

Australian Standard[®]

**Guide to the technical evaluation
of higher rank coal deposits**

This Australian Standard was prepared by Committee MN/1, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 9 March 1993 and published on 14 June 1993.

The following interests are represented on Committee MN/1:

Australasian Institute of Mining and Metallurgy
Australian Chamber of Commerce and Industry
Australian Coal Association
Australian Coal Industry Research Laboratories
Australian Coal Preparation Society
Australian Institute of Energy
Australian Mining Industry Council
Bureau of Steel Manufacturers of Australia
CSIRO, Division of Coal and Energy Technology
Department of Resource Industries, Queensland
Electricity Supply Association of Australia
Institution of Engineers, Australia
Joint Coal Board
National Association of Testing Authorities, Australia
Queensland Coal Board
Royal Australian Chemical Institute
Standing Committee on Coalfield Geology of New South Wales
University of New South Wales
University of Newcastle
University of Queensland

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This Standard was issued in draft form for comment as DR 90094.

Australian Standard[®]

**Guide to the technical evaluation
of higher rank coal deposits**

<p>AS CK14 first published 1967. AS 2519 first published 1982. AS CK14 withdrawn 1983. Second edition AS 2519—1993.</p>

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 8114 X

PREFACE

This Standard was prepared by the Standards Australia Subcommittee on Coal Mining and Geology, under the supervision of the Committee on Coal and Coke and the direction of the Multitechnics Standards Policy Board, to supersede AS 2519—1982, *Guide to the evaluation of hard coal deposits using borehole techniques*. It has been prepared as a guide to the technical evaluation of higher rank coal deposits using borehole techniques, and was written to meet a longstanding need for a uniformity of approach to the evaluation of higher rank coal bore cores.

The guide is based on papers presented at the Symposium on Coal Borehole Evaluation (Brisbane 1977) conducted by the Australasian Institute of Mining and Metallurgy. It also incorporates relevant details from AS 2617, *Guide for the taking of samples from hard coal seams in situ*.

No single set of procedures will satisfy the varied objectives of all exploration drilling programs. This guide merely describes the options, together with sufficient explanation for readers to select the procedures appropriate to their needs. A bibliography of selected texts to allow for more detailed study is given in Appendix A.

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

	<i>Page</i>
FOREWORD	5
 SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	6
1.2 REFERENCED DOCUMENTS	6
1.3 DEFINITIONS	6
 SECTION 2 STAGES OF PROSPECT EVALUATION	
2.1 GENERAL	7
2.2 PRE-EXPLORATION STAGE	7
2.3 EXPLORATION STAGE 1—REGIONAL ASSESSMENT	8
2.4 EXPLORATION STAGE 2—RESOURCE EVALUATION	10
2.5 EXPLORATION STAGE 3—MINE PLANNING	10
2.6 EXPLORATION STAGE 4—BULK SAMPLING OR TRIAL MINING	12
2.7 ONGOING EVALUATION DURING MINING	12
 SECTION 3 GEOPHYSICAL SURVEYS	
3.1 GENERAL	13
3.2 SURFACE SURVEYS	13
3.3 AIRBORNE SURVEYS	13
3.4 UNDERGROUND SURVEYS	14
 SECTION 4 DRILLING	
4.1 GENERAL	15
4.2 THE DRILL RIG	15
4.3 NON-CORE DRILLING	15
4.4 CORE DRILLING	16
4.5 DRILLING FLUIDS AND ADDITIVES	17
4.6 CASING AND COMPLETION OF HOLES	18
4.7 DIFFICULT DRILLING	18
4.8 SURVEY OF THE HOLE	18
 SECTION 5 DRILLING SITE FUNCTIONS	
5.1 GENERAL	19
5.2 DRILLING THE HOLE	19
5.3 LOGGING, FIELD TESTING AND REMOVAL OF CORE	20
5.4 DOWN-HOLE GEOPHYSICAL WIRELINE LOGGING	22
5.5 GAS EMISSION TESTING	28
5.6 DATA RECORDING	29
5.7 HANDLING THE CORE	29

