

TABLE OF CONTENTS

1	INTRODUCTION	1
2	ACID MINE DRAINAGE IN BRIEF	1
3	ABA AND THE ABATE STRATEGY	3
4	SUGGESTED SEQUENCE OF ACTIVITIES	5
5	STATIC METHODS	6
5.1	ABA TERMINOLOGY.....	8
5.2	SAMPLES REQUIRED.....	8
5.2.1	<i>Sample preparation</i>	10
5.2.2	<i>Paste/Initial pH</i>	10
5.2.3	<i>Acid Potential using Hydrogen Peroxide</i>	11
5.3	NEUTRALISING POTENTIAL METHOD.....	11
5.4	CALCULATIONS.....	12
5.5	TOTAL ACID-BASE POTENTIAL FOR A MINE.....	12
5.6	SCREENING CRITERIA.....	13
5.6.1	<i>Net Acid Generating Test (NAG) pH</i>	13
5.6.2	<i>Net Neutralising Potential</i>	14
5.6.3	<i>INTEGRATING THE CRITERIA</i>	18
6	KINETIC TESTS	19
6.1	TYPES.....	19
6.2	REASONS FOR DOING KINETIC TESTS.....	20
6.3	SUGGESTED METHODOLOGY.....	20
6.3.1	<i>Humidity cells</i>	20
6.3.2	<i>Methodology</i>	21
6.3.3	<i>Duration</i>	24
6.3.4	<i>Calculations</i>	25
6.3.5	<i>Practical pointers</i>	26
6.4	OTHER LABORATORY KINETIC METHODS.....	27
6.5	CONCLUSIONS FROM THE RESEARCH DONE IN THIS PROJECT.....	27
7	FIELD METHODS	32
7.1	ROCK SAMPLING.....	32
7.1.1	<i>Representative samples</i>	32
7.2	WATER SAMPLING AND MONITORING.....	33
7.2.1	<i>Down-the-hole profiling</i>	33
7.3	TEST PITS IN SPOILS.....	34
7.4	OTHER METHODS.....	34
7.5	CONCLUSIONS FROM THIS PROJECT.....	34
8	MODELLING	35
8.1	CONCLUSIONS REGARDING MODELLING.....	37
9	CASE STUDIES	37
10	FINAL REMARK	38

LIST OF FIGURES

<i>Figure 1. The Prediction Wheel for Mine Drainage Chemistry and ABA's part thereof (after Morin and Hult, 1999).</i>	4
<i>Figure 2. Suggested flow path.</i>	5
<i>Figure 3. Minimum No. of samples based on mass of Geologic Unit, (from SRK, 1989).</i>	9
<i>Figure 4. Initial and Oxidised (NAG) pH vs NNP</i>	15
<i>Figure 5. Plot showing different categories of acid-generation potential based on NPR.</i>	16
<i>Figure 6. Evaluation plot using %S and NPR to differentiate samples</i>	17
<i>Figure 7. ABACUS entry screen.</i>	18
<i>Figure 8. Menu for ABACUS.</i>	19
<i>Figure 9. Humidity cell configuration used at the IGS.</i>	21
<i>Figure 10. Repeatability of humidity cells</i>	23
<i>Figure 11. Two profiles – a non-acidic pit on the left and an acidic pit on the right.</i>	34
<i>Figure 12. Suggested flow path for hydrogeochemical modelling for prediction of AMD.</i>	36

PLEASE NOTE

THE COMPLETE MAIN REPORT

entitled

On-site and Laboratory Investigations of Spoil in Opencast Collieries and the
Development of Acid-Base Accounting Procedures

by

B.H. Usher, L-M. Cruywagen , E. de Necker and F.D.I. Hodgson

as well as its Appendices

the

Recommended Methods for Conducting and Interpreting Analytical Geochemical
Assessments at Opencast Collieries in South Africa

as well as

ABACUS, a button-driven spreadsheet to assist users in interpretation of Acid-
Base Accounting data.

ARE AVAILABLE ON THE ATTACHED CD ROM