HYDROGEOLOGIC ASSESSMENT

OF

SURFACE WATER, GROUNDWATER,

AND

FLOWING ARTESIAN SYSTEMS

ON

SLIPPERY ROCK CREEK WATERSHED

STATE GAME LANDS 95

SL 110-7-101.5

Prepared for:

DEPARTMENT OF ENVIRONMENTAL RESOURCES

OFFICE OF RESOURCES MANAGEMENT

DIVISION OF MINE HAZARDS

HARRISBURG, PENNSYLVANIA

Prepared by:

GWIN, DOBSON & FOREMAN, INC.

CONSULTING ENGINEERS

MINERAL INDUSTRIES DIVISION

ALTOONA, PENNSYLVANIA

1984

TABLE OF CONTENTS

	Page Number
Introduction	1
General Discussion	1
Purpose and Scope	3
Location and Description	5
Previous Investigation	7
Construction Project at Site	13
Executive Summary	15
Recommendations	18
Geology	21
Geologic Setting	21
Regional Hydrogeologic Features	21
Geophysical Logging Methods	22
Stratigraphic Correlations	26
Hydrologic Monitoring Considerations	27
Selection of Monitoring Points	27
Methods of Data Analysis	31
Precipitation	39
Surface Water Hydrology	46
Sample Locations and Descriptions	46
Definitions of Flow Systems	47
Establishment of Continuous Flow Recording Station	51
Measurement of Stage Relationships	53
Physical/Chemical Analysis of Surface Water Data	56
Selection of Points for Loadings Modelling	57
Summary of Surface Water Impact	65
Artesian Well Hydrology	67
Sample Locations and Descriptions	67
Definition of Recharge Systems	68
Establishment of Continuous Flow Recording Station	71
Physical/Chemical Analysis of Artesian Well Water Data	72 70
Summary	73
Groundwater Hydrology	80
Sample Locations and Descriptions	80 81
Correlation of Aquifers Physical/Chemical Analysis of Groundwater Data	82
Dye Study of Aquifers	83
Adjacent Water Well Reconnaissance	88
Summary	90
Abatement Alternatives	93

LIST OF APPENDICES

Appendix 1 -	Sample Station 1
• •	•
Appendix 2 -	Sample Station 2
Appendix 3 -	Sample Station 3
Appendix 4 –	Sample Station 4
Appendix 5 -	Sample Station 5
Appendix 6 -	Sample Station 6
Appendix 7 -	Sample Station 7
Appendix 8 -	Sample Station 8
Appendix 9 -	Sample Station 9
Appendix 10 -	Sample Station10
Appendix 11 -	Sample Station 11
Appendix 12 -	Sample Station 12
Appendix 13 -	Sample Station 13
Appendix 14 -	Sample Station 14
Appendix 15 -	Sample Station 15
Appendix 16 -	Sample Station 16
Appendix 17 -	Sample Station 17
Appendix 18 -	Sample Station 18
Appendix 19 -	Sample Station 19
Appendix 20 -	Sample Station 20
Appondix 21	Statistical Evaluation

Appendix 21 - Statistical Evaluation Methods

Appendix 22 - Discharge Relationship between Sample Stations and

Continuous Flow Station Measurement

Appendix 23 - Loadings Summary Sheets
Appendix 25 - Loadings Summary Sheets
Appendix 26 - Loadings Summary Sheets
Loadings Summary Sheets
Loadings Summary Sheets

Appendix 27 - Drill Logs

INTRODUCTION

GENERAL DISCUSSION

The following maps, plans, cross-sections, and drawings are included as a portion of this report:

Sheet 1 Title Sheet

- 2 General Location Map
- 3 Drill Hole Detail Plan and Drilling Summary
- 4 Gate Valve, Casing, and Pressure Gauge Detail at Big Bertha
- 5 Relationship of Geophysical Parameters RI series monitoring wells
- 6 Relationship of Geophysical Parameters R2, R3, C1 monitoring wells
- 7 Relationship at Geophysical Parameters Big Bertha artesian well
- 8 Geologic Cross-Section
- 9 Geologic Cross-Section
- 10 Regional Geology
- 11 Physical and Chemical Relationship of Hydrologic Parameters Sample 7 Slippery Rock Creek
- 12 Physical and Chemical Relationship of Hydrologic Parameters Sample 8 - Beep Mine Discharge
- 13 Physical and Chemical Relationship of Hydrologic Parameters Sample 6 Tributary to Slippery Rock Creek
- 14 Physical and Chemical Relationship of Hydrologic Parameters Sample 4 - Big Bertha Artesian Well Outflow
- 15 Physical and Chemical Relationship of Hydrologic Parameters Sample 3 Slippery Rock Creek
- 16 Physical and Chemical Relationship at Hydrologic Parameters Sample 5 Strip Pit Discharge
- 17 Physical and Chemical Relationship of Hydrologic Parameters Sample 2 Tributary to Slippery Rock Creek
- 18 Physical and Chemical Relationship of Hydrologic Parameters Sample 1 Slippery Rock Creek
- 19 Time Series Relationship of Hydrologic Parameters -

Sample 20 - Big Bertha

- 20 Time Series Relationship of Hydrologic Parameters Sample 19 Big Bertha
- 21 Time Series Relationship of Hydrologic Parameters Sample 13 Big Bertha
- 22 Time Series Relationship of Hydrologic Parameters Sample 17 Big Bertha
- 23 Time Series Relationship of Hydrologic Parameters Sample 16 Big Bertha
- 24 Time Series Relationship of Hydrologic Parameters Sample 15 Big Bertha
- 25 Time Series Relationship of Hydrologic Parameters -

Sample 14 - Big Bertha

26 Time Series Relationship of Hydrologic Parameters -

Sample 13 - Big Bertha

27 Time Series Relationship of Hydrologic Parameters -

Sample 4 - Big Bertha Discharge

- 28 Time Series Relationship of Hydrologic Parameters Sample 9 Monitoring Well ,1-B
 - 29 Time Series Relationship of Hydrologic Parameters Sample 10 Monitoring Well R2
 - 30 Time Series Relationship of Hydrologic Parameters Sample 11 Monitoring Well R3
 - 31 Time Series Relationship of Hydrologic Parameters Sample 12 Monitoring Well C1
 - 32 Relationship of Stream Stages Surface Flow System 1
 - 33 Relationship of Stream Stages Surface Flora System 2