

Cooperative Research Centre for Landscape Environments and Mineral Exploration

QUARTERLY REPORT TO LEME STAFF AND STUDENTS 1 JANUARY TO 31 MARCH 2002

**Ray Smith, Chief Executive Officer
6 May 2002**

1. CENTRE OVERVIEW

1.1 Highlights

Thematic Volume: Regolith Geology of the Yilgarn Craton.

A substantial LEME 1 deliverable - Regolith Geology of the Yilgarn Craton - has been completed. This has appeared as a one-paper thematic issues of the Australian Journal of Earth Sciences (Vol 49, No. 1). It marks the first issue of the journal in the Geological Society of Australia's 50th anniversary year. It is the first issue to contain a single paper, such is the importance seen in the subject. Congratulations to Authors Ravi Anand and Mark Paine.

1.2 First Year Visit (Review), February 2002

The Panel's Focus "Establishment of Operations of the new Centre".

The First Year Visit was carried out by a Panel with Dr Richard Jones as Panel Chair, Mrs Belinda Hughes (Customer Services Manager) and Professor Gerry Govett (CRC LEME Visitor). Since Professor Govett was not available for the 14 February, he visited the Centre 12 February and passed his findings to the Panel Chair.

The proceedings took place in the Australian Resources Research Centre at Technology Park, Kensington, WA.

LEME participants were

Dr Ray Smith, CEO

Professor Norm Uren, Deputy CEO

Dr Ravi Anand, Program Leader

Professor Nigel Radford, Program Leader

Mr Gary Kong, Business Manager

Mr Paul Wilkes, Operations Manager

Mrs Sue Game, Centre Support Officer

Mr Martin Davidson, Communications Officer

Dr Ross Fardon, Board Chair participated by a telephone interview with the panel.

In the debriefing session, the Panel commented on three key issues (none of which is negative).

- The major challenge for the centre is to operate effectively in a much wider, dynamic and high profile environment that its

predecessor. The enthusiasm, cohesiveness and competence of the Executive leaves the panel confident that this challenge can be met.

- The Centre is to be congratulated in effectively completing its Executive team with only one appointment to be confirmed by the Board.
- Program 4 is based around the Prime Minister's National Action Plan for Salinity and Water Quality. The Centre needs to ensure that the strategic direction of the Centre is not skewed too far by this important utilisation program.

In addition, the Panel had numerous helpful comments. They felt that our approach using research Themes was a good way to bring out the major research issues.

A copy of the Panel's Report and the CRC LEME Board response was circulated to staff and students per email attachment on 10 April 2002.

1.3 Strategic Planning

Proposed themes were developed during a concerted period of Executive and staff planning activities during December - February. This has culminated in the Executive document on research Themes in these Board Agenda papers. They formed supporting papers for the Board-Executive Workshop, 21 March.

Further staff, user and collaborator input took place through three one-day workshops (Canberra, Adelaide and Perth, 13, 14 and 15 March 2002).

The March 21 Workshop was of great value in establishing/refining strategic directions because it will bring together Board, Executive and consolidated staff input.

1.4 Program Leader Positions

All of the five Program leader Positions were filled and in place during February.

The Program Leaders are:

- Program 1: Dr Ravi Anand
- Program 2: Professor Nigel Radford
- Program 3: Dr Colin Pain
- Program 4: Dr Ken Lawrie
- Program 5: Associate Professor Pat James

I welcome the Program Leaders both to their portfolio positions and to the new Executive. We have exciting opportunities and challenges already on our agenda or in front of us and we have a very capable team for these purposes.

1.5. LEME 2 Projects

Work on projects is proceeding according to the agreed Project Schedules.

1.6 Year 1 Budget

The Year 1 detailed budget was completed during December-January, based upon Project Schedules approved at the November 20 Board

meeting. It was despatched to Executives 21 January, with a copy (with overview) to the Board 5 February.

1.7 Staffing

During February and March, the Executive Committee has been focussing on the Centre's needs in terms of cash-funded positions.

The starting point is Schedule 4 of the Commonwealth Agreement. Executives consolidated their views on the needs of the Centre, Core Party expectations, prioritising in terms of positions and timing, within the context of the usual financial planning (which includes requirements for a healthy level of operating funds).

Most of the decisions on staffing will be implemented during March through May.

A key appointment in terms of the overall running of the Centre was Mr Martin Davidson in the budgeted position of Communications Officer. Martin commenced 4 February and brings with him his professional experience in the areas of science communication, public relations, graphics, advertising and web design and utilisation.

1.8 First Round of LEME 2 Scholarships

Offers of LEME Scholarships for PhD and Honours students were despatched by the beginning of the Quarter. These resulted in 13 PhD students and one Masters and eight Honours students. A total of \$300K has been allocated in Year 1 for scholarships and operating funds associated with these scholarships.

1.9 Finances

The projected external income for Year 1 (\$723K) is slightly ahead of the target (\$700K) as shown in The Commonwealth Agreement.

1.10 Outlook

- Preparation of draft Strategic Plan - early May
- Convening of the Centre's two User Advisory Councils (May - June)
- Victoria Undercover Conference, Benalla - 30 April - 7 May (LEME Co-convenor with CSIRO Exploration and Mining)
- CRC Association Conference, Sydney 21 - 23 May
- Completion of Strategic Plan - July/July.
- Preparation of 2001/2002 Annual Report - July - Sept.
- 16th Australian Geological Convention, Adelaide - 1 - 5 July (LEME is a Silver Sponsor)

2. RESEARCH REPORTS

2.1 Program 1: Regolith Geoscience

Program Leader: Dr Ravi Anand, CSIRO Exploration and Mining, Perth

OVERVIEW

- Three research themes (Models of regolith-landscape evolution, understanding regolith processes, how geochemical anomalies form in complex landscapes) were developed and presented to the Board for approval.
- "Regolith geology of the Yilgarn Craton, Western Australia" was published in February 2002 as a one paper thematic issue in Australian Journal of Earth Sciences.
- Manuscripts for thematic volume on regolith-landscape evolution were edited and sorted into three categories: acceptable, acceptable but requiring figures, and needing to be returned to authors for significant revision.
- Mineral hosts project has investigated mineral hosts and traps for specific ore-related target and pathfinder elements. A variety of analytical approaches were used, including Laser Ablation ICP-MS to emphasis dispersion associated with specific mineral phases. Two reports, one dealing with two deposits i.e. Boddington and Mt Percy, and the other one with the Scuddles deposit are nearing completion. This study presents new data about the occurrence and levels of selected trace elements in a variety of minerals and mineralogical assemblages and has real potential in improving exploration procedures in regolith-dominated terrains.
- PhD thesis completed on "origin of Tertiary inset-valleys and their fills, Kalgoorlie Western Australia" by Peter de Broekert.
- Summary report on Gawler Craton palaeochannel studies completed.

PROJECT SUMMARIES

Thematic Volume: Regolith-landscape evolution across Australia (Project Leader: Dr Ravi Anand, CSIRO Exploration and Mining, Perth)

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 (32) have been edited, and sorted into three categories: acceptable, acceptable but requiring figures, and needing to be returned to authors for significant revision.

