

Cooperative Research Centre for Landscape Environments and Mineral Exploration

**QUARTERLY REPORT TO LEME STAFF AND STUDENTS
1 APRIL TO 30 JUNE 2002**

**Paul Wilkes, Acting Chief Executive Officer
19 August 2002**

1. RESEARCH REPORTS

**1.1 Program 1: Regolith Geoscience
Program Leader: Dr Ravi Anand**

OVERVIEW

- Monograph on "Calcrete: characteristics, distribution and use in mineral exploration" was completed and is currently being printed. It is a comprehensive book that will be a benchmark on calcretes for use by regolith geologists and mineral explorers.
- Genesis, classification and atlas of ferruginous materials, Yilgarn Craton was completed and published.
- A collection of papers on "Geophysical and Remote Sensing Methods for Regolith Exploration", has been completed and is in production.
- Manuscripts for thematic volume on regolith-landscape evolution were edited and returned to authors for revision where required.
- Draft report on synthesis of sedimentary deposition and landscape models for the northern Murray Basin was completed and being reviewed. Palaeochannel studies on Gawler Craton is prepared for publication
- Data analysis for Regolith mapping surrogate project is now completed and the final report is under preparation together with printing of required hard copies.

Regolith-landscape evolution volume (Project Leader: Ravi Anand)

Project aims

To provide a framework of regolith-landscape evolution across Australia and show its relevance to mineral exploration and environmental issues.

Work Plan for the Quarter

- Obtaining case histories.
- To complete the first editorial pass through the draft manuscripts.

Progress

All manuscripts (40) have been edited and returned to authors for significant revision. Some are received after revision

Issues and comments

- Departure of Matthew Killick has left Project Leader without much assistance.
- Generally the texts are good to reasonable. A major issue is the general lack of sections.
- The delivery of this project on time largely depends on the timely contribution by the contributors and the time.

Outlook and work plan for the next Quarter

- Continue to receive and editing manuscripts.
- Commence synthesis of case histories.

3D mapping volume (Project Leader: Colin Pain)

Project aims

To provide a framework for 3D regolith-landform mapping, and to present examples of the use of 3D and 4D regolith landform information.

Work plan for the Quarter

Continue to receive papers and begin editing.

Progress

- Authors are still preparing their papers
- A collection of papers on “Geophysical and Remote Sensing Methods for Regolith Exploration”, edited by Eva Papp, has been completed and is in production.

Issues and comments

Without assistance for the Project Leader, this project is going to fall behind it’s stated completion date.

Outlook and work plan for the next Quarter

- More papers will be received and edited
- The “Geophysical” report will be released.
- Continue to receive papers and begin editing.

Landscape evolution Eastern Goldfields (PhD project: Mike Craig)

Project aims

The aim of the research is to formulate, describe, test and explain a range of suitable regional and local models which may best account for the variable character and evolution of regolith and associated landforms in the Eastern Goldfields of the Yilgarn Craton, in Western Australia that are consistent with field observations.

Work plan for the Quarter

- complete remaining regolith maps and GIS data construction; begin writing-up.
- complete 1: 5million scale Yilgarn Regolith map in GIS ready format.

Progress

- Thermoluminescence age dating samples have been analysed and ages computed from the results -these data are now being prepared for inclusion in the GIS.
- GIS data continues to be constructed and maps drawn.

Issues and comments

None

Outlook and work plan for the next Quarter

- Continue with construction of remaining regolith maps and GIS data construction; continue writing-up.

Regolith evolution Dundas Tableland -implications for land management (PhD project: Mark Paine)

Project aims

To establish the Tertiary regolith-landform evolution of the Dundas Tableland, particularly the depositional environment, weathering and heavy mineral distribution within Late Miocene to Pliocene sediments.

Work plan

- Present small introductory paper at the Benalla conference.
- Complete particle size analysis for selected holes.
- Commence heavy mineral analysis.

Progress

- The paper was well received and some useful suggestions were made in relation to the direction of the project in subsequent informal discussions.
- Particle size analyses commenced in May and to date approximately 100 samples from 6 holes have been sieved. Preliminary results have been encouraging with previously unrecognised units being identified through interpretation of the sieve data.

Issues and comments

None at this stage.

Outlook and work plan for the next Quarter

- Aim to complete particle size analysis for selected 5 remaining holes during this quarter.
- Aim to start preliminary work on heavy mineral analysis.

Geochronology and quantitative models of landscape evolution (Project Leader: Brad Pillans)

Project aims

To provide numerical ages for regolith material, and to develop quantitative models of landscape evolution in regions which are important for mineral exploration and land management.

Work plan for the Quarter

- Laboratory analyses of samples already collected from field sites.
- Fieldwork will include western NSW (collaboration with Steve Hill and Ken McQueen), Dundas Tableland (collaboration with Mark Paine) and South Australia (collaboration with PIRSA)

Progress

- Samples collected from western NSW and Dundas Tableland
- Measurement of paleomagnetic samples from Pilbara begun; review and interpretation of southern Australia data.
- Analysis of cosmogenic Be-10 data from north Queensland.

Issues and comments

None

Outlook and work plan for the next Quarter

- Fieldwork in South Australia (collaboration with PIRSA)
- Analysis of samples collected.

South Australia (SA) sediments (Project Leader: John Keeling)

Project aims

Through investigations of regolith cover in areas of the Curnamona Province, Gawler Craton and Musgrave Block of South Australia, develop models of evolution of landscape and sediment accumulation that will aid prediction of element mobility associated with mineral deposits.

Work plan for the Quarter

- Continue regolith mapping in the Mingary area of the Olary Block, Curnamona Province (Crooks).
- Finalise report on northern Murray Basin drilling adjacent to Olary Block and develop models of landscape evolution and sediment accumulation (Fabris).
- Commence compilation of database of drill holes in the Callabonna Sub-basin of the Curnamona Province to support interpreted depth to basement modelling from airborne magnetic data (Gouthas).
- Assist with planning next phase of drilling in the Harris Greenstone Belt, Gawler Craton; collection and logging of samples (Sheard).
- Write up and present work on Gawler Craton palaeochannel studies (Hou).
- Present data on diagenetic halloysite and alunite in palaeochannel sediments (Keeling).
- Field work Pinjarra Lakes, Narlaby Palaeochannel (Kimber, Clark, Rogers, Hou).
- Sedimentary cover Musgrave Block: compile data for Wintinna 1:125,000 map sheet (P Rogers). Commence next phase of reconnaissance drilling in the Musgrave Block.

Progress

- Regolith mapping continues in the Mingary area in conjunction with bedrock mapping program.
- Draft report on northern Murray Basin drilling prepared and being reviewed.
- Draft report on synthesis of sedimentary deposition and landscape models for the northern Murray Basin completed and being reviewed.
- Talk and three posters prepared on geomorphology, stratigraphy and strandline definition and presented at the Australian Mineral Sands Conference, Mildura (Fabris).
- Abstract and poster prepared for 16th AGC (Fabris).
- Geochemistry of basement rocks penetrated below cover in the northern Murray Basin drilling indicate volcanics and diorite are equivalents of Cambro-Ordovician units of eastern Mount Lofty Ranges.
- Depth to basement drill hole data base completed for 1:250,000 map sheets Curnamona, Callabonna and Frome.
- Harris Greenstone drilling program underway.
- Palaeochannel studies on Gawler Craton prepared for publication:

Hou, B., Frakes, L.A. and Alley, N.F., 2002. Palaeochannel study models and their significance: example from the Gawler Craton, South Australia. *In: Preiss, V.P (editor), 2002. Geoscience 2002: Expanding Horizons. Abstracts 67 of the 16th Australian Geological Convention 2002. Geological Society of Australia*

Hou, B., Frakes, L.A. and Alley, N.F. and Clarke, J.D.A. in press. Characteristics and evolution of the Tertiary palaeochannels in the NW Gawler Craton, South Australia. *Aust. J. of Earth Sci.*

J.D.A. Clarke, P.R. Gammon, B. Hou, and S. Gallagher, (submitted). Revised Eocene stratigraphy and architecture of the margin of the Eucla and Bremer basins. *Aust. J. of Earth Sci.*

- Will Kimber (Hons student, ANU) completed field work at Pinjarra Lakes, Narlabay Palaeochannel (supervisor J Clark) accompanied by Rogers and Hou (LEME, PIRSA).
- Australian Clay Minerals Conference, Canberra (28 April- 1May). Paper presented: Keeling, J.L., Self, P.G. and Raven M.D. 2002. Halloysite-alunite in sediments east of Maralinga, South Australia: a record of acid drainage in the post early Tertiary landscape.
- Musgrave drilling program underway on AP Lands. Thirty four RC holes and seven diamond core tails have been completed with a total depth of 2000m for the RC drilling and 300m for the diamond holes. A further 13 RC holes to be drilled in this program. Cover sequence of variable thickness was encountered and includes palaeochannel sediments of around 100m thickness in one hole.
- Compilation of sedimentary cover on Wintinna 1:250,000 sheet 40% complete and line scanning and polygon labelling commenced for map production.

Issues and comments

Drilling programs on target but staff resources are unable to keep up with regolith logging. Detailed logging of cover sequences will be completed as resources permit.

Outlook and work plan for the next Quarter

- Workshop on regolith mapping Olary (Crooks, Fabris, Mauger)
- Issue reports on northern Murray Basin drilling and landscape/sediment accumulation.
- Prepare report on palaeochannel recognition and mapping using Gawler Craton examples
- Complete drilling programs in the Gawler and Musgrave regions.
- Finalise PIRSA contribution to LEME staff operating budget.
- Complete sedimentary compilation on Wintinna.
- Review regolith work program in the Curnamona Province in consultation with NSW DMR and Canberra University.

