

**ACARP PROJECT - COORDINATION OF IN-SEAM DRILLING RESEARCH
NSW OPERATOR'S MEETING 16/2/94**

PLEASE CIRCULATE TO INTERESTED PARTIES

ATTENDANCE: F. Hungerford, I. Baillie, S. Arnold, G. Paterson (ACIRL); R. Lama, P. Baker, R. Walsh, P. Roberts (KCC); J. Wood, B. Sheldon, D. Benson, B. Jerome, D. Smith, S. Goddard (BHP); P. Brisbane (Metrop); N. Blanche (Strata Drilling); M. Blanch (Geogas); P. Draheim, J. Abrahamse (BHP Moura); M. Minnis (Longyear); J. Fisher, T. Gilpin (UDR); B. Ross (Oceanic Coal); Y. Liu (CMTE); B. Agrali, A. Barnette (S. Bulli); P. Hardcastle (AMT).

1. OPERATORS' REPORTS: (Hopefully accurately minuted)

.1 Moura - Phil Draheim

One underground board and pillar mine (due to overlying gassy seams). "Souped up" JK Boyles/UDR 15 rig with Drillex DHM. Limit 500m. Surveys single shot, early Dupont tool failed. Coal has 14 m³/tonne 98% methane, vented to surface via vertical hole. Peak flows of +25 l/m/m achieved in about 10 days producing around 80-120 l/s in 260m hole. Seam dry and permeable and hole integrity good. Average flow around 4 l/m/m with flank holes 12 l/m/m. In 500m holes, takes 30 minutes to trip survey tool in and out. Surveys take about 50% of time. Try to complete holes before peak flows achieved. One hole intersected a structure and gas production blew motor out of hole. Holes are on free flow. Water to 6" pipe. Water removed from gas range via traps. Cores are taken from each area prior to mining to confirm seam has drained. Drilling two holes per pillar 10m from roadways with extra flanking holes from stubs to cover virgin sides. Water in dip holes no problem as gas blows water out.

.2 Cordeaux - Brian Sheldon

Drill ahead of each face with Proram Ramtrack, 65mm pilot plus 80mm Widyer reamer. Holes to 200m with core at 100m. Seam averages 4-5m³/tonne 85-90% methane. Do not drain. Uncertain of hole trajectory, holes curve but experience of trajectories used to allow for curve. Do not survey. The BHPR monitored rig not yet tested due to insufficient labour.

.3 Central Colliery, German Creek - Norm Blanche

Norm contract drills for Capcoal. Because of soft coal, rotary drilling deviates and not practical. First stage of drainage trials, drilled 260m holes at 40m centres across panel with Drillex DHM with 1° bend, UDR Boyles 15 rig. Seam 2.6m thick with 100mm shear zone 1m from floor. Had to drill in basal 1m of seam between soft and broken floor and shear zone. Inserted 2" polypipe in holes through rods to facilitate water drainage. Gas drained from 9m³/tonne to 2m³/tonne. Second stage of drilling attempted to drain block laterally along strike with 1000m holes. Had to drill in 900mm envelope between floor and shear. Sheared stone near floor limited first 2 holes to 750m but later hole to +800m. Pushed 600m (max length) 2" class 15, 3/8" wall polypipe through rods to drain water and gas. Holes block if not lined. Takes 3 to 4 weeks to dewater. Achiev 2.5 X 260m across panel holes per week and about 25m per shift for longer holes because of floor instability. Mainly using single shot survey at depth. Trialled Dupont tool which worked to 600m through 3 dykes before becoming inadequate.

.4 West Cliff - Peter Roberts and Richard Walsh

Rotary program Diamec with 80mm Widyer or 80mm pineapple. Holes at 90° to rib at 18m spacings, trajectories can be erratic. Drill on suction through stuffing boxes. When drilling ahead of faces, always have overlap of holes to protect drillers. With downdip holes, insert 32mm OD, 25mm ID conduit with last 8m perforated to help dewater. Geological and drilling details of the recent fatal outburst were discussed, but will not be summarised here due to their complexity.

.5 Tahmoor - Peter Baker

Peter had reported in detail on Tahmoor at the previous meeting. Use combination of DHM and rotary with DHM mainly around structures. Currently have one ATM DDM survey tool in use with two more on order. The DDM has been used satisfactorily to 650m (the maximum depth it has been tested to at Tahmoor). The DDM had problems transmitting from beyond a dyke which was lined with copper standpipe. Drill rate with DHM averages 70-80m per shift. Intend to use DDM for general DHM hole surveys, but Eastman single shot beyond dykes.

.6 Tower - Dave Benson

All drilling is DHM with 3 Kempe rigs. Has 3 DDM survey tools. 50,000 to 60,000m per year budgetted. Drilled a 1002m hole late 93. With DDM achieved 1000m in 8 days. Used Acudrill in first part of hole with problems, so changed to Slimdrill. To 200m depth 1m/min. Beyond 450m, 0.5 to 0.7m/min, ie 70-80m/shift. Plan 1000m holes parallel to LW blocks. Need 6 X 1000m holes at 60-70m spacings with 15 months lead time to drain a LW block. Previous patterns of 600m holes on 80m spacing with 15 months LT drained from 15m³/tonne to 2m³/tonne. Uses slotted steel casing in important holes or where cannot get good spacing (casing gripped with stillsands in chuck to install). A 700m hole can be cased in one shift at a cost of \$5000. Core holes are drilled each pillar length with Proram to ascertain drainage prior to mining.

.7 South Bulli - Adrian Barnette

Development headings are covered by drilling a Proram test hole to the virgin side. Mining 3 to 8m³/tonne. Plan to have ACIRL drill some 1200m holes soon.

.8 Metropolitan - Peter Brisbane

Use "home made" drills with AW rods, 65mm bit. Drill 160m across panel holes and flank holes for each development heading. Core samples from each 60-100m (pillar length) ahead of panel and on each side of known structures. Holes are vented to returns, no suction. Mine 8 m³/tonne at 45-90% carbon dioxide. Across panel holes draining for 6 to 9 months drop gas content to below 7.

.9 Oceanic Coal - Bruce Ross

New Longyear LM75 with BQ rods. Previously with LM37 which achieved 350m with BQ. Have achieved 1000m with LM37. Both rigs have been pushed off mountings by gas pushes but gas is generally not a problem. Most holes rotary.

2. ACARP RESEARCH PROJECTS - J. Hanes

.1 1993 Round

a) Ian Gray - SIMTARS, Optimisation of Longhole Drilling: Investigating factors involved in +1000m to 2000m holes including mathematical and physical modelling and comparative tests on drill rods. Report due by March.

b) Ripu Lama - KCC and BHP, Maintaining Integrity of Holes Through Structures etc: See report by RRipu Lama in these notes.

.2 1994 Round

The following projects were approved to work towards supplying answers over time to the problems faced by operators. The main need of appropriate survey tools is being addressed by groups such as Surtron and AMT.

a) Les Lunazewski - Lunagas, Selection of technology and design of equipment suitable for Australian conditions to detect and measure gas in the return drilling fluid. A mud logging system. 6 months.

b) BHP Research, Trial and further develop the drill monitoring system for the Proram drill and conduct a feasibility study and initial trial of using seismic methods to locate the rotary drill bit. 12 months.

c) ACIRL, Trial and further develop the borehole caliper. 12 months.

d) Ian Gray - AGA, Develop a pressurised well head system to enable drilling under pressure to help maintain borehole stability and to enable use of geophysical logging units mounted behind the bit. 12 months.

e) Ian Gray - AGA, Develop torque, load and RPM sensors to be later incorporated into behind the bit monitors. (1st stage of longer term work). 12 months.

f) Rod Young - AGA, Propose a standard approach for electrical and mechanical connections for down hole sensors to facilitate development of communications and interconnectibility. 6 months.

g) John Hanes, Research Coordinator, maintain communication between operators, industry, researchers and suppliers.