Issues and comments

- Generally the texts are good to reasonable. The inconsistency and lack of figures is the main issue that needs to be addressed. 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.

Outlook and work plan for the next Quarter

- Return manuscripts to authors for where necessary for text revisions, and obtain figures.

Thematic volume: 3-D Mapping (Project Leader: Dr Colin Pain, Geoscience Australia, Canberra)

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, is nearing completion, and will form a companion volume to the 3D collection.

Issues and comments

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

Outlook and work plan for the next Quarter

The geophysical volume will be completed and released, and more papers will be received and edited.

Geochronology and quantitative models. (Project Leader: Dr Brad Pillans, ANU, Canberra)

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.

Progress

- Measurement of paleomagnetic samples from Pilbara begun; review and interpretation of southern Australia data.
- Analysis of cosmogenic Be-10 data from north Queensland.
- Martin Smith, new PhD student has begun literature review for thesis topic.
- Analysis of luminescence results from quartz in basaltic soils, North Qld.

Issues and comments

None

Outlook and work plan for the next quarter

- Fieldwork in mid-year will include western NSW (collaboration with Steve Hill and Ken McQueen), and South Australia (collaboration with PIRSA)

- Planning underway for project activities and funding for 2002/2003 and beyond

SA Sediments. (Project Leader: Mr John Keeling, PIRSA, Adelaide)

Project aims

Regolith mapping and development of landscape evolution models for selected regions of the Curnamona and Gawler Cratons and Musgrave Block.

Work plan for the quarter

- Prepare second phase of drilling in the Gawler Craton and Musgrave Block
- Prepare summary of work completed to date on Gawler Craton palaeochannel studies
- Continue regolith mapping in the Curnamona Province (Mingary area)
- Sedimentary synthesis for Gawler Craton
- Report on drilling in the northern Murray Basin

Progress

- Logging of regolith in earlier Gawler drill holes completed for 75% of selected holes. Microfossils submitted for age dating by palynology. Spectral logging of samples completed.
- Summary report on Gawler Craton palaeochannel studies completed by B. Hou. Papers on palaeochannel sediments submitted to AJES (B Hou and others). Paper submitted to Aust Clay Minerals Conference on acid drainage from palaeochannel sediments (J Keeling).
- Fieldwork on Mingary continues. Depth to basement capture from drill hole database over Olary 1:250,000 sheet underway to support proposal to map depth of cover from airborne magnetic data.
- Paul Rogers temporarily transferred to Musgrave team to complete mapping of sedimentary cover on Wintinna 1:250,000 map sheet
- Report on Murray Basin drilling close to finalisation (A Fabris). Poster and talk prepared for Mineral Sands Conference in Mildura. Palynology results received.
- Papers submitted for 16th AGC (Hou, Sheard, Keeling)
- Hyperspectral imagery captured over Pine Creek kimberlite (Flinders Ranges) to support work on mineral indicator dispersion by Flinders Diamonds

Issues and comments

Nil

Outlook and work plan for the next quarter

Field work to continue in all areas. A Fabris to commence collection of data on Callabonna Basin regolith cover following completion of Murray Basin drilling report. J Clarke and student W Kimber undertaking field work on Narlaby palaeochannel in May (Hou and Rogers to assist).

Atlases and manuals (Project Leader: Dr Xiangyang (XY) Chen, University of Canberra, Canberra)

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 | Being printed | LEME |
| Transported overburden manual | Phang | Draft for internal reviewing is ready | LEME |
| Calcrete manual | Chen | Writing completed | LEME |
| Australian palaeoclimates | McPhail | Much of writing completed | LEME |
| Red-brown hardpans | Wright/Fitzpatrick | June 2002 | LEME |

Objective regolith logging. (Project Leader: Dr Ravi Anand, CSIRO Exploration and Mining, Perth)

Project aims

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

Work plan for the Quarter

- Project staff meeting to identify diagnostic and quantifiable key mineralogical and physical properties that can potentially be rapidly measured.
- Selection of regolith profiles for investigation.
- Explore equipments that are available for non-evasive measurement.

Progress

- Identified the following potential parameters: colour, magnetic susceptibility, electrical conductivity, radiometrics and mineralogy.
- Powdered regolith samples from a broad range of lithologies were selected for testing as an initial stage.
- Exploring/assessment of suitability of equipment to be acquired for this project include :
- FieldSpec Pro ASD (Analytical Spectral Device) which covers VIS/NIR/SWIR range for quick mineral analyses including iron oxides and can be used for colour determination.
- Bartington MS2 magnetic susceptibility meter for measuring magnetic susceptibility
- Gamma spectrometer – still under assessment.

Issues and comments

- Non evasive, quick and portable methods are chosen but supporting techniques like XRD, FTIR, chemical analyses and contact electrode electrical conductivity will be used to validate/interpret data.

Outlook and work plan for the next Quarter

- Test regolith samples to be sent to
- BRL Hardy Ltd for assessment of suitability of GRAMS colour measurement software
- 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.
- Commence summarising characteristics of regolith materials developed on various lithologies and environments of formation.

Mineral hosts. (Project Leader: Dr Ravi Anand, CSIRO Exploration and Mining, Perth)

This project has investigated mineral hosts and traps for specific ore-related target and pathfinder elements. A variety of analytical approaches were used, including Laser Ablation ICP-MS to emphasis dispersion associated with specific mineral phases.

Two reports one dealing with two deposits i.e. Boddington and Mt Percy, and the other one with the Scuddles deposit are nearing completion. This study presents new data about the occurrence and levels of selected trace elements in a variety of minerals and mineralogical assemblages. The data also characterise the behaviour of some trace elements during mineral weathering. This research has real potential in improving exploration procedures in regolith-dominated terrains.

Biogeochemistry in western NSW. (Project Leader: Dr Patrice de Caritat, Geoscience Australia, Canberra)

Project aims

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

Plan to visit one of the proposed study sites and collect preliminary samples.

Progress

- Talked to two of four supervisors about plans.
- Two sets of university inductions attended

Issues and comments

- Attempting to finish off other project work during this quarter and so effort was <50% so work will increase to greater than 50% for remaining quarter to compensate.

Outlook and work plan for the next 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.

Mineral Mapping South Australia (Project Leader: Dr Alan Mauger, PIRSA, Adelaide)

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

- Orientation for CRC LEME students – Ian Lau (PhD candidate) Curnamona Province; Cassie Gabell (Honours candidate) Curnamona Province focussing on Fe-Oxide in the regolith; Sean Mahoney (Honours candidate) studying the Tarcoola Mine using Hyperion data to map surface mineralogy and regolith.
- Prepare presentation at 5th Airborne Remote Sensing Conference, Miami (May, 2002). (Hyperspectral Airborne Survey for Geological Mapping, Musgrave Ranges, South Australia).
- Prepare CRC LEME Course on ENVI/Hyperspectral Analysis for Geologists – to be presented by Mauger, Lewis and Stamoulis with assistance from Lau (April 15-19, 2002).
- Prepare abstract for 16th AGC.
- Acquisition of HyMap and ASTER imagery over Flinders Ranges – Beltana and Pine Creek.