Regolith mapping surrogates (Project Leader: Mike Craig)

Project aims

The principle objective is to observe, evaluate and document the effectiveness of several vegetation surrogates for regolith and regolith processes. This will provide regional and prospect scale regolith mapping tools for mineral exploration and environmental monitoring.

Work plan for the Quarter

- Analysis of results to determine the value and extent of vegetation as a surrogate to regolith mapping
- Final Reporting: construction of final report; construction of final GIS; and generation of final hardcopy images.

Progress

Data analysis for this project is now completed and the final report is under construction together with printing of required hard copies.

Issues and comments

None

Outlook and work plan for the next Quarter

Submission of final report within next two weeks

Objective regolith logging (Project Leader: Ravi Anand)

Project aims

To develop a practical technology for accurate and rapid logging of regolith in drill chips and pulps.

Work plan for the Quarter

- Test regolith samples to be sent to
 - (a) BRL Hardy Ltd for assessment of suitability of GRAMS colour measurement software
 - (b) Becquerel Laboratory for natural gamma radiation levels before decision on the suitability type of gamma spectrometer to purchase
- Hiring of hand-held GCM-2 Conductivity meter to test suitability for electrical conductivity measurement.
- Purchase of equipment and data acquisition.

Progress

- Awaiting results from thirty five test samples from Lawlers profile which were sent to BRL Hardy Ltd for colour measurement using GRAMS colour measurement software.
- Awaiting results from twelve test samples from different regolith units from different lithologies to gauge expected range of K, Th, U.
- Electrical conductivity data are currently acquired using electrode measurement first before hiring hand-held GCM-2 conductivity meter.
- Magnetic susceptibility and frequency dependent susceptibility measurements were carried out for samples from ultramafic, basaltic, dolerite and granite lithologies.

Issues and comments

Pending purchase of ASD equipment, colour measurement investigation will be delayed for the time being. Meanwhile, spectral data were acquired using the IRIS as an interim measure, which covers the visible range to detect iron oxides.

Outlook and work plan for the next Quarter

- Commence measurement of physical properties such as colour, magnetic susceptibility and electrical conductivity and mineralogy from drill spoils of several prospects and deposits.
- Correlation of magnetic susceptibility data with Fe-oxide and mineralogical data
- Hiring of hand-held GCM-2 Conductivity meter and comparison of data acquired using this equipment with contact electrode electrical conductivity method.
- Purchase of ASD (Analytical Spectral Device) which covers VIS/NIR/SWIR range and Bartington MS2 magnetic susceptibility meter and to commence colour measurement.

Acid sulphate soil processes (Project Leader: Rob Fitzpatrick)

Project aims

The objective is to develop through better knowledge of pedological, geochemical, isotopic, mineralogical, hydrological and biological mechanisms of acid sulfate soil formation within a regolith-landform framework across Australia to develop new mineral exploration, risk assessment and land management techniques.

Work plan for the Quarter

- Commence new project with PhD student (Andrew Baker).

Progress

- Project proposal rewritten by combining the geochemistry (isotope studies) and geomicrobiology proposals and submitted to LEME for approval.
- Official commencement of PhD student (Mr Andrew Baker) on 30th June 2002.
- Presented paper entitled: Mineral products formed by oxidation of iron sulfides in Australian upland freshwater acid sulfate soils: genesis and significance at the 18th Australian Clay minerals conference in Canberra 29th April to 1st May 2002.
- Draft report completed: Mineral transformations during laboratory oxidation of inland sulphidic materials.
- Abstract entitled: Effect of acid sulphate weathering on surface properties of clay minerals” has been submitted for presentation at the European Clay Conference (Euroclay) Italy.

Issues and comments

- Advertise and appoint new CRC LEME geochemist in Adelaide (based in CEM).
- Advertise and appoint new geomicrobiologist appointment in Adelaide (based in CLW).

Outlook and work plan for the next Quarter

- Prepare abstract and present invited keynote address "Inland acid sulfate soils a big growth area" at 5th International Symposium on Acid Sulfate Soils at Tweed Heads.
- Present poster and oral presentations at the International Union of Soil Science (IUSS), 17th World Congress of Soil Science in August 2002 in Bangkok:
- Biogeochemical and mineralogical processes in acid sulfate soils: implications for environmental significance.
- Develop a colour brochure on Theme: Acid sulfate soils: regolith processes and implications.

Mineral mapping South Australia (Project Leader: Alan Mauger)

Project aims

- Establish techniques to identify previously unrecognised weathered basement appearing at the surface.
- Identify the mineral signatures of concealed mineralised basement as manifested in surficial material

Work Plan for the Quarter

- Present CRCLEME Course on ENVI/Hyperspectral Analysis for Geologists (April 15-19, 2002)
- Prepare mineral distribution map of Tarcoola Mine Site using HyMap data calibrated against PIMA spectra from ground samples.
- Field trip to Tarcoola Mines Site for Sean Mahoney's study using Hyperion.
- Commence processing of Pine Creek Hymap data.
- Publish the raw PIMA spectra for Lake Harris Drilling as part of exploration package.
- Attend conference in 5th Airborne remote Sensing Conference, Miami, USA.

Progress

Mauger

- Musgraves – presented paper (plenary and poster) at 5th International Airborne Remote Sensing Conference in Miami (May 2002).
- Visited Infoterra in Farnborough, UK – consulted on methods of processing HyMap and ASTER
- Evaluated software for orthorectifying HyMap data.
- Acquired HyMap data over Beltana and Pine Creek. Processed the Beltana data highlighting FeOx alteration in willemite hosting carbonate unit.
- Took delivery of Hyperion data over Screechowl Creek and Tarcoola Ridge.
- Acquired 966 ASTER images (level 1B) over South Australia. Catalogue prepared by Euro Exploration.

Keeling

- Mineralogy of the regolith, PIMA – collected new samples from Williamstown and Birdwood, scanned core held at core library.

Mahoney

- Tarcoola, Hyperion – presented project outline and literature review to peers and supervisors (Mahoney).
- Visited site with Pat James.
- Developing mapping strategy.

Gabell

- Presented project outline and literature review to peers.
- Will relocate and resume studies from Perth.

Lau

- Olary, HyMap – presented project outline to peers.

Stamoulis

- Departed on overseas study tour with Churchill Fellowship.

Issues and comments

Departure of Ian Tapley from team. Will require replacement of human resources.

Gold in calcrete anomalies (Project Leader: Mel Lintern)

Project aim

The principal objective of the project is “to better understand the formation of Au-in-calcrete anomalies in the regolith and develop more effective procedures for their use in mineral deposit detection”.

Work plan for the Quarter

- Continue to formulate project plan for study.
- Meet with remaining supervisors to discuss proposal.
- Collect and analyse samples from a proposed study site to assess suitability for study.

Progress

- Continued to formulate project plan for study.
- Visited two study sites and submitted samples for analysis.
- Successful completion of SEM, ESEM and TEM courses at Centre of Microscopy and Microanalysis at UWA; courses gave indication of techniques that could be used for examination of calcretes in detail.
- Review completed on use of calcrete in mineral exploration.

Issues and comments

None.

Outlook and work plan for the next Quarter

- Complete details of project proposal.
- Submit candidacy to Curtin University.

Further scope project and evaluate suitability of sites and samples for inclusion in study.

Mineral hosts (Project Leader: Ravi Anand)

This project has investigated mineral hosts and traps for specific ore-related target and pathfinder elements. Two reports, one dealing with two deposits i.e. Boddington and Mt Percy, and the other one with the Scuddles deposit are being reviewed. This study presents new data about the occurrence and levels of selected trace elements in a variety of minerals and mineralogical assemblages. This research has real potential in improving exploration procedures in regolith-dominated terrains.

Atlases and manuals (Project Leader: X Y Chen)

The main objective of this module is to produce manuals and atlases on regolith materials for exploration geologists and land managers.

Publication	Senior author	Completion date	Publisher
Regolith geology of the Yilgarn Craton	Anand	Published as a one- paper thematic issue in Aust. Journal of Earth sciences in February, 2002	AJES
Ferruginous materials Atlas	Anand	Printed	LEME
Transported overburden manual	Phang	Being reviewed	LEME
Calcrete manual	Chen	Being printed	LEME
Australian palaeoclimates	McPhail	Writing completed	LEME

1.2 Program 2: Mineral exploration in areas of cover

Program Leader: Professor Nigel Radford

OVERALL WORK PLAN FOR QUARTER.

Work plans for individual Projects are included in the appropriate project summaries.

Work for this quarter has been dominated by strategic planning, budgeting and attempts to include appropriate projects into the tight budgetary limitations under which the CRC will operate over the next 12 months. The poor focus demonstrated by the project proposals submitted means that the Strategic Themes workshops from last quarter were less than completely successful.

PROJECT SUMMARIES.

Regolith Expressions of Australian Ore Deposits (LEME 1) (Charles Butt, CSIRO E & M, Project Leader).

At the time of writing (17 July 2002) no project report has been received. However, allocation of unspent funds into budget year 2002-2003 indicates that the project is still incomplete and therefore behind schedule. Much of this delay is attributed to people who have promised articles being slow to either complete them, or to admit defeat and withdraw their commitments.

Girilambone Project.

(Ken McQueen, Univ Canberra, Project Leader).

