g	ND	*	*	*
Tritium	7.8 pCi/g	ND	*	*	*
Uranium	0.00270 mg/kg	ND	*	*	*
<u>Surface Water</u>					
Arochlor 1260	ND	ND	0.5 ug/L	MCL	No
Chromium	5,800 ug/L	ND	210 ug/L	FAWQC(1)	Yes
DDT	ND	ND	*	*	*
Gross Alpha	153 pCi/L	ND	15 pCi/L	MCL	Yes
Gross Beta	7.7 pCi/L	ND	50 pCi/L	MCL	No
Radium 226	0.2 pCi/L	ND	*	*	*
Radium 228	1.5 pCi/L	ND	*	*	*
Strontium 90	1.6 pCi/L	ND	*	*	*
Tritium	1,250 pCi/L	ND	*	*	*
Uranium	NA	ND	*	*	*

TABLE 1 (CONTINUED)

Selected Analytes	Maximum Detected Concentration	Background Concentration	Potential ARAR	Source of ARAR	ARAR Exceeded
		<u>Sediment</u>			
Arochlor 1260	NA	ND	*	*	*
Chromium	66.6 mg/kg	16.3 mg/kg	*	*	*
DDT	ND	ND	*	*	*
Gross Alpha	10.2 pCi/g	ND	*	*	*
Gross Beta	25.9 pCi/g	ND	*	*	*
Radium 226	1.4 pCi/g	ND	*	*	*
Radium 228	1.7 pCi/g	ND	*	*	*
Strontium 90	0.7 pCi/g	ND	*	*	*
Tritium	9.3 pCi/g	ND	*	*	*
Uranium	2.14 mg/kg	ND	*	*	*

Notes:

\* - Information not available

AL - Action level cited in source document

ARAR - Applicable or Relevant and Appropriate Requirement

DDT - Dichlordiphenyltrichloroethane

FAWQC(1) - Federal Ambient Water Quality Criteria (Chronic)

MCL - Maximum Contaminant Level

NA - Not analyzed

ND - Not detected

pCi/g - Picocuries per gram

pCi/L - Picocuries per liter

mg/L - milligrams per liter

mg/kg - milligrams per kilogram

Source of Table: Radian Corporation, 1994. IRP MAP, 148<sup>th</sup> Fighter Group, MANG, DIA, Duluth, MN. September.

contamination detected in groundwater samples collected at the site was determined to be naturally occurring and unrelated to waste disposal activities at the site.

Xylenes and silver were detected below action levels in sediment samples collected at Site 10 at maximum concentrations of 1,500 micrograms per kilogram (ug/kg) and 7.5 milligrams per kilogram (mg/kg), respectively. Gross alpha and gross beta radiation were detected at maximum concentrations of 10.2 picocuries per gram (pCi/g) and 25.9 pCi/g, respectively.

Arochlor 1260, Dichlorodiphenyltrichloroethane (DDT), and chromium were detected below action levels in soil samples collected at Site 10 at maximum concentrations of 500 ug/kg, 16 ug/kg, and 41.7 mg/kg, respectively. Gross alpha and gross beta radiation were detected in soil samples at maximum concentrations of 30.8 pCi/g and 61.4 pCi/g, respectively. In addition, radium 226, radium 228, strontium 90, tritium, and uranium were also detected in soil samples at maximum concentrations of 2.0 pCi/g, 4.2 pCi/g, 1.1 pCi/g, 7.8 pCi/g, and 2.7 µg/g, respectively.

A risk assessment conducted as part of the additional RI evaluated exposure to on-site workers through incidental ingestion of surface soils, sediments, groundwater, surface water, and fugitive dust. The risk assessment determined that contaminants detected at the site did not pose a current or future public health threat in the absence of remediation; therefore, the RI Report recommended that no further response action be conducted at the site.

After review of the RI, the Minnesota Pollution Control Agency (PCA) requested groundwater monitoring at Site 10 for one year (three events). The groundwater monitoring at Site 10 has been completed. Samples were analyzed for gross alpha and gross beta. The maximum gross alpha and gross beta concentrations for the year of groundwater monitoring were below federal Maximum Contaminant Levels (MCLs). The maximum gross alpha and beta concentrations for the year of groundwater monitoring ranged from 0.4 to 14 pCi/L and 7.1 to 8.8 pCi/L, respectively. The Federal MCLs for gross alpha and beta are 15 pCi/L and 50 pCi/L, respectively (Montgomery Watson 1998).

## 5.0 CONCLUSIONS

Previous investigations identified radiological contaminants in exceedance of ARARs for groundwater. The additional RI work showed gross alpha and chromium in exceedance of ARARs for surface water. A risk assessment concluded that site contaminants did not pose a current or future health threat to on-site workers.

Based on the results of the long-term monitoring conducted at Site 10, concentrations of contaminants of concern, gross alpha and gross beta, have consistently been detected below ARARs. Gross alpha and gross beta concentrations in groundwater are substantially less than those detected during the RI.

6.0 DECISION

Based on the findings of the site investigations and the long-term groundwater monitoring program prescribed by the MPCA, site conditions do not pose a health threat; therefore, no remedial action is necessary to ensure protection of human health or the environment at Site 10. This site will be removed from further consideration in the IRP process, and no further investigative or remedial activities will be conducted with regard to Site 10.

*Conrad DeFendts*  
Chief, Environmental Division

*4/28/98*  
Date

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Minnesota Pollution Control Agency

- Concur
- Non-Concur (please provide reason)

*Brenda L. Winkler*  
Signature

*Project Manager*  
Title

*4/28/98*  
Date

## 7.0 REFERENCES

Engineering-Science, Inc., 1990. Installation Restoration Program, Remedial Investigation Report, Minnesota Air National Guard Base, Duluth International Airport, Duluth Minnesota, Volumes 1-7. August.

Dames & Moore, Inc., 1987. Installation Restoration Program Phase II Confirmation/Quantification, Stage 2, Duluth International Airport, Duluth, Minnesota. September.

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Radian Corporation, 1994. Installation Restoration Program, 148<sup>th</sup> Fighter Group, MANG, DIA, Duluth, MN. September.

Roy F. Weston, Inc., 1984. Installation Restoration Program Final Report, Phase II, Stage 1, Problem Confirmation Study, Duluth International Airport, Duluth, Minnesota. October.