Progress

- Students presented their reading theses and project plans.
- Mauger attended Hyperion Workshop in Canberra 15 March.
- Prepared Abstract for 11th ARSPC (2-6 Sept, 2002) re: use of Hyperion to map carbonates in the Willouran Ranges.
- Paper accepted for the 5th Airborne Sensing Conference.
- Hosted and attended ASTER workshop 20-21 February 2002.
- Collaborated with Flinders Diamonds geologist undertaking regolith mapping in vicinity of Pine Creek kimberlite occurrence.
- PIMA Scanning of Lake Harris drill core and cuttings completed.

Outlook and work plan for the next Quarter

- Present CRC LEME 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.

Acid sulfate soil processes. (Project Leader: Dr Rob Fitzpatrick, CSIRO Land and Water, Adelaide)

Project aims

- The principal aim of this project is to determine the sources of the Pb, S, Cl, Fe, As, etc. in saline acid sulfate soils in seeps and regolith. The study will undertake detailed geochemical, mineralogical and isotopic research to establish the geochemical dispersion processes.

Work plan for the Quarter

- Prepare two papers and submit to symposium on "Acid Sulfate Soils" 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". by Fitzpatrick R., Skwarnecki M, Raven M, Merry R. and Bonifacio E. 2001.
- "Redox changes in a small wetland with potential acid sulfate, saline and sodic soils" by Merry R.H., Fitzpatrick R.W., Bonifacio E, Spouncer L.R. and Davies P.J.

Progress

- PhD student (Mr Andrew Baker) appointed.
- Two papers were submitted to symposium on "Acid Sulfate Soils" at the International Union of Soil Science (IUSS), 17th World Congress of Soil Science in August 2002 in Bangkok.
- The following paper and report are being written with Dr Eleonora Bonifacio (LEME visitor in 2000):
- "Effect of acid sulphate weathering on surface properties of clay minerals" by E. Bonifacio 1, L. Celi 1, R.W. Fitzpatrick
- "Mineral transformations during laboratory oxidation of inland sulphidic materials" by E. Bonifacio, R.W. Fitzpatrick, P. Self, M.D. Raven, M Skwarnecki and L. Celi.

Issues and comments

- Andrew Baker (PhD student) to commence PhD on 1st July.

Outlook and work plan for the next Quarter

- Commence new project with PhD student (Andrew Baker).
- Complete following report: "Mineral transformations during laboratory oxidation of inland sulphidic materials" by E. Bonifacio, R.W. Fitzpatrick, P. Self, M.D. Raven, M Skwarnecki and L. Celi.
- Present following paper at Australian Clay minerals conference: "Mineral products formed by oxidation of iron sulfides in Australian upland freshwater acid sulfate soils: genesis and significance" by Robert Fitzpatrick, Mark Raven and Marian Skwarnecki

Regolith evolution Dundas Tableland (Project Leader: Dr Ravi Anand, CSIRO Exploration and Mining, Perth / PhD Student Mr Mark Paine, Curtin University, Perth)

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 for the Quarter

- Complete second field trip from the 16th January to the 6th of February during which remaining sites in the Wannan area and identified sites in the Balmoral area will be mapped and sampled.
- Commence laboratory-based analyses of collected samples and reconciliation of field observations with existing geophysics data.

Progress

- A second field trip to the Dundas Tableland was completed during this quarter and samples were taken from the sites mentioned above. Samples collected included drill cuttings from approximately 45 drill holes through a strandline-hosted heavy mineral deposit flanking the Dundas Tableland.
- Cataloging, and logging of the collected drill chips occupied the remainder of the quarter.

Issues and comments

- None at this stage.

Outlook and work plan for the next Quarter

- Complete particle size analysis for selected drill holes during this quarter.
- Present small introductory paper at the Benalla conference.
- Start preliminary work on heavy mineral analysis.

2.2 Program 2: Mineral exploration in areas of cover Program Leader: Professor Nigel Radford, Curtin University of Technology, Perth

OVERALL

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

In addition, the plan aimed to appoint a Program Leader (Prof Nigel Radford commenced 11 February 02), produce a series of Themes within which to report the Program's science to the Board and other interested parties, to present this thematic structure to both the individual scientists through node workshops, and to the Board itself. In addition the Year One CRC Visit was anticipated along with a review by the CRC appointed Visitor.

WORK COMPLETED, PROJECT DEVELOPMENT.

During the period the new Program Leader was appointed and has made efforts to come up to speed in a new environment. Much effort has focussed on strategic issues such as description of Themes, and the presentation of these Themes to both "rank and file" as well as to Board management. This focus on strategy has limited the degree of interaction with active researchers to workshops in Canberra, Adelaide and Perth. Nevertheless, Themes are now in place and the task of developing new projects attractive to industry is advancing.

During the Quarter a small project with Triako Minerals, at their NSW property at Mineral Hill, has been approved and will get underway in April under the supervision of Keith Scott (E & M North Ryde).

FUNDING.

As mentioned above, a new project with Triako Minerals has been approved. Triako will provide funding for this up to \$16,000. Completion is scheduled for July 2002.

SIGNIFICANT EVENTS

Most of the LEME 1 projects are either complete or rapidly approaching completion. The significant exception is the Regolith Expressions volume, where delays are due to slow responses from agreed participants. LEME 2 projects are making good progress. One small new project with industry funding has been approved.

A new program leader appointed and in place.

Preparation of Themes as a framework for science across programs within LEME. Presentation of these Themes to both scientists and students within all Nodes, and to LEME Board. Acceptance that these Themes are both pertinent and the correct way forward.

Discussions advancing on new project ideas prior to setting of budgets in next quater for year 2 of LEME.

Attendance at NTGS conference in Alice Springs. Paper written describing options for cooperation between LEME and NTGS.

ISSUES AND COMMENTS.

Achieving the right blend of topics for new projects is the main challenge I see at present. It would be very easy to present an array of new projects to the exploration industry, but there are, and will be in the future, only limited opportunities for funding from industry. Therefore we have to be very careful and very selective in what we ask for and how we do it. The first stage will be get our own priorities sorted out. To this end, the consultative process undertaken with the Theme workshops has been valuable. A "brainstorming" session is scheduled in Perth for the week after Benalla.

It is becoming clear that the position of Program Leader could very easily become dominated by administrative and non-scientific work.

Statistical information required for appendices for this report are not yet to hand. These will be forwarded later.

WORK PLAN FOR NEXT QUARTER.

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

Program Leader will visit Adelaide Node in early April (completed at time of writing), will attend the Benalla conference, and will visit the Girilambone project in the field in late May. It is hoped that additional field visits to active projects may be possible at the same time.

A major effort will be devoted towards developing new projects that fulfil Program 2 objectives. These projects will then be scoped into the year 2 budgets. I envisage this occupying much of my time in the coming quarter.

PROJECT SUMMARIES

Regolith Expressions of Australian Ore Deposits (LEME 1) (Project Leader: Charles Butt, CSIRO Exploration and Mining, Perth)

Work Plan.