Work Plan

Work planned for the April-June quarter 2002 included:

- Digitisation and GIS entry for the drafted Hermidale 1:100K regolith-landform map.
- GIS training for Mr Ben Maly.
- GEOLOG training for Mr Mike Hicks.
- Entry of drill hole data into GEOLOG.
- Compilation of regolith sections for Hermidale drilling traverses
- Preliminary and two follow up field trips with Dr Alejandra Duk-Rodkin (exchange scientist from GSC) to collect field observations and samples for her project on the drainage history of the Girilambone-Cobar region.
- Major field trip by most staff involved in the Girilambone project to highlight work done by team to Program leader, check some field sites and to reconnoitre sites for the third phase of the project from Girilambone to Bourke.
- Initiation of PhD study by Dr Kamal Khider.
- Preparation of a presentation for the 16th AGC on the results of palaeomagnetic dating.

Work Done

- The Hermidale regolith-landform map has been scanned and digitised. It is still waiting for the GIS data entry and final publication.
- All drill hole data for both the Sussex and Hermidale stage drilling were entered into GEOLOG ready for output. Regolith section compilation was started.
- A start has been made on compilation of the Hermidale 1:100,000 sheet report.
- An 8 day reconnaissance trip (21-29 April) was made to the Cobar and White Cliffs areas by Ken McQueen and Dr Alejandra Duk-Rodkin to allow initial geomorphic observations.
- A 7 day trip (26 May- 1 June) was made to the Nyngan-Byrock-Cobar area by staff and students in the project. This was attended by Nigel Radford (Program 2 Leader CRC LEME), Ken McQueen (Project Leader CRC LEME UC), Roslyn Chan and Ben Maly (GA CRC LEME) Keith Scott (CSIRO CRC LEME) Michael Whitebread (UC PhD student CRC LEME), Kamal Khider (UC PhD Student CRC LEME), Dougal Munro (Special Project student UC, CRC LEME), Dr Alejandra Duk-Rodkin (Exchange Scientist, Geological Survey of Canada), Peter Lewis and Guy Flemming (NSW Geol. Surv.) Mike Hicks and Peter Buckley (NSW Geol Surv, CRC LEME). This field meeting provided an excellent opportunity for networking and liaising with a large number of staff within the Canberra and Sydney nodes of the CRC. A number of issues were discussed regarding project development and future work. Meetings and discussions were also held with industry personnel from the three operating mines in the Cobar area including: Rex Berthelsen, Craig Stegman, Mick Priestly (Peak Gold Mines Pty Ltd); Angela Lorrigan and Tim Green (Elura Pasmaenco); Wayne Taylor, Ian Stockton and Tim Hunter (CSA Mine, Cobar Management). A visit was made to the New Cobar open pit by some members of the field team. A visit was also made to the Byrock Quarry and useful contacts made with the operators. This area will be part of a future honours project study. The next phase of drilling on the Girilambone block will also extend into this region.

- The details of a student project examining the Yarrowonga anomaly, just east of Cobar were finalised and initial field work started by Dougal Munro.
- A 7 day trip (16-22 May) was made to the Cobar area to complete stratigraphic drilling, checking field sites and liaising with property owners. Eight air core holes were drilled for a total of 125m to sample palaeo-sediments for palynological dating. This work will help establish a time frame for the palaeo-drainage history. Dr Duk-Rodkin was able to finalise the field work for her project as part of the LEME-GSC exchange program. Also during the trip Dr Rodkin presented a talk on the Klondike Goldfield and progress to date on her Cobar project to the Cobar Branch of the AusIMM. Discussions were held with Rex Berthelson and contact made with Jonathon Lew (Chief Geologist, North Parkes and Peak). During this time Dougal Munro completed his field work on the Yarrowonga anomaly for Peak Gold Mines Pty Ltd.
- Keith Scott, Mike Hicks and Peter Buckley attended a data release meeting organised by the NSW DMR at NSW State Parliament on 23rd May.
- Keith Scott critically reviewed the geochemical data from Hermidale drilling and analysed selected samples by XRD. He also organised the analysis of the acid resistant component of samples by PIXE PIGME to test whether this technique can be used to distinguish different lithologies in bedrock drill samples.
- Ken McQueen and Brad Pillans prepared an oral presentation to be delivered as part of the LEME contribution to the 16th AGC in Adelaide.
- Materials on the Girilambone Project were prepared for display at the 16th AGC.

Major Issues

- Mr Ben Maly was seconded at short notice for 1 week by GA to assist with work on Christmas Island. GA have agreed to compensate the project for his salary during this period. This will result in a small delay to Mr Maly's work on the project.

Ideas and comments

- Joe Schifano (UNSW) has been granted status as a LEME student to work on the Girilambone project.

Outlook and work plan.

A large part of the last quarter was spent in field activities and finalising interpretation of field data. These activities have been very successful. A joint LEME-GSC open file report will be prepared by Dr Alejandra Duk-Rodkin on the drainage history exchange project. Completion of the final report for the Hermidale sheet has been delayed until the end of July. It is planned to have an informal project meeting in Canberra in the third week of July to assess progress. It is planned to have a series of presentations to industry personnel (probably in Orange as part of a joint AusIMM-CWEDG meeting) outlining findings to date from the project. Currently this is planned for late July early August.

Gawler-Harris Greenstone Belt.

(Malcolm Sheard – PIRSA-MRG, Geological Survey Branch, Project Leader).

Work Plan

- **Overall Project:** Regolith geology and geochemistry of the Harris Greenstone Belt (HGSB), Gawler Craton, South Australia. Refer to first report for details.

Work Done

- The drilling of HGSB Phase 2 diamond holes began in early June with 2 of the 3 x 50 m fully cored HQ diamond holes completed by June 26. Drilling in weathered komatiitic serpentinites with large diamond bits proved to be problematic and eventually toothed tungsten carbide bits were employed. Core recovery fair to good through the weathered greenstone and transported cover materials.
- Payment of project monies (as budgeted for) made to LEME in Perth via 2 cheques from PIRSA in Adelaide (\$49,950 + \$3,000).
- Geochemical analysis of field collected regolith samples from the March site visit + the drillhole cuttings from the 56 selected aircore holes drilled in mid 2001 completed with interpretive analysis underway.
- Some further literature search work undertaken.
- Preparation work & paper compilation for the 16th AGC in Adelaide + attending that conference.

Major Issues

- Nil

Lessons Learned

- No change from previous reports.

Outlook

- Post June: work on the 3 x HQ diamond drill cores (logging, photography, assay sampling. mineralogy etc)
- Photography of chiptrays still to do.
- Begin compilation of report text + data files & regolith atlas.
- Continued PIRSA funding of this work still depends on the State Budget and how seriously Departmental funds are cut. It is due to be released late on 11th July.

South Australian Regolith and ET Regional Projects (LEME 1 commitment). (Mel Lintern – CSIRO E & M, Project Leader).

1. Project aim

To develop techniques for exploration in regions of transported overburden in the Gawler Craton by understanding the relationships between geochemical dispersion patterns, weathering processes and evolutionary stages of regolith and landform development over a nominated site of concealed materialisation.

2. Work plan for the Quarter

Complete ET Regolith Project Final Report.

Complete SAR Final Report – this will be a synthesis of all work undertaken as part of this project. A GIS (including metadata) may be constructed given funding.

3. Progress (include progress against milestones)

ET Regolith Project Final Report now being reviewed by M. Cornelius, C. Pain and a PIRSA representative. SAR Final Report nearing completion. Waiting for diagrams from drafting.

4. Issues and comments

As before. Difficulties experienced in completing ET Regolith Project Final Report as this project is now overdue and project staff are committing themselves to other projects while waiting for the remaining contributors comments of the report to be addressed and circulated again.

5. Outlook and work plan for the next Quarter

Publish ET and SAR Final Reports

Gawler AEM Project (LEME 1 commitment).

(David Gray, CSIRO E & M Project Leader).

David is currently in the field and no report has been received (17 July). It will be forwarded as soon as received.

Western New South Wales Regolith project.

(Steve Hill, UC, Project Leader).

1. Project aims

Stimulate mineral exploration in western NSW through greater understanding of the regolith and landscape evolution

2. Work plan for the Quarter

- i) Complete Mt Gipps, Pinnacles, Tibooburra 1:25,000 regolith-landform maps (Steve Hill, Kylie Foster, Ancret Lewis, Anthony Senior, Tessa Chamberlain). Continue compiling Teilita 1:100K (Steve Hill) and Wahratta 1:25K (Kylie Foster) maps
- ii) complete regolith geochemistry analyses for Teilita 1:100K regolith map project and Mt Gipps, Pinnacles, Tibooburra 1:25K map projects (Steve Hill, Ancret Lewis, Anthony Senior, Tessa Chamberlain)
- iii) Continue hydrogeochemistry analyses (Patrice de Caritat, Dirk Kirste)
- iv) Commence regolith dating PhD project (Martin Smith, Brad Pillans, Steve Hill)
- v) Deliver, assess and write up an account of Broken Hill regolith mapping course (Steve Hill and Ian Roach)
- vi) Biogeochemistry, regolith and rainfall chemistry PhD project continues (Lea Hill)
- vii) Submit digital data for NSW DMR Broken Hill CD-ROM (Kylie Foster and Steve Hill)

3. Progress

(include progress against milestones)

- i) Mt Gipps and Tibooburra maps completed and having pre-publication review at present. Pinnacles draft complete should be finalised July 2002. Teilita 1:100K and Wahratta 1:25K compilation continues as time permits
- ii) regolith geochemistry analyses completed.
- iii) Hydrogeochemistry analyses continue
- iv) initial fieldwork for regolith dating PhD project undertaken in June with Martin Smith, Brad Pillans, Nigel Radford and Steve Hill
- v) regolith mapping course delivered, student reports assessed, account write up continues with forthcoming presentation at AGC
- vi) Lea Hill undertaking data analysis and thesis write up. Preparing presentation for AGC.
- v) Broken Hill 1:100K regolith-landform map submitted for inclusion on CD. 1:25K maps not included due to time constraints and the presently irregular coverage of completed maps. 1:25K maps may be released on another CD in the future.