The general reception by the operators of these projects was cool considering they are generally longer term projects which do not provide immediate solutions to today's problems.

3. CMTE RESEARCH PROJECTS

a) Peter Hatherly - Develop sensors including radar, radiometric, seismic for determining the position of the drill bit within the seam - ie a roof/floor proximity detector. Develop geophysical logging tools for detection of geological structures in in-seam holes.

b) Jeff Just - Develop tight radius water jet drilling.

4. REPORT FROM MARTIN MULLINER - SURTRON TECHNOLOGIES

Surtron have a statement of opinion from SIMTARS that the CHAMP survey tool is OK to use with certain restrictions. It is now with a NSWDMR-approved Assessing Agency awaiting certification. The final version of the Drill Scout MWD survey tool is at SIMTARS for final tests and approval. The cable cartridge prototype is progressing satisfactorily.

5. ACIRL REPORT - Frank Hungerford

.1 The AMIRA cooperative research project being formulated was discussed. It will review all available survey tools and compare their operational abilities, ease of use, depth capacity, efficiency of operation. Trials will be conducted to compare the accuracy of each system. Historical data will be compared. Options for survey of rotary holes will be reviewed and trialled as appropriate.

The operators were enthusiastic about this project and also agreed there is a need for Frank to gather and document data on drilling equipment (DHM, bits, rods etc) and drilling techniques as possibly another AMIRA project.

.2 The Westcliff drilling project has so far involved drilling of two long holes. The first achieved 1233m and the second hole is at 1257m. The initial wireline cable was 1233m and a new 1500m cable is being obtained. Drilling rates 45m/shift for hole 1 and 55m/shift for hole 2. Survey is single shot. High torque low rev Acudrill, 1¹/₄^o bend, 96mm bit instead of the usual 89mm. This motor and bit combination have overcome previous surge problems and motor not jamming in tight curves. Hole 1 gas ejected after 300m. Hole 2 gas after 1000m. At 1200m using about 40% of rated thrust of rig and is 7m left of target line.

6. ACARP PROJECT ON MAINTAINING BOREHOLE INTEGRITY - Ripu Lama

It was accepted there is much experience in Australia which is freely shared. Therefore chose to seek overseas expertise to compliment Australian experiences. Selected REI based on responses to queries and recommendations. A consultant from REI visited KCC and BHP mines last week. Technologies being considered include insertion of casing in difficult zones after drilling in holes which remain stable for a period, case holes which cave on drilling. Consideration will be given to materials for lining holes, chemical stabilisation, bits, rods, fluid quantities and pressures etc. River crossing technology for drilling holes through soft sands etc using one drill motor to drill and second to push liner behind bit might be appropriate. A preliminary draft is due in February and the final draft by June. The latter will be circulated for comment prior to issue of the final report.

7. AMT / UDR SURVEY TOOLS UPDATE

AMT/UDR have decided to change the direction of their developments in response to industry requirements. The earlier survey tool, the DDM (Directional Drill Monitor) has an effective limit of around 700m partly due to the acoustic data transmission system. The DDM Upgrade recently used at Tower reached +1000m without reaching the tool's limit. The system will be changed to a DGS (Drill Guidance System) which will serve as a platform for future applications by ATM and others. The new bus system will compress data downhole to

24 bit and will be adaptable to other designer's sensors. It will have 100 times the processing power of the DDM. The Profiler which should be completed by mid 1994 will identify changes of density between rock interfaces and will indicate relative distances between roof and floor. It will link with a Keylock system which will control the drill and only permit drilling when the correct tool face angle is selected. The limit to data transmission distance experienced by the old DDM will be overcome by a Modular Electric Connected Cable Assembly which is achieved with a modification to the drill rods costing \$15,000 to \$20,000 per 1000m.

To be able to recover the survey tool in cases of the motor being bogged, it was suggested that local mines should share in the cost of a set of rescue equipment or contract UDR to recover lost equipment.

8. NEXT MEETING

The next NSW Operators meeting will be held at Westcliff Colliery at 8am on Wednesday 25th May. If any operators would like to make any suggestions or to comment on the content, program or anything else about the meetings, please contact me.

The next meeting of the Queensland Operators will be held at Moura Mine on Tuesday 10th May. If any NSW operators or suppliers, researchers etc wish to attend the Moura meeting, please advise me by 2nd May.

JOHN HANES
4/3/94

ACARP PROJECT - COORDINATION OF IN-SEAM DRILLING RESEARCH

MINUTES OF OPERATORS MEETINGS NSW AND QLD MAY 1994

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1. QUEENSLAND OPERATORS MEETING MOURA 10/5/94

1.1 ATTENDEES: Phil Draheim, Jacques Abrahamse, Shane Bishop, Rod Sonter, Richard Whatman, Neil Tuffs, K. Gueno, Moura; Mick Kelly, Gordonstone; Ken Lewthwaite, Capcoal Central; Ian Gray, Sigra; Norm Blanch, Strata Drilling; Mal Minnis, Boart Longyear; John Kelsey, Tom Gilpin, UDR; Adam Lunarzewski, Lunagas; Richard Danell, BHPR; Yuzhou Liu, Paul Dunn, CMTE.

1.2 MOURA

275m depth, 15 m³/t CH₄, Boyles B15 rig, Drillex motor. Holes previously limited to 400-500m because of single shot survey delays. Now using ATM DDM survey tool and with 9 holes achieved 89m/shift cf single shot 50m. Longest DDM hole to date 530m. With 23m spacing reduce gas to 1m³/t in 6 months. Improved drilling rates with DDM has increased peak gas flow from 20,000 m³/day to 80,000 m³/day.

1.3 GORDONSTONE

CO₂ with some CH₄, 2 to 5 m³/t variable, depth around 250m. Water in seam is a nuisance. Drilling for water drainage by Norm Blanche; latest hole 700m in 14 shifts with single shot, produced 2 litres/sec water flow for 2 months. Gas surges from hole after 3 weeks. Wet conditions have slowed development rates from 210 m/week to 165 m/week. First LW will be 2.5km, rest 3.5 km long. Main barrier to long hole drilling is still the lack of an efficient survey tool for the conditions.

1.4 CAPCOAL

All IS drilling under contract. All holes must be drilled in lower 1m of seam to avoid shear zone. 880m hole takes 2.5 weeks by 2 shifts with single shot, long holes average 40m/shift; DDM operation range limited in this area to 500-600m.

2. NSW OPERATORS MEETING, WEST CLIFF 25/5/94

2.1 ATTENDEES: Richard Walsh, Peter Roberts, Mark Frenulavic, West Cliff; Ian Stone, Peter Baker, Tahmoor; Phil Eade, Jeff Wood, Brian Sheldon, BHP Colls; Bruce Ross, Oceanic; Frank Hungerford, ACIRL; Mark Finlay, Oldgard Pereira, CRAM; Ian Gray, Sigra; Scott Thomson, METS; Ray Williams, Geogas; Mal Minnis, Boart Longyear; Les and Adam Lunazewski, Lunagas; Derek Fitton, ASAHI; Richard Danell, BHPR; Bob Miller, Computalog; Dave Reiniger, Warajay; Alan HArgraves, Woll. Uni.