SECTION 6 LABORATORY TESTING AND ANALYSIS

6.1	NON-DESTRUCTIVE TESTS	30
6.2	SUBDIVISION	32
6.3	PARTIALLY DESTRUCTIVE TESTS	38
6.4	PRETREATMENT OF COAL CORE	39
6.5	SEPARATION TESTS	43
6.6	PREPARATION AND STORAGE OF ANALYSIS SAMPLES	47
6.7	ANALYSIS	48
6.8	SMALL-SCALE OR PILOT-SCALE COKE OVEN TESTS	61
6.9	SMALL-SCALE AND PILOT-SCALE COMBUSTION TESTS	63

SECTION 7 RECOMMENDED LABORATORY TEST PROGRAMS

7.1	GENERAL	69
7.2	PLY-BY-PLY ANALYSIS	72
7.3	WORKING SECTION ANALYSIS	78
7.4	CHIP SAMPLES	85
7.5	CHECK FOR INTERNAL CONSISTENCY	85

SECTION 8 PRESENTATION OF RESULTS

8.1	GENERAL	89
8.2	GEOLOGICAL DATA	89
8.3	COAL QUALITY DATA	92
8.4	CLASSIFICATION OF HIGHER RANK COALS	92

APPENDICES

A	REFERENCED AND RELATED DOCUMENTS	105
B	AUSTRALIAN CODE FOR REPORTING IDENTIFIED COAL RESOURCES AND RESERVES	115
C	DRILLING CONTRACT	119

FOREWORD

The exploration of a coal prospect has to be carried out in a series of well-defined stages and should involve the combined efforts of a team comprising geologists, mining and coal preparation engineers, chemists and technologists. It is equally essential that those involved in management, marketing and finance have a fundamental understanding of the procedures involved.

In the initial exploration stages, techniques other than the drilling of bore cores may be used. These may include the appraisal of existing data, field mapping, the use of geophysical surveys and the lithological and instrumental logging of non-cored boreholes.

Small-diameter bore core samples of coal are subsequently taken and analysed to provide information on coal quality, to assist in the geological correlation of seams and the calculation of the amount of resources available for exploitation. Mechanical tests are carried out on certain cores to provide mining engineering data.

Large-diameter bore core samples of the proposed seam working section are pretreated, to produce the expected run-of-plant size distribution, then tested and analysed to predict the yield and quality of likely products and to generate coal preparation design data. These data are then used in the mine plan to calculate commercial reserves. Samples may also be prepared for bench-scale coke oven, or power station, performance tests.

In the final exploration stages, bulk samples are extracted from the seam to enable pilot-scale trials to be carried out and to provide large samples for evaluation by potential purchasers.

Exploration may continue, ahead of mining, for the life of the mine.

The major aim of this Standard is to provide guidelines for the laboratory testing of coal samples recovered by drilling.

Sections that cover exploration stages, other geological techniques and drilling methods are included to provide an understanding of the position and importance of sample testing in a coal exploration program.

STANDARDS AUSTRALIA

Australian Standard

Guide to the technical evaluation of higher rank coal deposits

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard sets out recommended practices for the technical evaluation of a higher rank coal deposit, principally using borehole techniques.

It defines the various stages that comprise an exploration project, describes drilling equipment and methods, and makes specific recommendations concerning procedures that should be adopted in the logging, testing and analysis of a bore core.

This Standard recommends procedures for the technical evaluation of a coal deposit within the context of the entire exploration program. It provides a reference framework that will promote—

- (a) greater appreciation, within an exploration team, of the individual needs of its members; and
- (b) a uniformity of approach, from team to team, to the technology of coal exploration.

A bibliography of reference texts appropriate to the various clauses of the Standard is given in Appendix A.

1.2 REFERENCED DOCUMENTS The documents referred to in this Standard are listed in Appendix A.

1.3 DEFINITIONS For the purpose of this Standard, the definitions in AS 2418 apply.