4. Issues and comments

- i) Regolith mapping output greater than milestone expectations. This is mainly due to being able to incorporate GA graduates (e.g. Ancret Lewis), although this places a greater demand on Kylie Foster's and to a lesser extent Steve Hill's time. Reports have also been written to accompany these recently completed maps but are only at draft stage at present
- ii) Some previously high metal contents in silcretes at Teilita need to be further examined. Recent results from resampling appear at first pass to be variable. Some potentially interesting high Au (> 700 ppb...the highest result that we have so far obtained from the region!) calcretes from Pinnacles sheet will be resampled in late June.
- v) regolith mapping course was very successful and there is expected to be demand for further courses of this type (see work plan below)

Other:

5. Outlook and work plan for the next Quarter

- * Commence new three month GA graduate rotations from Matilda Thomas and Karen Earl. They will be working on the Silverton 1:25K regolith-landform map area. This project will be important for considering the near surface expression of bedrock in an area of deep transported cover. Fieldwork for this will be from June 29-July 19.
- * Regolith mapping shortcourse / workshop by Steve Hill and Kylie Foster in Olary region (July 8-10)
- * Continue with Wahratta 1:25k map and Teilita 1:100K map.
- * Regolith geochemistry data analysis

Regional seepage exploration geochemistry, Mt Lofty ranges.

(Rob Fitzpatrick, CSIRO L & W, Project Leader).

1. Project aims

a) Geochemical dispersion in acid sulfate soils, seeps and regolith Mt Torrens prospect:

The principal objective of this project is to determine whether saline acid sulfate seeps and regolith can be used as exploration sampling media.

b) Regional geochemistry of acid sulphate soils and saline seepages: a potential new exploration tool for detecting base-metal mineralization: To determine whether regional sampling of acid sulphate soils and seeps can detect base-metal mineralization.

2. Work plan for the Quarter

a) Geochemical dispersion in acid sulfate soils, seeps and regolith Mt Torrens prospect:

- Produce final version of the Mount Torrens report.

b) Regional geochemistry of acid sulphate soils and saline seepages: a potential new exploration tool for detecting base-metal mineralization

- Carry out regional sampling of saline acid sulfate seeps and regolith, and commence interpretation of the results.

Other

- Present paper “Mineral products formed by oxidation of iron sulfides in Australian upland freshwater acid sulfate soils: genesis and significance” at the 18th Australian Clay minerals conference in Canberra 29th April to 1st May 2002.

3. Progress (include progress against milestones).

a) Geochemical dispersion in acid sulfate soils, seeps and regolith Mt Torrens prospect:

- Completed major CRC LEME report No. 174 “Geochemical dispersion at the Mount Torrens lead-zinc prospect, South Australia, with emphasis on acid sulfate soils”

In addition, completed 2 posters and one oral presentation for the 16th AGC:

- Mineralogy of the Mt Torrens gossan, South Australia.
- Secondary lead minerals in acid sulfate soils, Mount Torrens prospect: implications for mineral exploration
- Contribution of scapolite and pyrite weathering to salinity in the Mount Torrens region, South Australia

b) Regional geochemistry of acid sulphate soils and saline seepages: a potential new exploration tool for detecting base-metal mineralization

- Sampling of acid sulfate seeps is in progress in the Callington – Strathalbyn area, where there is known base-metal mineralization. In addition, samples have been taken in catchments with no known mineralization between Harrogate and Mt Pleasant.

Other

- Presented paper “Mineral products formed by oxidation of iron sulfides in Australian upland freshwater acid sulfate soils: genesis and significance.” at the 18th Australian Clay minerals conference in Canberra 29th April to 1st May 2002.

4. Issues and comments

b) Regional geochemistry of acid sulphate soils and saline seepages: a potential new exploration tool for detecting base-metal mineralization

- Approval given by Dr Nigel Radford to extend the project until the end of September 2002. A revised budget and plan was submitted.
- Dr Skwarnecki’s contract has been extended to end of September.
- A draft job description and advertisement have been prepared for new CRC LEME geochemist appointment and emailed to Dr Ravi Anand.

5. Outlook and work plan for the next Quarter.

a) Geochemical dispersion in acid sulfate soils, seeps and regolith Mt Torrens prospect:

- Copies of the CRC LEME report 174 are being made.
- Present report to PIMA Mining and Star Mining and discuss further work.

Present two posters and one oral presentation at the 16th AGC.

b) *Regional geochemistry of acid sulphate soils and saline seepages: a potential new exploration tool for detecting base-metal mineralization:*

- Complete sampling of acid sulfate seeps in the Kanmantoo and Woodlawn/Dicks Creek areas, submit samples for analysis. Commence writing of final report.

Lithogeochemical haloes in the regolith (M Whitbread PhD) (Ken McQuen, UC, Supervisor)

No report submitted, but verbal presentation made at 16th AGC in Adelaide. Project is well on track and write up of PhD has commenced. The student will be undertaking consultancy work for Anglo American in Ireland.

AMIRA P618 - Isotopic Discrimination of Partial Leach Geochemical Anomalies in Covered Terranes. Geoff Denton (CSIRO E&M) Project Leader.

1. Project aims

- Use the unique fingerprinting and tracing capability of isotopic methods to develop an understanding of the processes by which partial extraction anomalies form and to provide a technique to discriminate “true” from “false” anomalies.
- Focus on the development of a robust exploration tool that can evaluate partial extraction using isotopic methods.
- The research will concentrate on anomalies in soils over covered terrains, not anomalies present in outcropping situations, and will not focus upon the development of partial leaches *per se*.

2. Work plan for the Quarter

The June quarter has focussed on the continuation of the case studies at Cannington and Rosebery. Approximately 100 analyses are to be completed on these two case studies. The final report for Elura is also to be written up. Preparations are to be made to present data and progress to sponsors at a meeting in July. Ongoing development of the analytical technique is being carried out and new lower blank teflonware is being introduced to the pumping system for the processing of partial leach samples.

3. Progress

The analytical phase of the Cannington and Rosebery case studies is well advanced. It is expected to be complete prior to the sponsor’s meeting on July 25th. The Elura report is also nearing completion. Teflonware components have been introduced to the low level laboratory. Although we are still using the original componentry for the case studies (to maintain the sample/leach volume ratio) the new teflon components are being tested using commercial samples.

4. Issues and comments

Blank contamination continues to be an issue for low Pb background samples in some case studies. We are continuing to look closely at the work practices in the laboratory and use ultra clean laboratory equipment wherever possible to reduce blank levels.

5. Outlook and work plan for the next Quarter

Reports are to be prepared for the Rosebery and Cannington case studies. At the July 25 meeting of AMIRA P618 the final three case studies will be selected for analysis. It is likely at least one of these case studies will be in the Northern Australian Proterozoic and a field trip will be completed during the current dry season.

Project: Laterite geochemical reconnaissance survey of the Yilgarn Craton. Project leader Matthias Cornelius, CSIRO, Perth.

1. Project aims:

To commence sample collection in the Eastern Goldfields during fieldwork for regional geological mapping by the Geological Survey of Western Australia. A brief field workshop will be held by CSIRO to instruct GSWA mappers in sampling procedures. In addition, 150 samples from the AGE-CSIRO database will be reanalysed for 53 elements.

2. Work plan for the Quarter March - June 02:

Analyse 150 samples of the AGE-CSIRO database for 53 elements by XRF and ICP-MS.

3. Progress

Samples were pulled out of storage and analyses have been completed by Ultra TRace Laboratories.

4. Issues and comments

None.

5. Outlook and work plan for the next Quarter:

Results and a very brief summary report will be submitted to the GSWA in July. A field workshop will be held in Kalgoorlie on 18-19 July.

CRC LEME/Triako Collaborative Project on Regolith at Mineral Hill

Project Leader: Keith Scott

Work Plan

To document regolith profiles in base metal and Au-rich profiles at Mineral Hill.

Progress

- Keith Scott visited the deposit in April and after discussion with company geologists selected 5 drill holes to provide profiles through base metal-rich mineralization at Parkers Hill and Au-rich mineralization in the Missing Link area.
- 68 samples from profiles provided by TMH 184 and 186 at Parkers Hill and TMH 201 and 204, through Au mineralization in the Missing Link area have been crushed and submitted for ICP/ICP-MS and Neutron Activation Analysis (NAA). Results for the former method have just been received.
- Based on the Pb and S determinations, the profiles at Parkers Hill appear to show a 10 m thick interval, at the base of complete oxidation, where sulfate species (probably anglesite) dominate. Above this interval, a 50 m non-sulfate Pb (probably dominantly cerussite) zone occurs. The specific minerals in these zones will now be determined by X-ray Diffraction (XRD).

Major Issues and Comments

This project resulted from an initial visit to the mine during Nov 2001 and a proposal submitted to the company during Dec 2001 but the project did not commence until April 2002 *i.e.* there may be long lead times for even small/simple projects.

Outlook and plan for the next Quarter

Samples from the profiles will be submitted for XRD analysis, when all the analytical data is available. It would be hoped to finish the project during the quarter and to present the results to the company at a workshop at the Mine during September *i.e.* ahead of the scheduled project finish time (Mid October).

WORK COMPLETED, PROGRAM LEADER.

During the quarter much of the Program Leader's efforts were absorbed by budget preparation and documentation.