2.2 TAHMOOR

Using Peewee multishot camera to survey rotary holes. Drilltech bit with pineapple cutters stays in seam. Currently have a 1m dyke through LW block which is difficult to drain behind. DDM fails to transmit data beyond dyke. Trying rotary holes through dyke then case the dyke +/- 2m with copper casing on completion of drilling. Total flow measurements are conducted with chart recorder in range far enough outbye to obtain laminar flow. Seeking method to

differentiate roof and floor cuttings. Will use MSA CO2 monitors (approx cost \$2500) to detect CO2 around rigs.

2.3 WEST CLIFF NEWS

Gas drainage drilling LM55, BQ, 65/80 Triefus, Proram + 65mm pineapple. Using Peewee multishot camera, (approx purchase cost \$70,000+) preliminary results appear OK. A trial of CHAMP to compare with Peewee conducted. KCC is committed to knowing where the gas drainage holes are located, that there are no obstructions to free flow and that the coal is adequately drained of gas. Desire is for survey while drilling. Will line holes after drilling with PVC (CO2) or Frac pipe (CH4) to aid water drainage and keep the holes open. Westcliff hole trajectories do not appear to be controlled by stress or cleats. Of the 12 holes surveyed with the Peewee, one hole deviated slightly to the right and the rest were straight to the 160m depth tested. Ian Gray suggested that the bayonette couplings of sewer rods could offer an inexpensive means of joining push rods for the Peewee. Target for in-seam drilling this year 100km.

Hole NC941 drilled by ACIRL reached 1535m using 96mm Triefus PCD and Acudrill motor. Survey by single shot at 18m to 900m then 24m intervals. This is apparently the world's longest directionally controlled hole in coal. The current hole is being drilled to detect a fault between West Cliff and Coal Cliff collieries. It is now at 947m averaging 55m/shift on single shot. Penetration rate has dropped from initial 0.8m/min to 0.4m/min. The use of 96mm bit and a shorter motor has eliminated the surging previously experienced from 400m depth using a Slimdrill and 89mm bit. At depth the hole is trending towards cleat.

2.4 SOUTH BULLI

A series of Proram holes were surveyed using the newly approved CHAMP electronic multishot tool. The holes were 82mm diameter and were standing up to 6 months. It was difficult to push the tool into the holes on conduit beyond 50m. They were surveyed at 12m intervals taking about 5 to 10 minutes per hole. The holes typically turn to the right when drilling to the east and to the left in holes drilled to the north. The surveys were effected at the hole collars by the proximity of a high tension electric cable. The effect is reduced at 3 to 4m distance. Experience at South Bulli shows that stone rolls tend to deflect the bit to roof or floor.

Long hole drilling by ACIRL is planned for exploration and gas assessment. Current gas contents are around 8m³/t. The holes are to be drilled within 5m each side of planned development panels with roof intersections each 80m and cores staggered at each second pillar length each side to give average 40m gas test spacing.

2.5 OCEANIC

Drilling rotary holes with LM75, BQ, 80mm bit. Exploration for longwalls. Hole starts through 30m dyke then 20m cinder, curves to right and at 1340m was within 45m of target. The bigger rig is less sensitive to smaller structures, so must rely on cuttings return which could be taking 20+ minutes. Hole is stabilised with liquid polymer when required.

2.6 CORDEAUX

10 holes drilled in last quarter. 60/80 bit, AW. Start 20° to left and hole consistently swings to right to be intersected by heading at 100m where core taken for gas content. A 200m hole can be completed in one shift.

3. PROJECT COMPLETION REPORT - OPTIMISATION OF LONGHOLE DRILLING - SIMTARS

Ian Gray reported on the completed research project covered in detail in his report to ACARP which can be obtained from AMIRA (phone 03 6548844, quote project number C3023). The project aimed to define factors critical to extending hole lengths to 2000m+. He described the rod buckle physical model which showed helical buckling of rods (the model could be brought to Wollongong for demos if funding provided). The way a hole builds angle seems to be mainly controlled by bottom hole assembly with possible influences from geology. Coefficients of friction for rods in the hole were found to be less than expected. Rigs are capable of drilling further than the strength limits of the rods. With best drilling practice, 1200m to 1600m appears to be the limit of drilling before rod yield commences using NQ/NT. The drill rods are the critical factor for longer hole drilling. The following table shows limits based on experimental data and data from rod suppliers. (There appear to be some discrepancies between the theoretical and practical, and these should be ironed out by extended modelling using more reliable rod data produced by suppliers or by more detailed independent rod testing - JH).

Limiting Item	0.17			0.25		
	LMC135	B20	ROD	LMC135	B20	ROD
Thrust	1700	1500	---	1200	1000	---
Pull-out	1550	1150	---	1050	800	---
Rotating off bottom	1000	1400	600	650	1000	450
Torque		(1.2kNm)		(1.2kNm)		
Torque at 8.9kN bit load	1000	1350	600	650	950	450
von Mises ratio			(1.2kNm)			(1.2kNm)
with turning(0.6)			1600			1050
von Mises ratio			1600			1200
without turning(0.6)						
Min Value	1000	1150	1600	650	800	1050

The reports recommendations are:

- a. Full testing of NQ and NT rod joints be undertaken as a matter of top priority.
- b. Darning needle drilling practice be adopted using:
 - i) Tool face angle change intervals of 18m or greater
 - ii) Bottom hole assemblies with reduced build up characteristics.
- c. Operators adopt good monitoring practice and analyse while drilling. This should include measurement of sliding, drilling, pullout loads, and torque to set tool face angle.
- d. Extended (c) to automatic monitoring of of the drill rig and bit loads.

- e. Operators continue to use water as the flushing medium to ensure turbulent flow to remove cuttings.
- f. Equipment be used and developed to permit measurement while drilling, of borehole trajectory, size, and the location of the surrounding strata.
- g. The use of nozzles in drill bits should be investigated and tested as a means of drilling with reduced bit loads.
- h. Alternative drill rods should be located, tested or designed. The requirement for more appropriate rods in the longer term is inevitable if 2000m+ holes are to be drilled.
- i. A rotatable bottom hole assembly be developed for coal so that straight hole drilling can take place.

4. REPORTS ON CURRENT ACARP PROJECTS

4.1 LUNAGAS - UNDERGROUND FLUID LOGGING SYSTEM

The project is nearing completion. It has considered the application of continuous monitoring of the amount and composition of gas in the return drill fluid. The broad concept is illustrated in the attached diagram. The final report is due by the end of June. The next stage of the project will involve detailed design and testing. (Alan Hargraves suggested the need for analysis of coal cuttings, especially for rank, as potential outburst indicator.)

4.2 BHPR - DRILL MONITOR AND BIT LOCATION BY SEISMIC

The monitored drill has only been used for a few holes due to problems of labour shortage at Cordeaux. A seismic trial of across-block hammer blows has been conducted to assess the feasibility of using a simple seismic source and the most appropriate waves and geophones. The initial trials over 100m showed location to around 5m accuracy.

4.3 AGA - THREE PROJECTS

A. STANDARDS FOR TOOL COUPLING - Designing a common electrical bus and mechanical connection standards for the research design and trial of in-hole test equipment by several researchers and suppliers. Seeking consensus, but not easy. (Phil Hardcastle has advised he will make provision on his survey tool to accommodate other manufacturers tools. This might be practical for the long run, but not necessarily practical or cost-effective for the design and trial stages: JH). Nearing completion.

B. BIT TORQUE, LOAD AND RPM SENSOR - For N size wireline rods. Will incorporate bending moment measurements. The tool should be able to detect changes in hole direction instantaneously. Recently commenced.

C. BOREHOLE PRESSURISATION - To prevent gas production during drilling, gas desorption from cuttings, borehole wall collapse and blowouts. Will assist geophysical logging during drilling. Recently commenced.

