

RAS 14525

Army Eaby Exh. # 4-C

[Originally Attached As EXHIBIT TDE #4 to Witness Eaby's pre-filed testimony]

U.S. NUCLEAR REGULATORY COMMISSION
 In the Matter of U.S. ARMY (JEFFERSON PROVING GROUND)
 Docket No. 40-8838-MLA Official Exhibit No. ARMY EXH. # 4-C
 OFFERED by: Applicant/Licensee Intervenor _____
 NRC Staff Other _____
 IDENTIFIED on _____ Witness/Panel _____
 Action Taken: **ADMITTED** **REJECTED** **WITHDRAWN**
 Reporter/Clerk _____

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Jefferson Proving Ground Madison, Indiana

Volume I & II - Text

Draft Final Phase II Remedial Investigation

Prepared for
U.S. Army Corps of Engineers
Louisville District
Louisville, Kentucky

**Total Environmental Restoration Contract
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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
ACRONYMS AND ABBREVIATIONS	xvii
EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION	1-1
1.1 PURPOSE AND SCOPE	1-1
1.2 INSTALLATION BACKGROUND	1-3
1.2.1 Installation Description	1-3
1.2.2 Installation History	1-3
1.2.3 Previous Investigations	1-5
1.3 REGULATORY SETTING	1-11
1.4 REPORT ORGANIZATION	1-13
1.5 SUMMARY OF SITES REQUIRING NO FURTHER INVESTIGATION	1-14
2.0 PHYSICAL CHARACTERISTICS OF JEFFERSON PROVING GROUND	2-1
2.1 PHYSIOGRAPHY	2-1
2.2 CLIMATE	2-1
2.2.1 Precipitation	2-1
2.2.2 Seasonal Temperatures	2-1
2.2.3 Weather Patterns	2-1
2.3 GEOLOGY	2-2
2.3.1 Bedrock Geology	2-2
2.3.2 Glacial Geology	2-4
2.4 SOILS	2-5
2.4.1 Cobbsfork-Avonburg Soil Group	2-5
2.4.2 Cincinnati-Rossmoyne Soil Group	2-6
2.4.3 Geotechnical Soil Analyses	2-6
2.4.4 Unified Soil Classification System	2-7
2.5 SURFACE WATER HYDROLOGY	2-7
2.6 HYDROGEOLOGY	2-9
2.6.1 Groundwater Use	2-9
2.6.2 Hydrostratigraphic Units	2-10
2.6.3 Groundwater Flow Characteristics	2-13
2.6.4 Background Groundwater Flow Characteristics	2-19
2.7 VEGETATION	2-20
2.7.1 Indigenous Plants	2-20
2.7.2 Threatened/Endangered Plant Species	2-20
2.7.3 Forests	2-20
2.7.4 Wetlands	2-21
2.7.5 Leasing Activities and Woodlands	2-21

Jefferson Proving Ground
Draft Final Phase II Remedial Investigation
March 2002
Page 2-9

2.6 HYDROGEOLOGY

2.6.1 Groundwater Use

The groundwater under JPG is generally of poor quality and is not used for drinking purposes or for other purposes in any significant capacity. The drinking water at JPG is obtained from the City of Madison Municipal Supply Systems and the Canaan Water System. The City of Madison withdraws its drinking water from the alluvial deposits in the Ohio River Valley approximately 5 miles south of JPG.

The ambient groundwater quality throughout Indiana is variable and dependent on the aquifer system, geologic setting, and depth of the water bearing formation. In general, the incidence of mineralized or saline groundwater increases rapidly at bedrock depths below 300 feet. The chemical quality of the potable water being used is adequate to meet the basic needs for household, municipal, industrial, and irrigation uses; however, the water is normally very hard, exceeding 180 ppm hardness. Other constituents which often impact natural water quality include iron, manganese, sulfate, fluoride, and hydrogen sulfide. Most of Indiana's groundwater contains more than the 0.3 ppm aesthetic threshold for iron. Sulfate levels are dependent on the sulfide mineral content of the bedrock and the redox potential of the groundwater, with the highest sulfate concentrations occurring where abundant sulfide minerals such as pyrite come in contact with oxygenated groundwater.

In the vicinity of JPG, most of the potable water is obtained from the alluvial aquifer along the Ohio River Valley. The State of Indiana reports that there are 21 municipal water supply wells in Jefferson County, 6 in Ripley County, and 0 in Jennings County, the 3 counties associated with JPG (IDEM 1989). The State of Indiana also reports that the non-community water supply wells in the 3 counties number 7 in Jefferson County, 10 in Ripley County, and 3 in Jennings County. ~~They also report that~~ There are less than 4,000 wells per county in these 3 counties, including all drilled or hand dug wells. It is assumed that only the wells tallied as water supply wells above are used for potable water supplies. There are very few wells in the vicinity of JPG that are used for domestic water supplies, thus limiting the potential for the groundwater contamination pathway to be completed for the human ingestion scenario. A review of state well records identified only one well within 1 mile downgradient from the area south of the Firing Line at JPG. This well is located 100 feet west of the east boundary and 1,700 feet south of north boundary of section 36 of township T5N, R9E.

The bedrock aquifer in the southern portion of JPG appears to contain a calcium-magnesium-bicarbonate type groundwater with a TDS content of over 600 ppm. Sodium and sulfate are the other two predominant dissolved species. The average iron content is 0.5 ppm. In general, the water is relatively high in TDS, is of poor quality, and would be marginal as a potable water source.

The groundwater perched in the glacial till also appears to contain a calcium-magnesium-bicarbonate-type groundwater with TDS over 400 ppm. Sodium and sulfate are the other two