At the time of writing, much additional effort is going into a revision of the strategic plan. This planning is facilitated by feedback from the Minerals Advisory Council meeting held on 13th June. The existing strategic plan is clearly inadequate, satisfying neither the MAC nor the Board.

I attended the “Victoria Under Cover” conference at Benalla, and was impressed by the enormity of the salinity issues facing Australia as a whole. The conference allowed useful contacts to be made with exploration interests around Stawell, where a field visit was later made. The opportunities for a regional scale project in the Stawell district are very real and could include cooperation with the Victorian Geological Survey’s regolith mapping group. This will be pursued further before the end of July.

I took part in field visits to the Girilambone and Broken Hill projects, both of which appear to be progressing well and achieving laudable outcomes for LEME and for NSW DMR. I also visited the LEME core parties in Adelaide, being AU and CSIRO Land and Water.

I prepared two papers for the 16th AGC in July, one for the LEME symposium, and the other for the Geochemistry symposium, of which I was co-convenor.

FUNDING.

During the quarter negotiations have advanced to provide several new, externally funded projects. Two projects to use various ground geophysical techniques in the Woody Woody manganese mine area are underway, and aggregate almost \$60,000 of new funding.

A new project is under negotiation with Dominion Mining for additional research work at the Challenger Deposit in South Australia. This work will bring in new funding in the order of \$35,000.

SIGNIFICANT EVENTS

See “Work completed, program leader” above.

ISSUES AND COMMENTS.

It is significant that several LEME 1 projects are still to be completed. These pose a risk in that they divert attention from LEME 2 objectives.

The resignation of the CEO at the end of the quarter presents real opportunities for the Executive as well as major problems. The issues believed to have contributed to Ray’s departure require and will receive urgent Board level attention. The seriousness of these issues cannot be over-emphasised. I believe the Executive can and will continue to run the CRC in an efficient and effective manner whilst a new CEO is appointed.

I believe, most strongly, that the current difficulties, especially in regard to strategic planning and budgeting, are, in significant part, a result of the removal of funding for the last year of LEME 1. The cost saving achieved is far outweighed by the ensuing chaos.

Issues regarding funding levels for institutions such as GA, CSIRO, NSW DMR, and PIRSA leave much additional uncertainty over the operation and even existence of the CRC.

WORK PLAN FOR NEXT QUARTER.

Projects within Program 2 will continue according to schedules already established.

The Program Leader will continue to ‘struggle’ with the Strategic Plan, with a deadline of the August Board meeting for a new draft.

A contribution for the Annual Report will be prepared.

The most important task, and one which seems to be continually subverted by writing reports that few, if any, people read, is to prepare a small group of project proposals that can be taken to the exploration industry for research funding. These have to be restricted in number and have to meet the demands passed on by the industry at the MAC meeting.

I have undertaken to pursue discounted prices for our analytical work.

1.3 Program 3: Environmental applications of regolith geoscience **Program Leader: Dr Colin Pain**

Work plan for the Quarter

Salt in the regolith

Data from a further series of cores from southern NSW will be compared with the results from the GILMORE cores. Analysis of satellite hyperspectral data from NASA will be undertaken.

Salt in erosional landscapes

Acceleration of office and field activities from May to the end of the financial year, including acquisition of ground geophysics and drilling.

Perth regolith

Completion of draft report for the Cities Project workshop (19th April), and then final report.

Baseline geochemistry

This project is on hold waiting for a student to take up the project.

Science communication

Benalla conference, 16th AGC

Work done against the work plan

Salt in the regolith:

Diamond cores put down as part of the MDBC-funded, BRS co-ordinated airborne geophysics survey of Billabong Creek were processed for EC1:5, pH, alkalinity, water content and samples were pressed to collect pore fluids for major anion and cation analysis. This has been collated and compared to down-hole chemistry from bore holes drilled in the GILMORE region. We are in the process of interrogating the chemistry of the pore fluids and making comparisons to regolith and groundwater chemistry.

A close correlation between pore fluid conductivities, bulk conductivities (via EC1:5 measurements) and chloride concentration is observed down-hole, in contrast to the experience from GILMORE. We now turn back to exploring effects of regolith materials, as the chemistry of the pore fluids for each area is similar.

Salt in erosional landscapes

The Boorowa and Harden catchments, between Cootamundra and Goulburn in central NSW, are currently under investigation. Both catchments contribute substantial amount of salt into the Lachlan and Murrumbidgee rivers, respectively. Gamma-ray and terrain modelling is currently under way to map salt stores and likely saline discharge sites. Enhanced gamma-ray spectrometry soil/regolith maps have been generated for both catchments. These maps separate thick residual and locally derived regolith/soils from thinner soils over moderately weathered bedrock. In places combination of the radiometric bands coupled with knowledge of bedrock weathering styles have been used to separate different soil textures.

Perth regolith:

Completion of the final report, and presentation to GA Cities Project.

Baseline geochemistry – still on hold

Science communication

Results from the GILMORE data were presented at the Benalla Conference at the end of April, and also at the 16th AGC in Adelaide.

Income

Significant events

Issues and comments

Irene Pestov is still on long leave. Richard Cresswell will be spending part of his time next year working on the South Australian part of the NAP, in Program 4.

Outlook and work plan for next Quarter

Salt in the Regolith

We now have a large amount of data from GILMORE and Billabong that requires evaluation and documentation. Geochemistry is a minor component of the Program 4 SA work plan; there will be considerable scope for additional input from this project to the understanding of salt in the South Australian context. This is hoped to link in closely with the CRC – Plant-based Solutions for Dryland Salinity and other projects in CRCLEME based in South Australia.

Salt in erosional landscapes

The relationships between regolith materials and the concentration/mobility of salts will be explored through a series of DC resistivity traverses and shallow drilling (approx 20 meters). The ground geophysics will be completed by the end of July, and the drilling by the 20th August.

The project has recently benefited from the involvement of Alex King, a new scientist working for Geoscience Australia. She will be working at the more detailed sub-catchment scale looking at the correlations between regolith materials including their textural and gamma-ray properties and salt loads.

There has been considerable interest in the project from the land care groups representing landowners and the Department of Land Water Conservation (DLWC). It is planned that DLWC will become an increasingly important partner in the project in terms for sharing data, providing local knowledge for validating results and product customisation and potential cost sharing.

Perth regolith:

Following discussions with GA Cities Project staff in early August, a plan for further work on this project will be developed.

Baseline geochemistry

Science communication

Other

There is a new project in development, on the “Development of soil-regolith toposequence-based methods for predicting variability in saline processes at point to regional scale” The project leader will be Rob Fitzpatrick. More details will be provided in the next Quarter.

Appendices:

Program staff and percentages

Name	% in Program
Andreas Schmidt-Mumm	20
Heinson	20
Stewart Greenhalgh	5
Irene Pestov	75
Jane Coram	75
Richard Cresswell	100
Tim Munday	40
P Davies	10
Richard Merry	10
Rob Fitzpatrick	30
Skwarnecki M	40
Elisabeth Bui	20
A Kepic	25
Jason Meyers	20
Paul Wilkes	15
Watkins	
Colin Pain, Program Leader	40
David Gibson	20
John Wilford	20
Ken Lawrie	20
Patrice de Caritat	15
Penny Kilgour	50
KP Tan	20

Projects:

Project	Leader	Comments
Geologically constrained AEM interpretation	Tim Munday	Waiting for better project definition
Salt in erosional landscapes	John Wilford	On track
Salt in the regolith	Richard Cresswell	On track
Salinity communication	Ken Lawrie	On track
Perth city regolith	Matthew Killick	To be re-negotiated, and a new schedule prepared
Baseline geochemistry in Australia	Elizabeth Bui	Waiting for PhD student

1.4 Program 4: Salinity mapping and hazard assessment

Program Leader: Dr Ken Lawrie

Overview

At the end of the 2001-2002 financial year, it has become apparent that many States are reluctant to co-fund major airborne geophysical (AEM) programs under the NAP. In the last few months BRS notified the CRC that the Commonwealth program initially proposed to handle salinity mapping (the SMMSP Program, to be administered by AFFA/BRS), had not materialised. Instead, the regionalisation of NAP funding to Catchment Management Authorities (CMAs), would now appear to require a reappraisal of strategies for securing funding, and different partnering and marketing strategies to be considered.

1. Work plan for the Quarter

Work in this quarter of the year was essentially the same as the previous quarter. The workplan for the quarter was to focus on the following main tasks:

- Technical scoping and workplan development in S. Australia;
- Methodology and product development /refinement using the GILMORE datasets, and write-up for the GILMORE report;
- Communication of the BRS-CRC LEME Salinity Consortium's science to peers and potential clients;
- On-going discussions on a strategic plan for Victoria;
- Development of a workplan for Queensland.
- Presentation of papers at Victoria Under Cover conference.

2. Work done against the work plan

The workplan was essentially followed, and outputs successfully delivered against milestones.