4.4 ACIRL - BOREHOLE CALIPER

The tool has 3 arms connected to a single vibrating wire gauge. Trialled at West Cliff recently. Can only measure erosion at bottom of hole. Trialled with only one arm (oriented up). One trial hole measured at 120mm dia (cf drilled 80mm). Will redesign to measure 3 independent arms.

4.5 CURTAIN UNIVERSITY - UNDERGROUND MINE COMMUNICATIONS

A project monitored by the ACARP Communications Taskforce to develop an intrinsically safe, integrated digital mine communication system for underground mines. The design is for a high quality digital voice and data communications system with capacity for automatic monitoring and ultimately remote control and compressed video in one system. The design of the basic system has advanced to the stage of involving a manufacturer for production feasibility study. (Trivia from meeting - the Communications Taskforce distributed a questionnaire seeking what the problems were and what research was required, to the mining industry and received a response of 57%. The Wollongong area response was 50%. The response rate to the In-seam drilling questionnaire was 100%. Does this show which mining people are more committed and interested?:JH)

5. AMIRA PROJECT - ASSESSMENT OF SURVEY TOOLS

Draft proposals sent to BHP and KCC for consideration. The project can be pruned as some of the comparative trials have already been conducted. Agreed that cooperation between the pits and suppliers can produce results faster. KCC and South Bulli offered their results on the Multishot tool trials. Need meeting of supervisors and AMIRA shortly to consider shorter (3 month) projects directed by operators.

6. CMTE PROJECTS

6.1 SENSING AND LOGGING FOR IN-SEAM BOREHOLES

Investigating the feasibility of using radar, radiometric and seismic methods to log in-seam boreholes. Work on recommissioning the Uni Q seismic probe commenced; A borehole radar antenna was designed and a prototype built; geophysical logs from Appin-Tower assessed indicating feasibility for radiometrics; experiments with gamma logging conducted with large block of coal indicate shale should be detectable from 50cm distance. (If AMT successfully demonstrate their Profiler detects roof/floor proximity, some of the CMTE work might be obviated- JH).

6.2 TIGHT RADIUS WATER JET DRILLING

The aim is to develop drilling technology to permit drilling of vertical holes from the surface with change of trajectory over a tight radius into the coal seam for in-seam drilling. Will use flexible tube rather than rods for drilling. Steering is difficult. Lab experiments will be followed by field trials.

7. SUPPLIERS NEWS

7.1 UDR/AMT - Working on increasing signal transmission distance. Old tool maximum 1000m depending on freedom from dykes, roof etc. New generation will exceed 1km. M.E.C.C.A. (Modular Electrically Connected Cable Assembly) is expected to be released June 1994. It

uses a dielectric coaxial cable permanently installed into a drill string with automatic coupling as rods are added. The cable shows virtually no signal loss at 2km (theoretical). Transmission will be achieved using an ultra low impedance source driver thus guaranteeing the signal is IS and that it is virtually impossible to lose the signal in high salinity water. It will be available for all upgraded DDM's as well as the new DGS. The cost will be about \$28,000 for the system electronic upgrade and less than \$20 per meter for cable.

7.2 MULTISHOTS

The CHAMP electronic multishot distributed and approval held by Surtron (09 4305116) and the Peewee photographic multishot supplied and approval held by Warrajay (042 262903) have both become available in recent weeks. The former is being trialled by South Bulli and the latter by KCC. Preliminary results for both indicate they do the job.

The Drillscout MWD tool to be supplied by Surtron is back to SIMTARS for what should be the final tests.

8. NEXT MEETINGS

Researchers meeting on downhole systems and communication at CMTE Brisbane, Tuesday 27th September, 10am.

NSW operators on Wednesday 31st August, 9am at Appin Colliery. (Qld operators who wish to attend, please advise early).

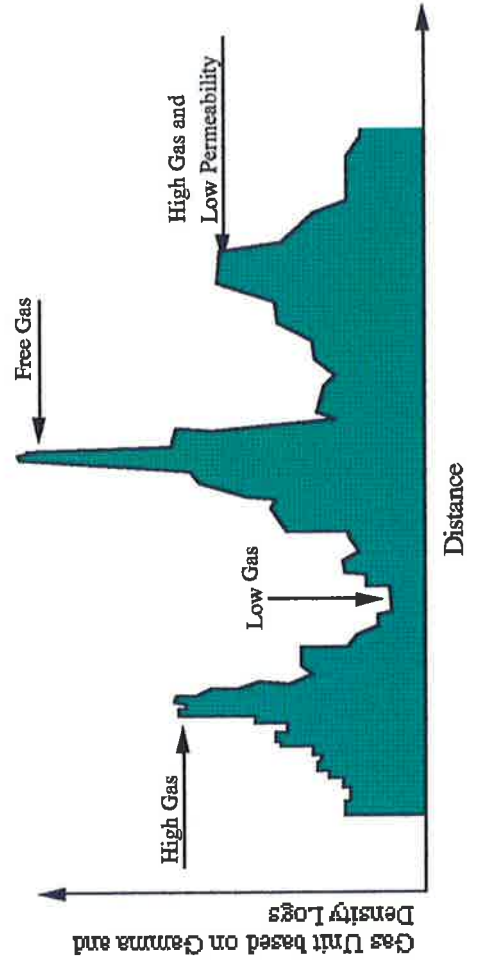
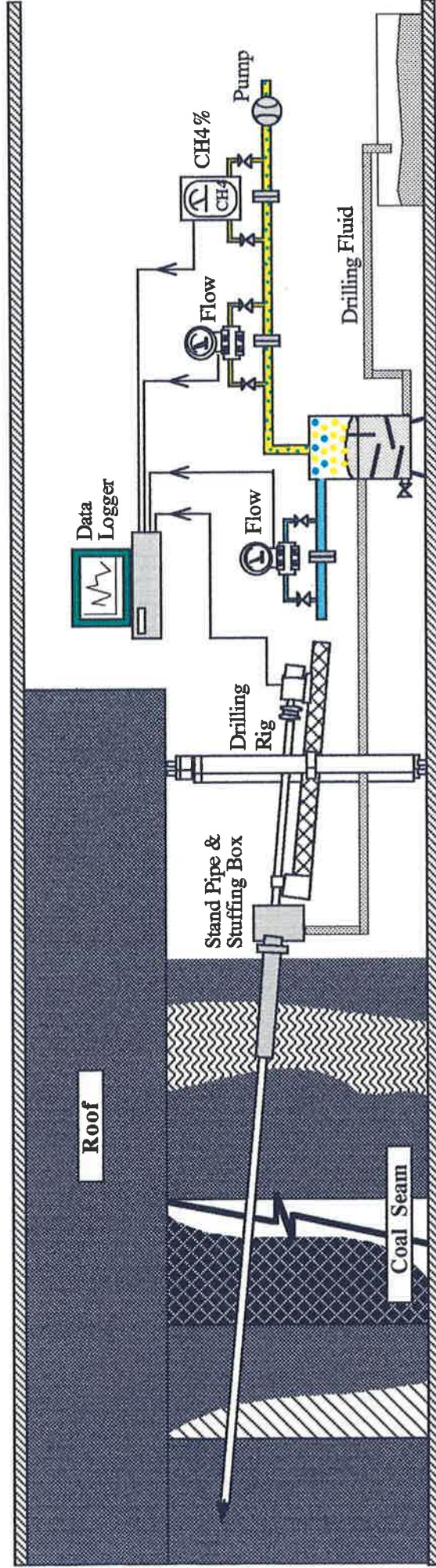
Qld Operators on Thursday 29th September at Gordonstone Colliery, 9:45 am. (NSW operators who wish to attend, please advise early).