Geochemistry Exploration Environment Analysis (GEEA) special issues: completed, no activity planned. Awaiting publication of second issue
Thematic volume: work plan in the past quarter has been to continue to seek, collect, collate and edit relevant case histories from all sources.

Progress (include progress against milestones)

GEEA special issues. Publication of second issue delayed by publisher for unknown internal reasons. Publication was promised for 10 April.
Thematic volume. Requests for over 200 selected case histories were made to potential authors, of which 178 were agreed upon. To date, we have received 43 drafts (external and internal authors), which are undergoing formal peer review and editing. A further 30 case histories from the previous Conceptual Models volume could be included.

Issues and comments

Progress of the volume is dictated by the provision of case history material by authors. As anticipated, the ongoing changes in the industry have adversely affected many potential authors from accessing material or finding time to complete their papers, consequently, most are behind schedule and others have been withdrawn.

Outlook and work plan for the next Quarter

Project staff and 'outside authors' will continue to write case histories and special chapters. We shall again contact our authors, prior to reassessing the schedule and content of the compilation.

Girilambone Belt (Cobar-Bourke). (Project Leader: Assoc Prof Ken McQueen, University of Canberra, Canberra)

Work Plan

This project commenced in September 2001. Work planned for the January-March quarter 2002 included:

- Analysis of recent drill samples by PIMA and interpretation of PIMA data.
- Completion of the Hermidale 1:100 000 regolith-landform map and review workshop.
- Preparation of a palaeochannel overlay map.

- Detailed laboratory logging/microscopy of drill samples.
- Completion of data entry into GIS database.
- Geochemical analysis of samples from the follow up sampling.

Work Done

- All regolith samples from the Hermidale drilling were analysed by PIMA and resultant spectra interpreted.
- Draft of the Hermidale regolith-landform map completed and undergoing final refinement.
- Petrographic examination and laboratory logging of all regolith samples is complete.
- Results of all geochemical analyses of Hermidale drill samples are to hand, data have been merged into our database and initial interpretation completed.
- A major review workshop was held and a report submitted to LEME Executive.
- Palaeontological dating has been conducted on some palaeochannel sediments with interesting results.
- Restricted geophysical interpretations were completed and have been used to help with the regolith mapping.
- Analysis of water samples collected in December for major cations and trace elements has been completed.

Major Issues

There have been no major issues over the quarter.

Ideas and comments

- Palaeontological dating of materials is showing some promise.
- Two PhD students (Kamal Khider, UC) and Joe Schifano (UNSW, LEME status pending) commenced projects that are part of the Girilambone project.
- Petrological and geochemical results confirm a new Alaskan-type intrusion to be present in the area.
- A number of sites for follow up drilling have been established from the work to date.

Outlook and work plan.

The project is progressing well and more work was completed than originally planned for this period. Results to date indicate that the project is meeting its objectives. The review meeting in March was successful and helped us plan the next stage of future activities (see Review Meeting report for details). There will be a major field-based exercise at the end of May to ground check some sites and prepare for the next stage of the project.

Aripuanna Brazil Anglo American. (Project Leader: Dr Matthias Cornelius, CSIRO Exploration and Mining, Perth)

Project aim:

Interpret two geochemical traverses across base metal mineralization at the Aripuanna Prospect, Mato Grosso, Brazil, evaluate soil sampling and investigate alternative sampling techniques for base metal exploration in tropical environments.

Planned work for quarter:

Prepare final report for Anglo American plc.

Work done:

A final report was completed in February 2002 and submitted to Anglo American plc on 1st March 2002.

Issues, comments, outlook:

Work was completed on time, within budget and to the satisfaction of the company sponsor. No further work is planned at this stage.

Harris Greenstone Belt regolith geology. (Project Leader: Mr Malcolm Sheard, PIRSA, Adelaide)

Work Plan:

January 2002, begin sampling for regolith geochemical analysis.
February, chip tray photography, planning for field work.

Work Done

- Logging of HGSB Phase 1 aircore/diamond drilling (core, cuttings, chiptrays) completed late January.
- Budget & work program detailed with Mel Lintern & Ian Robertson (LEME, Perth) & agreed to by both agencies (Feb-Mar).
- Field excursion to the Lake Harris area (8 days) MJS with Ian Robertson. Examined: outcrop, cover sediments, regolith materials & weathered outcrop profiles. Sampled surface + outcrop materials for geochemical + mineral analysis. Also regolith mapped a 4 x 9 km area at 1:10,000 scale.
- Some further literature search work undertaken.

Major Issues

Nil

Lessons Learned

No change, see last report

Outlook

- Post March: regolith geochemical-mineralogical sampling continuing.
- Photography of chiptrays.
- Phase 2 diamond core drilling to start late April - early May
- May – June: regolith geochemical-mineralogical sampling from Phase 2 drill cores.

**South Australian Regolith (SAR) (LEME1 commitment).
(Project Leader: Mel Lintern, CSIRO Exploration and Mining, Perth)**

Work plan for the Quarter

Complete draft report for ET Regolith Project.
Progress Final Report for the SAR Project.

Progress

- The draft report has been circulated and Mike Craig (compiler) is waiting for the contributors' comments to be returned.
- Final Report writing for the SAR Project has begun.

Issues and comments

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.

Outlook and work plan for the next 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.

AEM Gawler Craton Survey (LEME1 commitment). (Project Leader: Dr David Gray, CSIRO Exploration and Mining, Perth)

David is currently in the field and no report has been received (24 April).

Western NSW regolith and landscape evolution. (Project Leader: Dr Steve Hill, University of Canberra, Canberra)

Work plan for the Quarter

- 2001 Honours theses (Rod Dann, Tessa Chamberlain) assessments completion (January)
- NSW vegetation and rainfall transect sampling and fieldwork (January)
- Teilita fieldwork (February). 1:100K regolith-landform mapping, regolith characterisation and hydrogeochemistry.
- NSW DMR Broken Hill project meeting and field trip (February)
- Rockwell, Thackaringa, Pinnacles, Wahratta, Mt Gipps, Tibooburra 1:25K regolith-landform mapping (Jan - March)
- Commence laboratory analyses and map compilation for Teilita (Feb - March)
- Regolith mapping and field techniques shortcourse (29 March - 4 April)

Progress

- Honours theses marking completed. Rod Dann awarded H1 (first-class Honours), and Tessa Chamberlain awarded H2A.
- Rainfall collected by Lea Hill from rainfall transect as a part of PhD project. Final field mapping of detailed study sites along transect completed.
- Teilita fieldwork completed by Steve Hill, Patrice de Caritat, Dirk Kirste and Ian Hutcheon (see earlier February report sent to Nigel Radford and NSW DMR for further details)
- NSW DMR project meeting and field trip completed as planned.
- Regolith Mapping and Field Techniques shortcourse successfully completed by Ian Roach, Steve Hill, Kylie Foster and Glen Fisher.
- Status of 1:25K maps:
 - Rockwell:** fieldwork completed, draft compilation finalised but needs some refining
 - Thackaringa:** fieldwork completed, draft compilation near completion.
 - Pinnacles:** fieldwork completed, geochemistry samples submitted for analyses, draft compilation completed and scanned.