In summary, main highlights in the 4th quarter of the 2002-2003 financial year, were:

- Detailed technical workplans between BRS and CRC LEME and South Australia agencies for NAP work were refined. AEM, radiometrics and airborne magnetics data acquisition commenced. Awaiting BRS agreement, and signing off on workplans by the South Australia NAP Board in late July.
- In Victoria, a strategic plan for salinity mapping with NRE Victoria was progressed to a second draft.
- AFFA requested LEME's input into a strategic planning document arguing that there is a compelling case to use NAP funds to fill some key science gaps in salinity science. The document sent to the States for comment clearly recognises the importance of regolith and airborne geophysical datasets as major data gaps.
- GILMORE report. This document sets out the methodology for salinity mapping in a few different landscapes. The LEME contribution has been completed to first draft stage, and the initial draft report submitted to BRS; joint sections awaiting BRS input, with drafting of final figures and editing continuing.
- Qld (St. George area) workplan submitted to BRS, for incorporation in Commonwealth submission to the Qld. Government.
- Presentations were made at the Benalla conference in early May. The team received GA 'Mugs of the Month' for its running of a very successful field trip and co-organisation of the conference. Presentations are summarised in Appendix 1.
- **MDBC Honeysuckle Creek Project**
Tim Munday organised and chaired a meeting on behalf of the Murray Darling Basin Commission concerned with developing a joint approach to the continued study of the Honeysuckle Creek airborne geophysical data sets. This was held in Benalla, Victoria in early June and brought together representatives from the local Catchment Group, DNRE Victoria, BRS, CSIRO Land and Water, and Exploration and Mining, the universities of Monash and La Trobe and the MDBC. As a result of the meeting a limited drilling program was agreed to with the results to be presented in a follow-up workshop in mid-August. BRS are organising and conducting the drilling program. Responsibility for convening the follow-up workshops and activities is being taken up by the BRS and DNREVic.

3. Technical lessons learned.

GILMORE methodology development and write-up

Program 4 staff have been engaged in the write-up of the GILMORE report that documents a systems approach to mapping and assessing salinity hazards. This involves the integration of regolith, hydrogeology and geophysics. In this quarter, the Program 4 team completed a draft of the report, incorporating BRS contributions. Some sections that are to be co-authored remain outstanding, awaiting some additional BRS input. The technical finding and significance of this work was summarised in the previous quarterly report. In brief, some of the additional insights in this quarter include:

- (a) The relationship between conductivity and moisture content in materials was explored, and a set of empirical transformations for the Gilmore data set devised to convert CDIs to moisture content. Maps of moisture content at various depths produced. Such maps may be important for determining salt storage and transmissivity of groundwater.
- (b) Devised a set of empirical transformations to apply to CDI slice data to best replicate drillhole conductivity logs. The transformations show that CDIs substantially overestimate conductivity at ~12-18 m depth. The implications for this are firstly that if the true conductivity peak is below 20 m, an artificial second peak may be present in the CDIs at around 15 m, and secondly, if the conductivity peak is between 10 and 20 m, the CDIs will drastically overestimate this. A set of corrected CDI slice images for the northern Gilmore AEM area were produced, showing that although there is a conductivity anomaly centred in the northern central part of the area, it is not nearly as strong as suggested by the raw CDI data.
- (c) Development of a series of methodologies to model and display surface and sub-surface datasets in 3D. Over the Gilmore study area these techniques have been used to model the regolith in 3D. This types of analysis and display is providing an improved understanding into:
 - the distribution of regolith materials
 - geomorphic and hydrological processes both past and present
 - the morphology of the buried landscape
 - the characteristics of the sedimentological system and how it has evolved through time
 - the controls of the storage and movement and saline ground water.
- (d) New insights into the distribution and characteristics of regolith materials and their relationship to the palaeo-landscape are providing predictive rules that can potentially be used to extrapolate regolith materials and associated groundwater characteristics into other areas for groundwater flow modelling
- (e) A new series of products for the NAP has resulted from this type a synergistic display and interpretation including:
 - 3D AEM conductivity models
 - 3D AEM models constrained by major regolith material types
 - 3D groundwater flow conduit and barrier maps
 - regolith moisture maps that provides information on major textural variation in the regolith.

4. Potential Income

Approximately \$870,000 has been identified for work by the BRS-LEME Salinity Consortium in South Australia. Agreement between BRS and CRCLEME for resource allocation to South Australian Project yet to be concluded, and the detailed workplans drafted identify \$677,00 for salaries and operating funds, if agreed to by BRS. Approximately \$150,000 was requested for salinity mapping activities in Qld.

5. Significant events

In this quarter presentations were given by team members at the Victoria under cover conference in Benalla in early May. A few seminars were also given in May and June. There was also some preparation for presentations at the 16th AGC.

6. Issues and comments

- **External**

There is still confusion as to whether there will be some or any strategic State-agency driven initiatives in the States, or whether funds will solely be derived through CMA-sourced project proposals. Clarification is being sought.

In the 2001-2002 year, there has been little to no penetration of the BRS-LEME Salinity Mapping Consortium into the process of helping to determine salinity hazard mapping priority areas within the States. Instead of centralised project planning at Commonwealth and/or State agency level, many project plans are being developed/submitted for NAP funding through CMAs, requiring a very different approach given the number of such agencies. In this light, new strategic and business plans, and communication and marketing strategies are being drafted in consultation with key potential clients and collaborators.

In South Australia, airborne surveys and on-ground studies have commenced, however LEME's continued participation is awaiting signing of agreements over funding and roles and responsibilities.

In NSW, an initial technical meeting was held in late June to discuss salinity mapping. Most of the priority areas appear to be in upland landscapes where airborne radiometrics, digital elevation models and ground validation, including regolith studies may be particularly useful.

In Victoria, a strategic plan for airborne AEM program is being drafted in consultation with NRE Victoria. An application for funding for work in the St. George area has been made. In this quarter work the first draft of the GILMORE report was completed.

7. Outlook and work plan for next Quarter

A strategic plan for work in the area of salinity mapping, hazard assessment and landscape re-design is being developed by LEME. This incorporates a business plan, communications and marketing strategy. Activity in this quarter will be focussed on securing funding, and finalising the GILMORE report to peer review standard.

Project: South Australia - SMMSP

Project Leader: Tim Munday

Overview

- Completed joint BRS/CRC LEME Project schedules and budget for the South Australian SMMSP.
- Completed a technical review of joint BRS/CRCLEME project schedules with SA-SMMSP Technical Review committee. The schedules were accepted with minor changes and have been put up to the Project Board for final approval.
- Airborne geophysical surveys as part of the SA-SMMSP have begun in South Australia, with Fugro the sole contractor for a combination of systems.
- Chairing a multi-agency meeting in Benalla, Victoria, on behalf of the Murray Darling Basin Commission, to progress the next phase of investigation on the Hoineysuckle Creek Geophysical data sets. A limited drilling program was agreed to and is being progressed by the BRS.

Work Plan

- Start "on ground" activities in South Australia as part of the SMMSP.

Work Done

1. South Australia

In the April-June quarter, significant progress was made in South Australia, with the CRCLEME/BRS Project Schedules accepted by the Joint State-Commonwealth Technical Review committee. They are now being forwarded to the Project Board for sign off.

Fugro Airborne Surveys were accepted as the sole contractor for the surveys to be conducted as part of the South Australian work. For the five areas being studied, a mix of technologies is being deployed including a helicopter frequency domain EM system (DIGHEM), a fixed wing time domain AEM system (TEMPEST) and a MAGSPEC aircraft. Planning for a preliminary on ground scoping exercise is

planned for early July by John Wilford, Dave Gibson, KP Tan and Richard Cresswell.. Flying has started in the state. Plans are in train for a more detailed series of on ground studies with State counterparts.

A series of fact sheets concerning the project have been developed by the State team with input from CRCLEME. They now reside on the NAP web site for SA.

Tim Munday initiated a transition in responsibility for the South Australian SMMSP activities following a decision to relocate back to Perth. This is ongoing.

Major issues

1. There is no agreement between BRS and CRCLEME on the split of funds for follow-up work associated with the SA-SMMSP. This threatens the Commonwealth component of the project.
2. In the SA-SMMSP Richard Cresswell takes over as the Principal Project Scientist
3. Funding for the proposed CRCLEME component of the Project remains unclear, affected by the current uncertainties surrounding the funds advanced to LEME through BRS.
4. Staffing issues remain problematic, with uncertainties over the Geophysics position in Program 4 and the role of contractors in the SA-SMMSP. The importance of having unhindered access to a geophysicist for the duration of the SA-SMMSP is critical and needs to be addressed with some urgency.
5. The issue of a cross-program geophysical theme requires urgent attention given the importance of geophysical technologies in LEME-led activities. The planning behind this remains opaque.

Technical Lessons Learnt

- The importance of being able to forward model the expected geophysical responses of “targets” has become apparent as part of the South Australian Scoping studies and continues to be an issue for other states. Access to appropriate software is important in this regard.

Outlook

- An agreement with BRS on the joint approach to the SA-SMMSP.
- The start of on ground activities in South Australia and a review of preliminary data from the SA surveys.

- List of all Program staff and their percentages in the Program

In-kind

Name	Contributing Organisation	% Time
Dr. K. Lawrie	Geoscience Australia	80
Dr T. Munday	CSIRO DEM	40
Mr. J. Wilford	Geoscience Australia	80
Dr. C. Pain	Geoscience Australia	20
Ms P. Kilgour	Geoscience Australia	30
Mr. D. Gibson	Geoscience Australia	80
Dr. I. Lambert	Geoscience Australia	10
Ms H. Apps	Geoscience Australia	100

External cash funded

Name	Host Organisation	% Time
Dr. K.P. Tan	University of Canberra	80
Ms. K. Nelson	Geoscience Australia	25

Presentations by Program 4 staff at the ‘Victoria under cover’ conference at Benalla in early May 2002. Several presentations were repeated in Canberra.