If you have any comments or advice on the meetings, or on in-seam drilling research requirements or ideas on how to do things better, please let me know.

The cooperation of attendees at the meetings and the free exchange of ideas is commendable. I congratulate all of you in the in-seam drilling industry on your efforts in solving your problems on the job and your willingness to share.

JOHN HANES
Phone /fax 042 291349

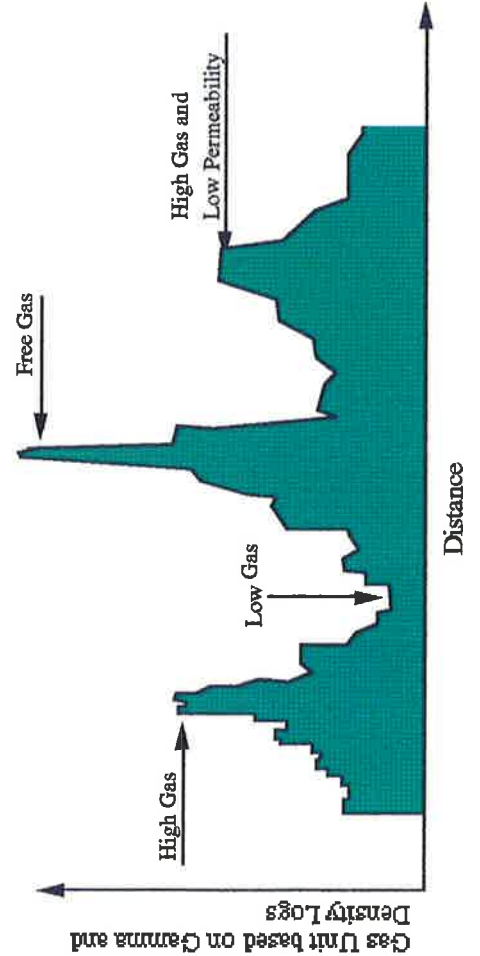
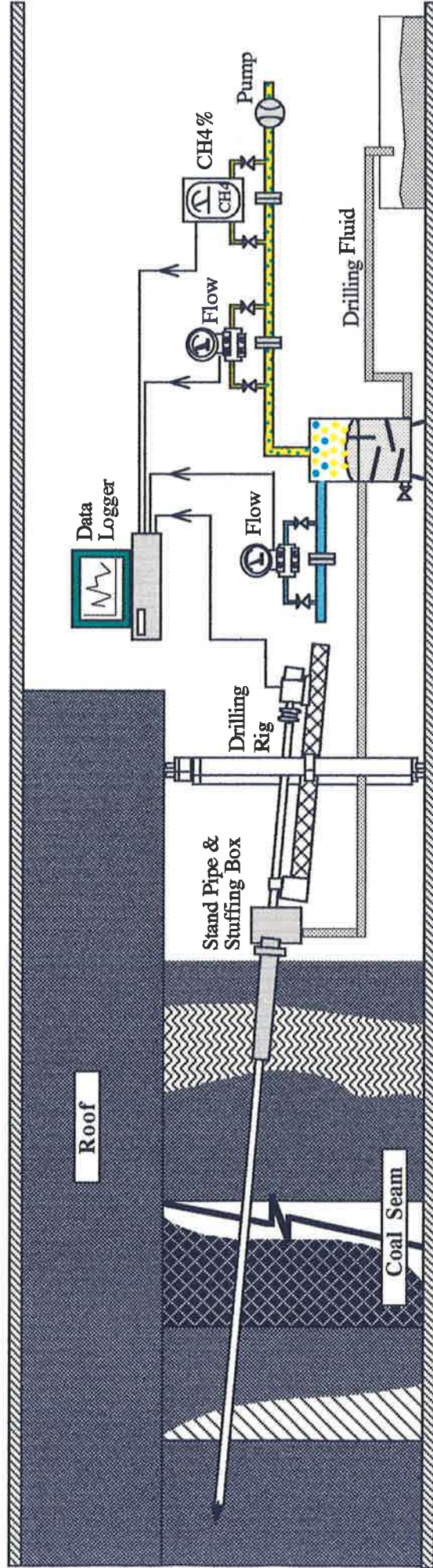
UNDERGROUND DRILLING FLUID-LOGGING SYSTEM



LEGEND:

Coal Properties:	
	Low Ash
	High Gas and Low Permeability
	High Ash
	Open Cleat
	Fault

UNDERGROUND DRILLING FLUID-LOGGING SYSTEM



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COORDINATION OF IN-SEAM DRILLING RESEARCH

MINUTES OF RESEARCHERS' MEETING 27 SEPTEMBER 1994

PLEASE DISTRIBUTE COPY TO INTERESTED PEOPLE.

1 **ATTENDEES:** Peter Hatherly, Peter Fullagar, Tsevitt Chen, Jeff Just, Mike Gladwyn, Wayne Murray, Ian Pollock, CSIRO/CMTE; Alan Davies, BHPAC/ACARP; Rod Young, Ian Gray, AGA; Richard Danell, BHPR; Martin Mulliner, Surtron Technologies; Malcolm Minnis, Peter Pretorius, Boart Longyear; Tom Gilpin, Peter Middleton UDR; Trevor Cook, Haliburton.

2 ACARP SHORTLIST FOR 1995

Projects in in-seam drilling shortlisted for ACARP funding in 1995 are as follows:

- a) AGA - Drill Rod Joint Testing
- b) AGA - Electronics for Bit Load, Torque etc sensors
- c) CMTE - In-Seam Sensing
- d) BHPR - Bit Location System and IS Computer
- e) J Hanes - Coordination of In-seam Drilling Research

3 SUPPLIERS UPDATE

a) **MECCA/DDM** - Tom Gilpin advised that AMT has responded to market requirements and changed priority from developing the DGS system to overcoming data transmission difficulties with the DDM. The MECCA system of cable-in-rod is due for delivery and trial in October. The cable connectors are spring loaded and connections are transparent to the drill operators. Data transmission is expected to be 115 kilobytes per second over 1500m. The cable is a monoconductor which can be used for multiplexing. The uphole board of the DGS system is completed and should be ready for trials by year's end. The profiler is expected by March 1995. Detailed discussions will be required between AMT and others who require to incorporate their systems onto the AMT tool to define software communication protocol etc.

b) **DRILL SCOUT** - Martin Mulliner advised the Drill Scout is finally approved and will be available in two weeks. It incorporates a fluxgate magnetometer and a roll sensor. It is designed to replace the single shot tool, but its degree of sophistication is not in the same league as the DDM. Accuracies are inclination to 0.1 degree and azimuth to 1.0 degree. Tool face is in 5 degree increments. It is hardwired via cable on a cartridge (capacity 350m). Wires are wet connected into silicon grease glands and self amalgamating tape. The battery runs for a full shift before needing an 8 hour recharge. The units are now approved and available for purchase. Service is in USA only at this stage. Surtron plan to keep tools as backups. The CHAMP is a more accurate survey tool which also provides a total magnetic field strength reading. Shearwell have a MST1500 steering tool with fluxgates and accelerometers connecting to a 486 processor. It uses electromagnetic wave transmission.

c) **HALIBURTON** - Trevor Cook advised Haliburton is involved in hydrofracking methane drainage holes in Australia. Considering use of core tubing units especially for surface to in-seam drilling.