Wahratta: fieldwork completed, draft compilation underway.

Mt Gipps: fieldwork completed, geochemistry samples submitted, draft compilation complete, currently being scanned.

Tibooburra: fieldwork, compilation and scanning complete. First print out just through. Close to release.

Teilta laboratory analysis and map compilation underway.

Issues and comments

- It's been a very busy and successful quarter. The challenge now is to consolidate on this.
- Employing short-term contract staff has been great for rapid outputs, but a challenge to service with facilities and supervision. This makes completing work within time constraint of contracts a challenge.
- Honours theses were very successful, and it's great that the Tibooburra map has been able to be produced ready for publication from one of these theses.
- Teilta project has had some interesting preliminary geochemical results including a silcrete analysis with over 60 ppm Cu. We are awaiting further analyses on samples from this area.
- Mapping shortcourse success may evolve into future courses for a range of participants.

Outlook and work plan for the next Quarter

- Completion and release of 1:25K regolith landform maps with accompanying reports.
- Write-up mapping shortcourse report and manuscript for Journal of Geological Education.
- Examine Teilta laboratory analysis results and continue map compilation.

Regional seepage exploration geochemistry. (Project Leader: Dr Rob Fitzpatrick, CSIRO Land and Water, Adelaide)).

Work plan for the Quarter

- Complete final report, digital geological map, regolith-landform map, DEM soil map.
- Commence writing three papers presented at the 2001 Amer Soc of Agronomy Meeting.
- Conduct field trips to Woorndoo, Corangamite and Dundas Tableland to collect key samples from saline seepages.
- Prepare paper for International Union of Soil Science (IUSS), 17th World Congress of Soil Science in August 2002 in Bangkok.
- "Geochemical dispersion in regolith around Pb-Zn-Ag mineralisation near Mt Torrens, South Australia" by Skwarnecki, M., Fitzpatrick R., Raven M, Merry R. and Bonifacio E. 2001.
- Revise project proposal, to include wider regional investigations in Mt. Lofty Ranges, Victoria and NSW.

Progress

- The LEME report entitled "Geochemical dispersion at the Mount Torrens lead-zinc prospect, South Australia, with particular emphasis on acid sulfate soils" was completed and sent for refereeing, along with preliminary versions of the geological and regolith-landform maps.

- Conducted field trips to Woorndoo, Corangamite and Dundas Tableland to collect key samples from saline seepages. Analyses were received for Fe precipitates samples from Dundas Tableland and Dicks Creek. Plans have been made for the regional geochemical survey of saline acid sulfate seeps and regolith in the Kanmantoo-Strathalbyn area. The regional project was approved in late January 2002. Sampling will commence in May.
- A position paper on a new research theme entitled: " Acid sulfate soils: regolith processes and implications", was prepared for LEME Executive. This theme incorporates the use of Acid Sulfate soils in mineral exploration and land management issues.
- Three abstracts were submitted for the 16th AGC.
- A paper was submitted to 17th World Congress of Soil Science in August 2002 in Bangkok as per work plan (above).

Issues and comments

Discussions are ongoing with PIMA Mining for further work to the south of their prospect near Strathalbyn.

Outlook and work plan for the next Quarter.

- Produce final version of the Mount Torrens report.
- Carry out regional sampling of saline acid sulfate seeps and regolith, and commence interpretation of the results
- Present a paper at Australian Clay minerals conference.

Dalgaranga Base Metals. (Project leader: Dr Nikita Sergeev CSIRO Exploration and Mining, Perth)

Work plan for the Quarter

- 3D modelling of regolith stratigraphy and geochemical data.
- Digitise and compile all geological and geochemical information as a database;
- Verify and interpolate logging data using element distribution patterns in cross sections;
- Generate 3D regolith stratigraphy and element distribution models.
- Analysis on speciation of base metals in the regolith (March-April 2002):
- Gravity separate selected samples from the anomalies, followed by chemical analysis for base metals;
- Perform SEM analysis of fractions rich in base metals;
- Prepare polished sections of selected primary ore samples and analyse by SEM.

Progress

All geological and geochemical information digitised and compiled as a database; logging data verified and interpolated using element distribution patterns in cross sections. First 3D regolith stratigraphy and distribution models and cross sections for base metals were generated. Six selected samples from the anomalies in the residual regolith and transported overburden were gravity separated, followed by chemical and SEM analyses next Quarter. Fourteen polished thin sections of primary mineralised rocks were prepared, followed by their study under an optical microscope and SEM next Quarter.

Issues and comments

First attempt of 3D modelling of regolith stratigraphy and geochemical data showed necessity to concentrate on 2D modelling in sections due to lack of data between exploration lines. Approach for analysis on speciation of base metals in the regolith, complicated by small size of available samples, has been modified by using of adjacent and combined samples.

Outlook and work plan for the next Quarter

Analysis on speciation of base metals in the regolith will be continued, including chemical analysis of granulometric fractions for base metals and SEM study of heavy concentrates. Polished thin sections of primary mineralised rocks will be studied under an optical microscope and possibly SEM. 2D regolith stratigraphy and distribution models for base metals and selected elements will be generated using modified technique. The results will be interpreted in terms of parameters and possible sources of the regolith anomalies. All the results will be integrated and preliminary model for the dispersion of base metals in the transported overburden of the Dalgara area will be generated. The final report will be prepared by the end of next Quarter.

Litho-geochemical haloes in regolith (Project Leader, Assoc Prof Ken McQueen / PhD student Mr Michael Whitbread, University of Canberra)

No report submitted, but verbal summary presented in Canberra in early March. Project is well on track and write up of PhD has commenced. The student has some financial difficulties and may take limited contract consultancy with Anglo American in order to fund the rest of his write-up.

Partial leach isotope geochemistry: AMIRA P618. (Project Leader: Mr Geoff Denton (CSIRO Exploration and Mining, Sydney)

Work plan for the Quarter

- Prepare spreadsheet of all data on proposed case studies against selection criteria, to be circulated by AMIRA to Sponsors to facilitate selection of further case studies.
- Cannington and Rosebery selected as the next case studies. A sampling program to be carried out at Rosebury on line 1200N. Continue to pursue samples from Cannington stored at Amdel in Adelaide.
- Analytical work at Elura to be finalised and the final report for Elura to be started.

Progress

- Final analyses for Elura completed. Reporting underway and approaching draft stage.
- All data on the proposed case studies have been compiled against selection criteria and presented as a report to AMIRA. We are awaiting feedback from AMIRA.
- Geoff Denton and Simon Gatehouse carried out a field trip to the Rosebery mine lease late January and analytical work has commenced on that case study.

- Geoff Denton located the Cannington geochemical samples that the project had been trying to obtain for some months. Analytical work underway.

Issues and comments

There is minor concern that after the hard work to reduce analytical blanks, we have started to see blank levels rise again. We are currently modifying our analytical equipment replacing polyethylene with teflon fittings. We hope this will help in lowering contamination levels, as well as fixing occasional leaks in the plumbing system.