Apps, H.E., Lawrie, K.C., Gibson, D.L., Brodie, R.C., Wilford, J., Tan, K.P., Chan R.A., & Hight L.M., 2002. GILMORE Project GIS – providing a 3D framework for mapping and assessing mineral prospectivity and the risk of dryland salinity. *In* Phillips, G.N. & Ely, K.S., (eds.); Victoria

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- Lawrie, K.C., Munday, T.J., Gibson, D.L., Mernagh, T., Wilford, J., Williams, N.C., Brodie, R.C. & Apps, H., 2002. The role of airborne electromagnetics in a multi-disciplinary approach to mapping mineral systems under cover. *In* Phillips, G.N. & Ely, K.S., (eds.), Victoria Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria. p. 107-120. CSIRO Exploration and Mining and CRC LEME.
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- Dent, D., Munday, T., Brodie R., & Lawrie K., 2002. A preliminary interpretation of high-resolution airborne geophysical data, and implications for salinity and land management – Honeysuckle Creek, Victoria, Australia. *In* Phillips, G.N. & Ely, K.S., (eds.), Victoria Undercover- Benalla 2002. p. 1-10; CSIRO Exploration and Mining and CRC LEME.
- Gibson, Tan & Wilford. Poster paper for 16th AGC. The Bland Basin, an Upstream Extension of the Murray Basin.

1.5 Program 5: Education and Training

Program Leader: Associate Professor Pat James

Work done against the work plan for the Quarter

Landform and Regolith mapping workshop – on 31 March and 1 April I attended 2 days of this workshop in Silverton and Cockburn, far west NSW. The joint LEME/MTEC workshop was organised and lead by Steve Hill and Ian Roach. There were 21 students attending including participants from all Melbourne Universities, ANU, NSWDMR and GA. I was extremely impressed with all aspects of the course that I was able to observe. This included field excursions, field mapping and evening lectures and digital map preparation. I subsequently organised for this workshop to be repeated for SA participants (15 attendees 7-10 July).

Hyperspectral/ENVI workshop – 15-19 April - Application of Hyperspectral Remote Sensing and the ENVI software package. I organised the course which was presented by Alan Mauger & Vicki Stamoulis (PIRSA) and Megan Lewis (AU Soil and Water) at the Soil and Water Waite campus. About 12 participants attended, with no fees charged, including one student, Berlinda Crowther, from ANU.

E&T Subcommittee – on 12 April, following requests and discussions with all nodes, I sent an email to the members of the reconstituted E&T subcommittee informing them of the make-up of the committee. The subcommittee comprises Pat James (Convener and U Adelaide representative), Steve Hill (Deputy and U Canberra representative), Mehrooz Aspandiar (Curtin representative), Richard Greene (ANU representative), Ian Roach (MTEC representative). I have subsequently met with all members of the committee during visits to all of the nodes and we are actively pursuing the business of the portfolio. Major items include resolution of student/scholarship issues, preparation of project proposals, budget issues, development of short courses, etc.

Administrative Support etc – following a brief search, I secured the services of Maureen Blake, from June 3, as a casual part time (.5 LEME) administrative assistant for the E&T portfolio. Maureen has extensive experience in geoscience support, bibliographies and education through her former employment with the Australian Mineral Foundation. After a trial employment period she is now about to take on a 2 year contract to include Adelaide Node support, and the position has been upgraded to .8 FTE with support from PIRSA.

Programme Leader visits to Adelaide – Nigel Radford and Ken Lawrie visited Adelaide Geology & Geophysics on 10 and 11 April, while Ravi Anand visited on 23 April. For each visit, I organised a series of brief seminars by Adelaide LEME students and scholars presenting their project proposals. (Adelaide students have just made a number of these Powerpoint presentations to local staff and I have captured them as digital files and will make them available across the LEME nodes linked to the SRD. The programme leaders were able to meet individually and collectively with many of the Adelaide University LEME staff for discussions regarding possible projects.

Node Visits - I attended the Benalla Conference (29 April-2 May), and visited the Perth (6-9 May) and Canberra (13-15 May) nodes. At each of the nodes I met as many LEME staff and students as possible, both individually and in groups. I attended seminar sessions by students presenting their research proposals and results at Curtin (10 Geophysics, 5 Geology), U Canberra (5 Geology) and ANU (8 Geology). I have obtained the Powerpoint files for many of these and have passed them on to HQ with the aim of eventually putting them on the LEME website. I also visited Melbourne to discuss MCA/MTEC courses with Kevin Tuckwell (see MTEC item) and also met with Bob Haydon (CRC*PMD), to begin discussion of possible links with their E&T programme.

Update on student complement

I continued with the preparation of the Student Register Database (SRD) of all students in LEME. The database has searchable and rankable ordering of all students and allows simple update, printing and review. The database has now been separated into two versions. One contains all students who have completed their studies, and the other contains details of current students. Copies have been sent to Executive members, AD's and E&T subcommittee members for comment. I hope to see the SRD shortly made available on the web for access by all LEME staff and students. The precise details of students, supervisors, programmes,

themes and projects is still not currently accurate or up-to-date. I will be checking the data and providing an accurate update as a matter of urgency.

E&T Budget Proposals – I prepared 3 project proposals and budget schedules for items within the E&T Programme. They included requests to support the following projects (with scholarships and programme costs already pre-committed) – 1) NURGS – (\$30K), 2) Short course development MTEC/MCA (\$20K), 3) Virtual Regolith Worlds - Computer aided learning/online learning development (\$25K). All of these except the NURGS proposal were provisionally accepted by the executive.

MTEC/MCA Matters – Graham Taylor submitted the draft minutes of the MTEC Consortia Management Committee Meeting of 27 March. On June 21 I visited Kevin Tuckwell to discuss the plans for short courses, workshops and the proposed development of online learning modules by LEME and MTEC. I was invited to attend and present a talk at the MTEC lecturers meeting in Adelaide 26-28 June. I gave a talk entitled “Communicating with your audience”.

Adelaide Cash funded lecturing positions. I assisted with the advertisement and setting up of appointment panels for cash-funded (Level C – Regolith Geologist) and in-kind (Level A – Exploration Geochemist) lecturers at Adelaide University. Applications, referees reports and interviews have been conducted. One nomination for the Level A lectureship has been forwarded to the Executive Dean of the Faculty of Sciences for approval.

Field Excursion – on a visit to the western districts of Victoria from 1-2 June, I visited the field sites of Rob Fitzpatrick, which show the salt-affected toposequences near Gatum on the Dundas Tablelands. I met there with a local farmer (Rob Lawrence), and discussed the previous research, his attempts at salinity remediation and his interest in future LEME activity. I showed him a copy of the Benalla conference papers (he showed interest in gaining a copy, possibly via the internet), and I subsequently sent him a copy of Rob’s most recent report.

Adelaide Node meeting – a meeting for all Adelaide node members was convened on 5th June by John Keeling. At the meeting, which was attended by 25-30 people, we introduced new LEME members and students, including Maureen Blake as the new node administrative support officer (including E&T support). I then presented a seminar to the research seminar series of the Department, outlining the new Strategic Plan and its included major research themes.

Short Courses and Workshops – Other than those documented elsewhere, I have begun discussions with a number of LEME members about the development of future short courses, including Graham Heinson (Airborne geophysics), Ron Watkins (Environmental geochemistry), Steve Hill (further Regolith/landform mapping), Ian Robertson/Charles Butt/Ravi Anand (regolith mapping/exploration geochemistry) and anticipate other courses in remote sensing, 3D visualisation/modelling and GIS. I also undertook discussions with Reid Keays regarding future collaboration and coordination with VIEPS.

16th AGC – I coordinated attendance of about 50 LEME personnel (25 Staff & 25 students) to the conference. I organised and helped to occupy (with Maureen Blake) the LEME booth, hosted a LEME welcoming function (BBQ), presented a LEME talk entitled (*Fostering Research and wider community understanding of the regolith*).

Executive duties – I participated in various Executive meeting and phone conferences. I presented regular reports to the executive and HQ. I assisted with the preparation of the draft strategic plan and attended a day long session of the Minerals Advisory Council in Perth which reviewed the progress of the plan. I have begun to assist the coordination of the new Project Officer (Ian Roberts) in the preparation of the LEME 2001/2 Annual Report.

Outlook and workplan for the next Quarter

- Help to prepare revised strategic plan
- Preparation and coordination of Annual Report
- Continue revision of SRD and increase access and communication across nodes
- Begin development and operation of new E&T projects
- Develop liaisons with other CRC E&T programmes

2. ASSISTANT DIRECTORS - CENTRE CULTURE AND LIAISON

2.1 Assistant Director, Perth and Deputy Chief Executive Officer: Professor Norm Uren

Informal group meetings were held every second Monday over morning tea in the Exploration Geophysics student common room.

1. Curtin Applied Geology and Exploration Geophysics Departments have continued to exhibit at High Schools Careers Expos at Narrogin, Fremantle, Midland, South Hedland, Broome, Victoria Park, Aquinas College (Manning) and Australind. . A concerted effort is being made to counteract the current decline in enrolments.
2. Brett Harris has completed his PhD entitled Transient electromagnetic methods and their application to the delineation and assessment of groundwater resources in the Eastern Goldfields, Western Australia.
3. Stewart Greenhalgh and Graeme Heinsen visited ARRC for discussions with LEME researchers, with a special emphasis on the Geophysics the progression of Geophysical projects (29-30 May).
4. Six Honours, one Masters and three PhD students in Applied Geology and Exploration Geophysics gave presentations to Education Program Leader Pat James on 9th May at ARRC to acquaint him with their projects.
5. The Interactive Virtual Environment Centre at ARRC was officially opened on 10th May. This new facility, when fully commissioned, will provide up to date technology for visualising multi-dimensional geoscientific data.
6. PhD student, Don Hunter gave a presentation on NMR to the WA Branch of the Society of Exploration Geophysicists on 15th May.
7. Curtin's insurers announced a \$10,000 excess on insurance claims. This means that most equipment in the field equipment is virtually uninsured. Consideration needs to be given to supplementary insurance cover as a project cost.