3 RESEARCHERS' PROGRESS

- a) **Pressurisation of Boreholes**, Ian Gray - Materials have been chosen and now trying to commence manufacture. The main problem with the sealing material has now been overcome. Expect to have a sealed unit ready for surface trial in 6 weeks. Will then require an underground drill test site. Considerable engineering will be required to fit the unit to a drill rig and Ian requested support from drill manufacturers. Interest has been expressed by some NSW mines.
- b) **Torque, Drag, Thrust, RPM, Bending Moment Indicator**, Ian Gray - Designed, not yet constructed. The testing frame is substantial due to the large loads expected. Will enable simultaneous measurement of torque, bending moment and thrust. Preparing software with plans for on line processing at the drill. Sensor unit will reside behind the BHA.
- c) **Standard Electrical and Mechanical Connections**, Rod Young - The main objective is to communicate up and down the hole. AMT approached to avail MECCA for research and have indicated willingness to include other groups equipment on board. The design communication rate of MECCA should satisfy most people's requirements. Cable costs are \$28K per kilometre plus fit out. The downhole electronics are powerful, but Rod does not have information on mechanical assemblage or programming. Discussions with Surtron indicate they cannot achieve the required +20Kbaud with standard cable, but might be able to improve by spooling coax or fibre optics onto the cartridge (the mandril is available separately). Discussions required between Rod and AMT and other users to determine how to get required equipment into a single pod. Possibilities include all gear in a single pod (eg AMT + 4 other sensors) and connection of multiple pods. Pods and connections must be flameproof. At this stage questions were raised regarding whether IS or Flameproof equipment were required for use in CH4 holes. Alan Davies agreed to follow this up with a meeting with appropriate Mines Dept personnel etc.
- d) **Caliper Probe**, Peter Hatherly - In infant stages, measure by Irad at 1m intervals. Originally 3 arms connected to one strain gauge, but achieved better results from a single arm profiling top of hole. Considering new designs; Acoustic caliper might be appropriate, hole diameter too small for radar. Martin advised there is a 32 arm caliper for vertical wells used by Kinleer.
- e) **Drill Monitor and Location System**, Richard Danell - Monitored rig will be moved to Appin to drill structures. The rig monitor is adaptable to other rotary rigs. The seismic across block test yielded standard deviation on channel waves of 1m at 5m offset. Some downward seismic tests have been conducted with surface rig producing excess noise from the drill, so will test accelerometer on surface rig. Tests also underground. Alan Davies suggested interaction with the Coffey project on roof detection in surface drilled holes which also suffered drill noise which was apparently overcome. Completing specifications for IS 486PC with 8 to 16 channels - Please advise Richard if you have any suggestions for general applications for this computer. If ACARP approves funding, should submit for approval mid 95. Martin Mulliner advised there is an IS 486 available in the petroleum industry.

f) Water Jet Drilling, Jeff Just - Initial tests of tight radius drilling are planned; will drill horizontal hole in seam, create a cavity then turn. Bought a 2001 pm @800 bar Womer pump. Will use a flameproof motor drive at KCC to trial waterjet assisted rotary drilling on a Longyear rig. The objective is to drill straighter holes by reducing thrust.

g) Roof, Floor, Structure Sensing, Peter Hatherly - The CMTE project on Sensing and Logging for In-seam Boreholes is developing sensors to locate the roof and floor relative to the bit and geophysical logging tools for detecting structures. The best advanced is the radar tool which has been tested in a sloping hole in a 6m thick coal seam in a highwall. The tool successfully detected and delineated stone bands in the seam, but the seam was too thick to detect roof or floor. The tool should also be able to detect structures in the coal. The prototype works with 800 Mhz frequency and is short range. A lower frequency tool should achieve a range of 5m with lower resolution. The Uni Q sonic tool is to be tested shortly to determine its potential for application to detecting roof, floor and structures. The natural gamma tool should be able to detect shale at 50cm range. This is a more sophisticated natural gamma than that in the older Geoscience tool with the ability to differentiate different spectra. CMTE is seeking some funds from ACARP to supplement other funding for 1995. The project will initially consider pump-down tools to demonstrate the viability of sensors and follow with MWD as appropriate.

h) Radar, Wayne Murray - Bow tie antenna designed at 80mm diameter. 500MH for 2.5m-3m range and 800MH for 1-5m range. Test at Swanbank reported in previous paragraph. Need large dielectric contrast at stone coal etc interfaces to get good reflection. Current work involves improving antennas followed by a second trial at Swanbank. Will probably need the tool to be inserted in a metal drill rod with a ceramic window. Kevlar rod might be suitable. Ian Pollock to circulate specifications on data transfer rates etc to Richard and Rod.

i) Radiometrics, Tsevitt Chen - Have designed a module with lucite and kevlar windows to log up and down. Will then collect more data from a BHP mine. The tool is spectrometric and can differentiate contributions from Na, K etc.

4 GENERAL BUSINESS

a) It was suggested that longer (eg 2 page reports should be circulated amongst interested parties quarterly on each research project in in-seam drilling and associated projects. JH to organise IS Drilling projects and AD the others. IS Drilling researchers take note and prepare a separate 2 page report at normal quarterly reporting times and forward to JH for distribution.

b) Mike Gladwyn suggested there is a need for tighter definition by ACARP of industry requirements for research. There is also a need for stability to assure projects continue to end of term.

5 NEXT MEETING

24/3/94 in Wollongong in conjunction with Outburst Workshop.

IN-SEAM DRILLING RESEARCH CO-ORDINATION NSW OPERATORS MEETING 30/11/94

Attendees: (20) F. Hungerford, ACIRL; M. Finlay, CRAM; P. Roberts, West Cliff; M. Ogilvie, KCC; A. Knight, BHP; B. Eager, Tower; B. Jerome, D. Smith, Appin; P. Maddocks, Metrop; I. Poppitt, Coalex; J. Penrose, ACE; P. Hardcastle, AMT; B. Stromquist, ASAH; M. Minnis, Longyear; A. Hargraves, Cons; D. Reiniger, WMM; J. Halliday, Nat. Earthmoving; I. Pollock, W. Murray, CSIRO; R. Wischusen, AMIRA.

Operators News

a) **ACIRL** - At South Bulli, a long hole to test an aeromagnetic anomaly intersected a hard dolerite intrusion at 750m. Took a core and continued drilling to 850m. Pulling back 200m and branching to define size of intrusion. Survey shots with Eastman single shot produced anomalous readings (to 180° out) in vicinity of intrusion but OK away from it. The CHAMP will be run in the hole to test its magnetometer facility for detecting the proximity to the intrusion. At North Cliff, drilling parallel flanking holes for long term drainage ahead of proposed panel. Drilling due North with 1.25° bend in soft ground. Although oriented the motor to right, the hole tended to curve up 3° to left. The aim is to drill 550m then insert 2" pipe perforated at inbye end for dewatering. At Metropolitan, working with CRAM to train Metrop drillers in use of new Ramtrack Diamec 262 drill. At Newstan, conducting exploration drilling to prove structure for future longwalls. The hole starts though a hard dyke, then a 10m fault followed by two 4m faults. Took 2 weeks to drill first 100m but now at 500m.