Unofficially we have been notified that it is possible that Pasminco may not be able to continue to support the project. If this is the case and no further sponsor can be found then the scope of the project may have to be reviewed.

Outlook and work plan for the next Quarter

- To complete the final report for the Elura case study.
- To complete the analytical phases of the Cannington and Rosebery case studies.
- To report on those case studies at the next sponsor's meeting in June 2002.
- To select the final case studies and make preliminary plans for collection of samples.

2.3 Program 3: Environmental applications of regolith geoscience

Program Leader: Dr Colin Pain, Geoscience Australia, Canberra

WORK PLAN FOR THE QUARTER

- Salt in the regolith: This project on lowland salt planned to study the chemistry of pore fluids and compare regolith and groundwater chemistry to determine relationships and histories.
- Salt in erosional landscapes: Collect data, both ground and remotely sensed, delineate catchments, and plan drilling and field program.
- Perth regolith: A pilot study to consult stakeholders, find their concerns, and identify appropriate regolith data sets for the construction of a unified hazard identification and response plan.
- Baseline geochemistry: It has been decided that the best way to carry this project forward is to recruit a PhD student to undertake the work as a thesis topic.
- Science communication: Preparation of papers and abstracts.

WORK DONE AGAINST THE WORK PLAN

- Salt in the regolith: Equilibrium chemistry exists within the pore fluids extracted from cores in the regolith of the Temora district. This suggests equilibrium between fluids and host minerals. This will be presented at the Benalla Conference at the end of April. Groundwater evolution from recharge to discharge is important, with exchange

occurring between the groundwater and the pore fluids in the sediments.

- Salt in erosional landscapes: All existing data have been collected and compiled. Ground geophysical transects and drilling sites have been planned, and will be done by a commercial operator
- Perth regolith: Collection of information has been done, and a draft report prepared.
- Baseline geochemistry: This project is on hold waiting for a student to take up the project.
- Science communication: Benalla conference abstracts, plus other papers

The following staff were involved in project development.

C. Pain – Program management

T. Munday – development of salt mapping projects

P. de Caritat – environmental geochemistry

D Kirste – environmental geochemistry

J Coram – development of projects with MDBC

M Skwarnecki – acid sulphate soils, salt mapping

R. Fitzpatrick – acid sulphate soils, salt mapping

The following staff were not assigned.

G. Heinson, J. Clarke, J. Field, P. Davies, R Watkins, R. Greene, R. Merry,

S. Greenhalgh, A. Schmidt-Mumm, X. Y. Chen, A. Christie, D. Ellis.

I. Pestov is on extended leave

INCOME

\$26,500 for Perth regolith study.

SIGNIFICANT EVENTS

Nil

ISSUES AND COMMENTS

- Management and team performance in the Salt Mapping Consortium will continue to be an important issue as we work through the development of the Consortium as a high performance team.
- Personnel concerns have dominated many discussions, with the return and subsequent departure (on long leave) of Irene Pestov and the lack of clarity over John Sims' position. Jane Coram has rejoined us after maternity leave, and is rapidly coming up to speed.

OUTLOOK AND WORK PLAN FOR NEXT QUARTER

- Salt in the regolith: We will shortly be receiving data from a further series of cores from southern NSW, which will be compared with the results from the GILMORE cores. We have also received satellite hyperspectral data from NASA, which requires analysis. John Sims and I will be travelling the steep learning curve of ENVI to get to grips with this.
- Salt in erosional landscapes: Acceleration of office and field activities is planned from May to the end of the financial year, including acquisition of ground geophysics and drilling.

- Perth regolith: Draft on target for completion prior to Cities Project workshop (19th April) and available for comment and modification in response to stakeholder input.
- Baseline geochemistry: This project is on hold waiting for a student to take up the project.
- Science communication: Benalla conference, 16th AGC

APPENDICES:

The following will be updated during the next quarter.

- List of all Program staff and their percentages in the Program
- List of the projects in the Program
- List of students involved in the Program and show in which project each study lies

2.4 Program 4: Salinity mapping and hazard assessment

Program Leader: Dr Ken Lawrie, Geoscience Australia, Canberra

OVERVIEW

At the end of the third quarter of the 2002-2003 financial year, bilateral agreements for the NAP have now been signed between the Commonwealth and South Australia, Victoria and Queensland. Detailed technical workplans have recently been agreed between the BRS-LEME Salinity Consortium and South Australia. In Victoria, a strategic plan is being drafted in consultation with NRE Victoria, however it remains unclear whether funding in Victoria (and NSW) will be distributed through individual Catchment Management Authorities, or through centralised State agencies. In Queensland, QDNR have invited the BRS-LEME consortium to contribute to work in only one small project area (St. George). In this quarter work has also continued on the GILMORE report, and a significant number of publications were produced, and presented in support of this work.

WORK PLAN FOR THE QUARTER

Work in the first quarter of this calendar year has focussed on the following main tasks:

- Methodology 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;
- Technical scoping and workplan development in S. Australia;
- Preliminary discussions on a strategic plan for Victoria and a workplan for Queensland;
- BRS staff from the Consortium commenced work on Queensland ground validation.

WORK DONE AGAINST THE WORK PLAN

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 has completed a first draft of approximately two-thirds of this report, and this was sent to BRS for comment in late March. No feedback has been received to date, and as yet the team have not had access to the BRS components of the report.

Drafts written include:

- Systems approach to mapping and assessing salinity hazards;
- Regolith analysis and methodologies;
- 3D modelling of regolith materials;
- Mapping salt stores in erosional landscapes;
- An evaluation of regolith logging methods and techniques.

To complete the report the following steps are required:

- A key element of the GILMORE report requires an assessment of the correlations between airborne AEM data and ground conductivities. Due to a skills gap in the current Program 4 team, a report was commissioned from Geoscience Australia in February. Richard Lane and Ross Brodie are the authors of the report, to be completed in early May.
- On receipt of the GA report, this information within will be integrated with other borehole datasets to inter-link the AEM data with other (eg matrix, porosity, solute effects etc). This is critical in giving us a clear picture as to what the AEM system is mapping (eg salt, variation in solute concentration, materials);
- Integration of these data and results with data on the hydrochemistry and hydrogeology modelling is also required. BRS staff are to provide this section of the report.
- The report is scheduled for completion in June.

TECHNICAL FINDINGS OF THE WORK IN THIS QUARTER

(a) The relationship between CDIs, downhole conductivity logs, moisture content of drill cuttings and clay contents has been examined in detail. The results include:

- There is good correlation in GILMORE datasets between CDI values and downhole conductivity log averages over the CDI slices when data is compared slice by slice (r squared mostly 0.8-0.9). The slope of the relationship varies depending on depth: at very shallow depths the CDI underestimates conductivity, at intermediate depths it overestimates, and >50 m depth it again underestimates the conductivities.
- There is good correlation between downhole conductivity log and moisture content of all project holes in area 1 when averaged over CDI depth slice intervals. This implies that the salinity of the contained water is approximately constant.
- There is also fair to good correlation between CDI and moisture content for each CDI slice interval (r squared ~ 0.6). The slope of

the regression equation changes with depth because of the under or overestimation of resistivity at different depths. Therefore over area 1 is it considered that the CDI's are a good indicator of moisture content of the sediment/saprolith.