The following papers were given by LEMERs.

Kepic, A., and Butler, K., 2002, *The art of measuring very low amplitude seismoelectric signals*: 64th Conference and Exhibition, European Association of Geoscientists & Engineers, Extended Abstracts, P193, Proceedings published on CD ROM.

Kepic, A., and Howman, D., 2002, *The application of geophysical methods to detecting sub-surface cavities under roads*: 64th Conference and Exhibition, European Association of Geoscientists & Engineers, Extended Abstracts, D-11, Proceedings published on CD ROM.

Meyers, J., 2002, *Geophysical overview of the Euroa region, northern Victoria*: Victoria Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria, 17-23.

2.2 Assistant Director, Canberra: Dr Brad Pillans No Report

2.3 Assistant Director, Adelaide: Mr John Keeling.

1. Work plan for the Quarter

- Convene Node meeting
- Input to planning and advisory meetings

- Assist with project development and budgets
- Plan and coordinate LEME contributions to 16th AGC

2. Progress

- Adelaide node meeting held on 5 June. Progress with project submissions and schedules discussed. Seminar presentation by Pat James provided an overview of LEME activities and also introduced the new LEME student database. Meeting well attended.
- Comments provided on draft Strategic Plan. Input to presentations and discussions at the Minerals Advisory Council meeting in Perth on 13 June.
- Advice and publicity material on salinity mapping program in SA sought from Glenn Gale and Glen Walker (Department of Water, Land and Biodiversity Conservation).
- Preparation of budget schedules, input to PIRSA budget planning 2002-03. Compilation of PIRSA in-kind cash contribution to LEME 2001-2002.
- Regolith session for 16th AGC in place. Approximately 50 LEME staff and students to attend contributing 29 talks and 15 poster presentations on LEME activities to the AGC program. Booth display materials in hand.

3. Issues

- More integration of research activities across core parties desirable. May be achieved by fewer and larger projects but this still requires a high degree of flexibility and increased opportunity for interaction and discussion to consolidate research focus.
- The appointment of Maureen Blake (PA E&T Program 50%) very positive and provides a point of administrative contact for the Adelaide node. Funding to increase position to 80% is being pursued through PIRSA.
- Insufficient funds for some research proposals an ongoing issue to be addressed at Executive level and through pursuit of external funding opportunities.

4. Outlook

- Adelaide node remains generally positive and enthusiastic.

3. OPERATIONS

3.1 Business Manager : Mr Gary Kong

No report

3.2 Operations Manager: Mr Paul Wilkes

No report

3.3 Centre Support Officer: Mrs Sue Game

3.3.1. Work Plan for the Quarter

- PA assistance to CEO - ongoing
- Executive Committee meeting coordination and arrangements - ongoing
- support for Business Manager - ongoing
- LEME Publications - ongoing
- Update LEME 2 staff and student contact records and PR records - ongoing
- Revamp and manage LEME filing system and archive LEME 1 and prior- ongoing
- Start up CRC LEME Procedures Manual
- User Advisory Councils - work directly with respective Chairmen to get the two Council meetings happening by the end of July.
- Annual Report preparation

3.3.2 HO Staffing

Resignation of CEO, Dr Ray Smith. Dr Smith's resignation on 28 June 2002 and departure came as a complete shock to his PA. The resignation of the Deputy CEO and Assistant Director, Norm Uren,

was also unexpected. The subsequent debate about who would be appointed A/CEO, and bids to move the location of LEME Head office were 'unsettling'.

Administrative Assistant. Mrs Pearl Phillips accepted a permanent position within CSIRO Petroleum administrative section. On 14th June 2002 Ms **Jennie Campbell** was offered by LEME a 12 months contract for three days a week in the LEME Head Office (Level 2). [Jennie's contract has since been signed off by CSIRO for a 3-month term only because of the uncertainties of the Head Office situation]

Communications Officer: After a period of illness, Mr Martin Davidson resigned effective 26 June. Mr **Ian Roberts**, who is based at Adelaide University, was contracted to produce the Annual Report.

3.3.3 PROGRESS AGAINST WORK PLAN

3.1 PA to CEO - ongoing. Dr Smith travelled interstate four times during period, attending conferences and strategic planning meetings and program meetings. He was heavily involved with Prog 3 and 4 Leaders, GA and BRS in regard to the salinity mapping and funding issues.

3.2 Executive Secretary - ongoing.

- During the period Executive met per teleconference five times - 18 April, 26 April, 14 May, 30 May and 26 June. Documents/agendas were prepared, minutes/notes provided.

- Major tasks for Executive during the period were the production of the strategic plan and development of the themes, and preparation of Project Schedules for the 2002-2003 Budget.

- The interim positions of Assistant Directors Canberra and Adelaide were due to be made permanent. Sue coordinated internal advertising and interviews. Assoc Prof Ken McQueen and Mr John Keeling were appointed 23 May 2002.

- Ad Hoc Executive for ANU. Dr Bear McPhail was nominated and appointed to this additional position on the Executive on 25 June 2002

3.3 Head Office Administrative Support.

Business Manager. Assisted Gary Kong as and when required

Program 2 Leader. Nigel Radford has not as yet arranged his 50% administrative assistant. LEME HO has assisted him with travel arrangements and occasional administrative help.

Operations Manager. Jennie Campbell and Sue have assisted Paul Wilkes with travel and conference bookings and with copying, typing and so on as required.

3.4 LEME Publications

OFR Production & Distribution

Twenty-four LEME Open File Reports were produced/released during the period, and complimentary/statutory copies were sent out. The majority of reports are second impressions of CSIRO Division of Exploration and Mining Restricted Reports, first issued between 1995 and 1998, which formed part of the CSIRO / CRC LEME / AMIRA Project P417: Geochemical Exploration in Regolith-Dominated Terrain, North Queensland.

Two exceptions were No. 115: which presents outcomes of a collaborative project between Dominion Mining, CRC LEME and PIRSA now released in the public domain, and No. 73 - Genesis, Classification and Atlas of Ferruginous materials, Yilgarn Craton.

Dr Ian Robertson has coordinated this release and production as part of a Centre Project which he has completed on time at the year-end. Dr Robertson now ceases his involvement. No arrangements have yet been put in place to continue this process.

Sales

Open File Reports –

3 copies of 85

1 copy each of 77, 76, 81, 80, 50, 58v1, 59

1 copy each of the following maps –

Balaclava regolith-landforms map 1:25000

Triple Chance regolith-landform map 1:25000

Kinalung West-Quondong West regolith-landform map 1:250000
Redan regolith-landform map 1:25000
Broken Hill regolith-landform map 1:100000
4 copies of *Regolith Dating Methods*
12 copies of *The Regolith Glossary*

3.5 **Maintain staff and student contact records and PR records**

Minor changes during the period to staff and student lists. Provided updates for new Executives during the month.

3.6 **LEME Filing**

Archiving of LEME 1 records continues, headed by Jennie, with all the Financial Accounting Records now in CSIRO archives. Next section to be archived will be the Business Manager Records for LEME 1.

Central filing system for HO is being progressively set up. CEO / Centre Support files are straightforward. Major task is still to integrate Business Manager records for central reference.

3.7 **Procedures Manual**

One of the agreed outcomes of the Executive Workshop, held March 2002 was that Sue would coordinate / produce a LEME Procedures Manual for reference in hard copy and on the web. On 24 May 2002 a structure / index and a number of completed (drafted) sections were circulated to Executive Committee Members for comment. The aim was to enable people to have input to the structure and content in the early stage. To date, only Ray Smith has commented and that was positive comment. Sue intends to mention the 'project' again once management issues have settle down - say September / October.

3.8 **User Advisory Councils**

MINERALS ADVISORY COUNCIL - Meeting 13 June 2002

Coordinated MAC Meeting at ARRC, ie support documentation, facilities, catering, travel arrangements and so on. This was a whole day workshop attended by nine Minerals Industry representatives, the CEO, LEME Program Leaders and Executives. CEO provided notes of discussions.

LAND USE ADVISORY COUNCIL. Still to be convened. Invitations were sent out in July from Chairman Kevin Goss, who visited Ray Smith on 27 June and discussed the format of the MAC workshop. [the first meeting of this group is now being delayed, pending revamp of the Strategic Plan]

3.9 **2001-2002 Annual Report.**

20 June, to aid the collection of data from LEMERS in relation to publications, conference attendance and other presentations, grants, collaboration, and visitors. Info due back 22 July. Executives urged to do all they can to personally speak to the troops and get this exercise underway. Sue joined in Annual Report planning meeting 27 June, which included contractor Ian Roberts. Tasks, responsibilities and time lines were established.

4. **OUTLOOK - FORWARD PLANNING**

- Appointment of Acting CEO [Paul Wilkes appointed]
- Advertising, interview and appointment of New CEO - August/September. Head Office operation and location are uncertain, depends on new appointee.
- Major problems with BRS funding [resulted in special board meeting 2 August in Adelaide].
- Scheduled Board Meeting and AGM, 29 August 2002, Perth.
- LEME web site - nearly complete / new website to be launched. Martin Davidson to be contracted, Ravi Anand to supervise, Sue to coordinate.
- Update staff and student contact list and circulate following finalisation of budget
- Strategic Plan being re-written - Coordinator Nigel Radford

- PR Mailing List still needs a major overhaul in view of new strategic directions, new focuses and new partners - environmental arena and so on.
- Procedure Manual - defer until Sept/Oct and appointment of new CEO and decision on where Head Office will be.
- Continue archiving LEME 1 file records and continue establishing new filing system for LEME 2 Head Office records using Trim software)