b) **West Cliff and Tahmoor** - both pits having difficulties keeping drainage up to longwall development. At WC where in 12-15m³/tonne CO₂, trying to drill straight rotary holes parallel to development drives. One face has 23 holes in it to try to drop gas contents. Some faces can be stopped for 4 weeks. Have purchased a Cram Ramtrack plus EW rods and multishot photographic tool to test old cross panel holes for straightness and depth to determine any shortfalls in drainage. At both pits, every hole now drilled is surveyed. Monitoring of drainage holes is conducted daily in single headings and weekly for across panel holes and long holes in advance of developments. At Tahmoor, post drilling surveys have shown that drilling BQ with Diamec, can get 10-15° deviations and failure to cross block and predrain developments. Recent work has shown that undrained areas just beyond drained areas appear to have lower than normal permeability and produce very hard coal cores compared with more friable cores in drained areas. Developing a hypothesis that coal shrinkage accompanying drainage is transferring stress concentrations to surrounding coal thus reducing the permeability. (Accounts of similar experiences would be appreciated). Hole dewatering after drilling is achieved by inserting 32mm electric conduit with the inbye 8m perforated. The annulus between the conduit and standpipe is sealed. The gas pressure in the hole and the increased velocity at the outlet successfully dewater the hole. For dewatering long holes, refer to Norm Blanch of Strata drilling who has a mechanical system for inserting polypipe from a 500m coil. To achieve straighter rotary holes with BQ and AW, have used a 65mm PCD bit with a 65mm stabiliser directly behind the bit followed by a 3m rod then another 65mm stabiliser. Trouble was experienced with the PeeWee multishot with considerable variation from the single shot. It appears the problem has been with poor factory calibration. Dave Reiniger has approached the manufacturers of the original multishot to obtain a more reliable tool. Frank Hungerford advised that at each new job, he conducts a calibration of his survey tool on a surface gridline to determine correct performance of the tool before using it U/G. Regarding the Fraz nature of electrical conduit used for dewatering, Ellicott diagrams by Geogas indicate that above 85% CO₂,

cannot get explosive mixture, but with less than 85% CO₂ can get explosive mixtures depending on the air input to the hole. Ripu Lama has commenced an ACARP project to improve permeability of the coal by a form of pulsed infusion shotfiring. Shot a trial line on the surface with large quantity of explosives in each of two holes. Underground trials will be subject to inspectorate approval.

c) **Metropolitan** - Now surveying and have found a reasonably consistent 500m radius curve followed with AW rods. Pumped water into a hole to see where it emerged in the opposite road, but did not match camera results. There is a need to standardise the methods of calculating and plotting survey results (Frank H. plans to address this in the AMIRA project if it gets going JH). Have just purchased a Ramtrack mounted Diamec 262 drill and rod trolley on tracks. Intend to use DHM drilling in fan from gate to gate. No vacuum. Operate 6 drilling crew plus PM. Have 3 old Fletcher rigs. Have successfully tried coring with a calyx (tungsten sawtooth) bit with conventional double tubed barrel. Hole lengths 120m in solids, 60m in pillars. Plan 200m fans later. Coring to 80m with 25 minutes recovery time which is the maximum recommended by Geogas. Every cored hole is surveyed. Getting sodium bicarbonate deposited in the range from CO₂. Considering bimetals producing electrolysis.

d) **Ellalong** - grunching at 1m per shift and loading in southern outburst prone area at 550m d.o.c., but not economical. When first encountered high gas, attempted to drill drainage holes, but holes closed to oval cross section under stress at 10-15m depth.

e) **Tower** - Running 3 DDMs and 2 Slimdrill and 2 Acudrill DHMs. 75% coring and 25% open hole. Every in-seam hole is surveyed while drilling. ProRam holes for face cores are surveyed after drilling. Drilling rates vary from 30m to 100m per shift depending on operator experience. Take cores each 70m down predevelopment holes (pull rods for core each time, resulting in long lost gas times for deeper cores). It takes about a half shift to take a core. Drainage generally free, but a dyke in current development is slow to drain. Aim is to drain LW blocks by 3 holes along middle of block and 2 flanks all parallel to panels with long lead time. Most present drainage is by across panel fans. Have 10 drillers on each of 3 shifts. A problem, shared by other pits is a small number of technical staff for supervision and monitoring.

f) **Appin** - Recent problem CO₂ zone near West Cliff southern boundary, crossed by gateroad. Needed 20 to 25 holes each 30m to drain face. Gas content 7. Miner flitted each 2nd day between 3 headings. In CH₄, fan drilling standing for 12 months drops content to 1. Drill test holes with ProRams and core at 50m and 100m then survey with single shot. Longwalls drilled with crossmeasure holes 10/50m in maingate and 5/100m in tailgate. Last LW gasout history improved due to slower but consistent mining rate of 12000 tpd with precautionary delays if gas rises to 0.9%. Cross measure holes at -18° and -30° all cased with steel casing (West Cliff don't case but are not now experiencing gasouts). Total of 45 people in gas drainage work, but struggling to keep up. To push camera up holes for survey, glue conduit which is sacrificed on completion of survey (Metrop has 6 threads turned on conduit and screws, West Cliff uses threads).

RESEARCH NEWS

ACARP PROJECTS

a) **Borehole Integrity** - Ripu Lama reports has received a draft preliminary and a prefinal report from REI, the USA consultants, but both were of an inferior standard to what was expected. Ripu travelled to Europe and USA in September to observe drilling through unstable ground and will summarise his findings and those of REI for the final report by December, 94.

- b) **Drill Monitor and Bit Location** - Richard Danell reports the monitored ProRam is now at Appin drilling and recording through mylonite zones. The optical detector for bit penetration rate has not yet been replaced, but everything else is working well. The system can be fitted to other rotary rigs. Trials cross correlating the acoustic signal generated by the bit conducted through the drill string with the signal conducted through the drilled material have yielded poor signal to noise ratios and have therefore been unsuccessful. Work is progressing on developing an inexpensive acoustic source to be located behind the bit. Specifications for an IS 486 computer system have been developed.
- c) **Caliper** - Frank Hungerford reports that following the West Cliff trials, design modifications have been considered and a modified "commercial unit" design is currently being prepared.
- d) **Borehole Pressurisation** - Ian Gray reports that while material for the energised seal has been chosen, obtaining quantities for manufacture has been difficult. The capability of the design has been extended to include rotary drilling. A mine site will be required for trials in 1995 - volunteers required please.
- e) **Bit Torque, load, RPM Sensors** - Ian Gray reports a basic design has been completed that will enable the system to operate in an environment of high bending stresses and low axial load. The main problem implementing the design has been obtaining very high strength non-magnetic tubes, but a supply of Cu-Be tube has been located.
- f) **Standards for In-seam Drilling Connections** - Rod Young reports that the AMT MECCA system promises to satisfy uphole data transfer requirements. AMT are interested in third parties using the AMT system as a vehicle for research. Rod is currently investigating the IS requirements for downhole connections and tools.
- g) Wayne Murray of CSIRO advised that trials with the radar as part of the CMTE project on in-seam sensing indicate coal is a good medium for radar and should detect structures and roof/floor up to 3m from the hole. The unit should be ready for demonstration in 3/95 followed by IS approvals later in 95.
- h) **New Projects for 1995** - Roger Wischusen advised projects approved by ACARP for next year are Stage 2 of BHP project to develop the drill monitor and bit location system, Sibra (Ian Gray) to test drill rod joints, AGA (Rod Young) to develop the electronic connections for the bit torque, load, rpm etc sensors, CMTE for in-seam sensing and J. Hanes to continue in-seam drilling research coordination.