- The CDI values in depth slices have been transformed by the relevant regression equations to give maps of calculated moisture contents at various depth slice intervals. This will provide valuable data for groundwater modelling.
- There is a fair to good positive correlation between clay content of sediment and saprolith and the moisture content. Thus high moisture indicates clay-rich sediment or saprolite. Intermediate moisture contents are present in sand and weathered basement siltstone, and saprock/bedrock has low moisture content.

(b) Significant advances have been made in building 3D facies maps of regolith materials based on percentage moisture contrasts.

(c) Hydraulic conductivity measurements.

Limited pump test and triaxial core transmissivity tests on GILMORE boreholes and materials have suggested that there are significant porosity and permeability differences between different regolith materials. However these tests are relatively expensive, and the team has been examining other methods.

- An assessment was made of the practicality of calculating the hydraulic conductivity (K) of regolith materials using known porosity and grain size distribution (derived from laboratory measurements). Available references suggested that empirical calculation of K can be carried out using these two variables in addition to other constants, namely the dynamic viscosity and fluid density.
- Preliminary empirical K results from GILMORE datasets are encouraging. This method suggests that gravel-bearing sand-rich units may be 3 orders of magnitude more conductive than mud-rich lithologic units. Since the conductivities shown on AEM depth slices (CDI) are associated with porosity, and regression equation shows that K is inversely proportional to porosity (power function), it is possible that AEM data can be used as a surrogate to calculate the hydraulic conductivity. Diagrams of the inferred empirical K have not yet been produced, but it is suspected that introducing another derivative equation on the empirical K data would show the preferential groundwater pathways. This task will be carried out in the 4th Quarter, as will validation of this method and results against borehole measurements.

QLD

Prepared images of St George area for David Dent (to give to the minister)

INCOME

Approximately \$870,000 has been identified for work by the BRS-LEME Salinity Consortium in South Australia. Agreement between BRS and CRC LEME for resource allocation to South Australian Project yet to be concluded. This has implications for the split of funds from the glass jar. These funds will be offset against the \$810,000 advanced to CRC LEME by AFFA in Yr 1.

SIGNIFICANT EVENTS

Preparation made for Victoria Undercover Conference in Benalla in late April – Early May. In this quarter a number of publications were written by Program 4 team members (see appendix). Presentations were given at several workshops and conferences (see appendix).

ISSUES AND COMMENTS

- **External**

Advice received from MDBC and AFFA that it is unclear whether work proposals in Victoria and New South Wales are to be developed primarily with the State agencies or with the CMAs. Clarification being sought through BRS and AFFA. If proposals are to be developed primarily with the CMAs, this increases significantly the effort required by the Consortium to generate new business.

- **Internal**

A facilitator was brought in mid-April to assist with forging stronger team dynamics between BRS and LEME. This process is on-going.

OUTLOOK AND WORK PLAN FOR NEXT QUARTER

A strategic plan for work by the BRS-LEME Salinity Consortium, incorporating a business plan, communications and marketing strategy, and workplans for each State/regionally-based project for the year ahead, is currently being developed with BRS. This will be finalised by end May.

The main task of the team is to complete the GILMORE report by the end of the 4th Quarter.

It is also hoped to have a first draft of a strategic plan for work in Victoria completed in the 4th quarter, and for workplans developed for the St. George area in Queensland, and the MDBC project areas in Honeysuckle Creek (Victoria) and Billabong Creek (NSW).

Appendices to Program Leader reports, updated quarterly:

Program staff and their percentages in the Program

In-kind

| Name | Contributing Organisation | % Time |
|-------------|----------------------------------|---------------|
|-------------|----------------------------------|---------------|

| | | |
|----------------|-----------|-----|
| Dr. K. Lawrie | AGSO | 80 |
| Dr T. Munday | CSIRO DEM | 40 |
| Mr. J. Wilford | AGSO | 80 |
| Dr. C. Pain | AGSO | 20 |
| Ms P. Kilgour | AGSO | 30 |
| Mr. D. Gibson | AGSO | 80 |
| Ms H. Apps | AGSO | 100 |

External cash funded

| Name | Host Organisation | % Time |
|-----------------|--------------------------|---------------|
| Dr. K.P. Tan | University of Canberra | 80 |
| Mr. G. McMurray | AGSO | 25 |
| Dr. A. Green* | Consultant | 20 ?? |

*Note Dr. A. Green has retired from CSIRO, and is now retained on an as-needs, contractual basis. Mr. D. Hunter took leave from CSIRO to undertake a PhD project within LEME.

PROJECT SUMMARIES

Project: South Australia - SMMSP (Project Leader: Dr Tim Munday, CSIRO Exploration and Mining, based at Geoscience Australia, Canberra)

Project aims:

Riverland: Determination of the depth, thickness and continuity of the Blanchetown Clay at sufficient resolution to enable:

- targeting of recharge-reduction options in dryland areas
- a focus for improved irrigation efficiency and drainage works in irrigation areas;
- zoning of irrigation development.

Outputs will include:

- A map of the Blanchetown Clay within a 20 km zone from Lock 3 to the Border, as inferred from an EM conductance map and field calibration;
- Report on overall site investigations

Tintinara: Improved irrigation and groundwater management planning tools:

- In the Mallee Highlands: mapping the distribution, thickness and hydrogeological characteristics of the discontinuous underlying shallow clay layer to facilitate management practices that minimize flushing of near-surface salt down into the groundwater;
- Mapping the extent of dryland salinity in the coastal plain.

Outputs will include:

A map of the clay across the main area of concern, as inferred from the EM conductance map and on-ground calibration;

- Improved estimates of salt loads to the groundwater using the additional information from geophysics and drilling (report);
- Report on overall site investigations

Angas-Bremer Plains: Prevention of, or better management of shallow, saline groundwaters and soil salinity, and protection of sensitive aquatic habitats.

Outputs may include:

- Three-dimensional maps of the soils and regolith, with emphasis on palaeochannels
- Report on overall site investigations

Jamestown: salinity management plans to protect high value cropping land, based on an improved knowledge of groundwater, soil and salinity distributions.

Outputs may include:

- Maps and associated products including enhanced soil and regolith maps.
- Report on overall site investigations

Bremer Hills: to determine the relationships between geology, geomorphology, groundwater and stream salinity

Outputs may include:

- Map and associated products including soil and regolith maps
- Report on overall site investigations.