COOPERATIVE RESEARCH PROJECTS

- a) **Rotary Hole Survey Equipment Comparisons** - operators are accumulating much experience with the need to survey most if not all rotary drainage and test holes. A meeting will be held in Wollongong early in 1995 (say February) for operators to exchange experiences and to document those experiences (JH to organise and report). Start putting together your plans and survey results.
- b) **DHM Survey Equipment Comparisons** - Boggled down with apparent apathy. Roger Wischusen distributed a submission for funds to all collieries in September. A positive committment was received from BHP Australia Coal, negatives were received from a few small operators, but no responses have been received from the larger players. The

project is to be run mainly by Frank Hungerford with assistance from Norm Blanch. Frank will accumulate and document his own experience plus the experience of the other main users of survey equipment with DHM's. Operators are getting experience and finding shortfalls and shortcuts with their equipment, but it is too time consuming for them to test other equipment or to test various calibration techniques etc. The project aims to document all this to save operators time and heartbreak and to provide feedback to developers and suppliers. If each of the 4 main Companies using MWD survey equipment contributed, the cost would be \$22,000 each which is a very small proportion of their annual longhole drilling budgets. If commitment is not received by January, the project will be dropped. If you as an operator see value in the project, please push your boss for its approval.

c) **Straighter Rotary Holes** - This project arose from the operators meeting. It will involve CRAM conducting a workshop with operators to determine the current state of the art and what has to be trialled and tested and then trialling, testing and documenting. The project will run according to operators directions and will incorporate operators ideas. Emphasis in industry is on drilling straighter holes so there is a need for the project. To administer the work cost effectively, it is necessary to tack it on to the DHM Survey Tools project, however if that project is no longer needed and this one is, it can be run separately but will be more expensive. Let me know your views.

SUPPLIER NEWS

a) **AMT** - Phillip Hardcastle advised the official launch of MECCA will be at AMT's Central Coast office on 14/12, all invited. The DGS (drill guidance system) will follow for surveys and incorporation of third party probes. UDR are introducing NT rods to allow drilling to +1.5km. Following requests by BHP, the Profiler is being expedited and should be available mid 1995 and DGS should be approved at the same time. Phil's latest concept is the "Bullet". This is a pump down tool which will conduct surveys during its transmission down and up the hole. For BQ minimum it will be suitable for quick rotary surveys, but is designed for wireline coring. It is a complete inertial system with solid state gyroscopes producing a total hole accuracy of the order of 0.1° . It is interpreted by a hand held instrument on its retrieval from the hole.

b) **Longyear** - No new progress to report.

c) **WM Mining Services** - Dave Reiniger reported his new company. Now sourcing multishot tool from Quality Machine Systems as disappointed with suppliers of and performance of the PeeWee. Approval of the new multishot which is "idiot proof" is expected soon. Exhibited a new American borehole packer for pressure testing. The tool has been used for 40 in-hole tests and is still operating. Cost is less than \$1000.

d) **West Cliff** want "black box flight technology on drill rigs, especially on rotary rigs, as well as recorders of drill operating parameters". Suppliers?

NEXT MEETINGS

Tentative dates and locations for the next operators meetings are

NSW Wednesday 29th March, Wollongong Master Builders Club.

Qld Wednesday 5th April, German Creek.

Outburst symposium and workshop, 20th to 24th March, Wollongong Novatelle.

MEETINGS QUESTIONNAIRE RESULTS

With the minutes of last meeting, I sent out a questionnaire to attendees of the NSW and QLD meetings to determine your valuation of the meetings and the research that is being conducted. The results are as below. 18 questionnaires out of a possible 40 were received. Of these were 10 operators/supervisors, 5 were researchers and 3 were from suppliers. The responses are shown according to these classifications. Comments are essentially not edited. Whether we agree or not, they are the comments of our colleagues and I value them and will follow them up.

Most questions require a number between 0 and 5 as an answer.

0 = no value at all or NO 5 = top value or YES.

	OPERATORS	RESEARCHERS	SUPPLIERS	TOTAL
1. Are the meetings achieving their objectives?	4.4	4.4	3.3	4.2
2. Value to you personally of the meetings	3.3	4.2	4.7	4.0
3. Value to your organisation of the meetings	3.1	4.4	4.3	3.9
4. Value to you of current supplier support	2.5	4.5	3.5	3.1
5. Value of ACARP in seam drilling projects	3.1	4.8	3.7	3.8
6. Value of in-seam drilling contractor support	2.9	4.3	4.7	3.6
7. Value of the cooperative research projects				
a) Rotary survey tools comparison	3.1	3.8	3.7	3.4
b) Long hole survey tools comparison	3.3	4.0	4.0	3.4
c) Straighter ProRam holes	2.7	3.8	4.3	3.1
8. Value of the minutes of the meetings	4.2	4.8	4.3	4.4
9. What other research etc is needed				
a) Immediately : Straighter rotary holes, define optimum hole sizes, rotary hole surveys without reentering hole, stuffing box, closed water cycle, survey accuracy, inexpensive MWD steering tools and better BHA design, real time definition of what is being cut at the bit.				
b) Short term (1-2 years) : Non-water drill fluids, geosteering tools, steerable directional BHA's, better rods, comparison of productivity and straightness of fully cored holes with conventional holes, leadtimes and hole spacings for longhole drainage, water drainage.				
c) Longer term : Hole lengths, determine industry's needs to drill 2000m+ holes, drainage via surface holes.				
10. Suggestions for improving meetings; better use of diagrams, plans etc to illustrate progress and work, better attendance by operators, invite oil etc operators (suggestions please), onsite visits.				
11. Suggestions for improving communications: Faster distribution of minutes.				
12. Suggestions for improved approach to research: ACARP and Taskforce to be more aggressive and proactive, ensure work is not being conducted by manufacturers before letting research contracts, involve all levels of management, disseminate news on				

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overseas work and that of manufacturers, involve hands-on people, ACARP addressing longer term needs and not short term, a financial commitment from Companies.

13. Other suggestions/comments etc.: Drilling is mainly conducted by labour who are not trained drillers and who are defensive re communication. Drillers who respect each other will drill and communicate better.

COMMENTS

I want to thank all attendees of our meetings plus correspondents during 1994 for your continuing support and willingness to share experience and knowledge.

Although beyond my ACARP brief, I have a concern for a trend in the industry which could prove disastrous. The trend as it effects in-seam drilling was clear at the meeting, but it is also apparently similar for other aspects of the industry. The problem as I see it is ever-increasing demand on the time and energies of technical staff. The message at the meeting was that the emphasis on drilling and testing is increasing with larger numbers of drillers to be supervised and many more holes to be monitored. Technical staff numbers are not increasing proportionately. There is a huge demand on the technical staff to supervise, monitor, interpret and develop new techniques to improve in-seam drilling reliability. Each technical person is expected to carry more responsibility. The technical staff have to concentrate on the priorities set by management. Consequently, there is a greater emphasis on DOING (ie production, getting the jobs done, etc) and, I suspect, not enough emphasis on THINKING (analysis, interpretation, implications etc). The impressive amount of drilling and testing being done to assure gas drainage efficiency is an example of the tenacity and the great energy available amongs the drilling people, but can the reliability be improved by doing less work more smartly? tlf gas and outburst control especially are to advance to the levels required for safe mining in today's increasingly more difficult conditions, technical people need time to analyse their data, analyse the implications of their findings and to develop techniques to improve their technologies and reliabilities of assessment; ie time to THINK. DOING without THINKING can be fatal. It is not sufficient to rely on the "Experts" or "someone else" to think out solutions. It is the people on the job, with help as necessary, who are best suited to interpret what is happening and how to solve on-the-job problems. There is also a great need to document the progress and the mistakes so that the industry as a whole can learn. The people who attend our meetings are well suited to these challenges, but are under heavy burden.

I will now descend from my soapbox and conclude this newsletter with a wish to you and your families for a happy and healthy Christmas and a prosperous New Year. I look forward to a rewarding New Year with further progress in in-seam drilling successes and sharing of knowledge by all involved in the industry.



With my best regards

JOHN HANES

ACARP IN-SEAM DRILLING RESEARCH CO-ORDINATOR

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SEE A COPY OF THIS NEWSLETTER**