Work plan for the Quarter

1. Technical review of proposed commonwealth (BRS and CRC LEME) tasks and activities with joint State and Commonwealth SMMSP team (April 9th).
2. Development and agreement of data protocols and Project IP (April 9th)
3. Review of Tenders for SA geophysical surveys. (April 26th)

Progress

Tim Munday confirmed as Project Leader for Commonwealth Team and NAP Board formally advised in Board Meeting of 19th Feb 2002

1. Circulation of proposed activities for Commonwealth Team for discussion with State partners (March 2002)
2. Technical review and discussion of proposed workplan with State counterparts completed and feedback circulated for discussion (Meeting on April 9th in Adelaide and comments distributed April 12th)
3. Iteration of proposed Project schedules and outputs within Commonwealth Team following feedback from Technical Committee (Internal CRS and CRC LEME discussion on workplans April 22nd April)
4. Conclusion of Tender review for airborne geophysical surveys and discussion of recommendations with SA National Action Plan Project Board (complete).
5. Discussion of Data sharing protocols and IP issues and development of Associated Projects protocols for interaction with 3rd parties who may have an interest in data acquired as part of SA SMMSP (Discussion with NAP Project Board 19th April).
6. Review of geophysical system options for SA surveys completed.

Issues and comments

1. Agreement between BRS and CRC LEME for resource allocation to South Australian Project yet to be concluded. This has implications for the split of funds from the glass jar.
2. Need to determine how project overheads administration will be handled to avoid duplication between BRS and CRC LEME (Which has implications for funds available for "on ground" activity).
3. Equity split between CRC LEME partners in Project and implications for delivery of project outputs to be resolved.
4. Tender process successful in securing best survey options for SA project through excellent negotiations by Ross Brodie (GA) and discussions with Fugro as sole supplier of survey data for State. This followed formal tender submissions by several contractors for the proposed work.

Outlook and work plan for the next Quarter for South Australia

1. Internal review and completion of Workplan and associated Project Schedules for Commonwealth Component of SA –SMMSP (By May 17th).
2. Submission of CRC LEME component of workplan to LEME executive by 15th May.
3. Submission of Commonwealth Component of Project management and Project Schedules for sign off by SA – Nap Project Board (24th May).
4. Initiate publicity of survey and work program with State partners (May 2002).
5. Initiate field program in SA (Jamestown, Riverland and Tintinara (end May 2002).
6. Develop Tech Transfer options with State partners (mid June 2002).

PUBLICATIONS WRITTEN, PUBLISHED AND/OR SUBMITTED BY PROGRAM 4 STAFF IN THE 3RD QUARTER.

- 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 Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria. p. 271-274. CSIRO Exploration and Mining.
- 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.
- Lawrie K. C., Pain, C. F., Gibson, D., Munday T. J., Wilford J. & Jones G., 2002. Regolith – a missing link in mapping salinity processes and predicting dryland salinity hazards. *In* Phillips, G.N. & Ely, K.S., (eds.), Victoria Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria. p. 167-173. CSIRO Exploration and Mining.

- Gibson, D.L. & Wilford, J., 2002. Aspects of regolith and landscape of the Strathbogrie-Caniambo-Dookie area: the need for interpretation of detailed geophysical datasets in the light of regional data and models. *In* Phillips, G.N. & Ely, K.S., (eds.); Victoria Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria. p. 235-248. CSIRO Exploration and Mining.
- Gibson, D.L., Wilford, J., Tan, K.P. & Lawrie, K.C., 2002. Palaeogeography, a predictive tool in environmental studies- applications to the margins of the Murray Basin. *In* Phillips, G.N. & Ely, K.S., (eds.); Victoria Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria. p. 183-192. CSIRO Exploration and Mining.
- Wilford, J., Gibson, D.L., Lawrie, K.C., & Tan, K.P., 2002. Extending regolith-landform maps into the third dimension- unravelling the palaeogeography story for mineral exploration and environmental applications. *In* Phillips, G.N. & Ely, K.S., (eds.); Victoria Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria. p. 193-202. CSIRO Exploration and Mining.
- Ely, K.S., Lawrie, K.C., Phillips, G. N., Gibson, D. L., Tan, K.P. & Heislars, D. Victoria Undercover – Benalla 2002 field excursion guide *In* Phillips, G.N. & Ely, K.S., (eds.), Victoria Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria. p. 281-284. CSIRO Exploration and Mining.
- Phillips, G.N., Hughes, M.J. & Lawrie, K.C., 2002. Victoria Undercover 2002, and the Victorian Geotraverse. *In* Phillips, G.N. & Ely, K.S., (eds.), *In* Phillips, G.N. & Ely, K.S., (eds.), Victoria Undercover: Benalla 2002 Conference proceedings and field guide: collaborative geoscience in northern Victoria. p. 271-274. CSIRO Exploration and Mining.
- 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.
- Eggleton, T. Tan, K.P. & Lawrie, K.C., 2002. Mineral quantification in clay-rich sediments. *In* Greene, R., (ed.). Australian Clay Minerals Society 18th Biannual Conference. Ext. Abs., p. 44.
- Tan, K.P., Gibson, D.L., Lawrie, K.C. & Wilford, J., 2002. Unravelling the natural gamma response of sediments in a complex regolith environment. GILMORE project area, central New South Wales. *In* Greene, R., (ed.). Australian Clay Minerals Society 18th Biannual Conference. Ext. Abs., p. 10-11.
- Lawrie, K.C., Pain, C.F., Gibson, D.L., Munday, T.J., Wilford, J. & Jones, G., *In* press. Mapping salinity processes and assessing and predicting dryland salinity hazards. AGC Abstract.
- Wilford, J., Dent, D., Braaten, R. & Dowling, T., 2001. Running down the salt in Australia 2: Smart interpretation of airborne radiometrics and digital elevation models. *The Land*, 5.2: p. 79-100.

- Gibson, D.L., Tan, K.P. & Wilford, J., In press. Sedimentary systems in the 'Bland basin', an upstream extension of the Murray Basin. AGC Abstract.
- Wilford, J., In press. Customised regolith maps for delineating salt stores and predicting near surface saline ground water flow, NSW. AGC Abstract.
- Wilford, J., Dent, D., Braaten, R. & Dowling, T., 2002. Predicting salt stores using airborne radiometrics and digital elevation models. Sydney University Conference.

Other publications written, submitted and/or published in this quarter

- Mernagh, T. P., Lawrie, K. C., van Achterbergh, E., & Ryan, C. G., In press. Characterisation of hydrothermal zircons in porphyry, epithermal, and lode gold deposits. AGC Abstract.
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2.5 Program 5: Education and Training

Program Leader: Associate Professor Pat James, Adelaide University, Adelaide

WORK PLAN FOR THE QUARTER

- Began work as E&T Coordinator and Program Leader on March 1
- Prior to March 1, as member of E&T subcommittee I was involved with assessment of Honours and PhD Scholarships and choice of students to receive scholarships
- During March main activities planned were preparation of presentations for Canberra/Adelaide/Perth Theme workshops.
- Set up the Education and Training subcommittee

WORK DONE AGAINST THE WORK PLAN

- 8 Honours students received CRC LEME Scholarships and operating funds for 2002.

- 14 postgraduate students received LEME Scholarships or top-ups to begin study in 2002. The E&T subcommittee is currently considering offer of further scholarship support within the current budget.
- The Education and Training subcommittee was set up in late March and 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)
- Attended Canberra Executive workshop and executive meeting (12 March)
- Attended and presented at Canberra/Adelaide/Perth Theme workshops (13-15 March)
- Attended and presented at Canberra Board meeting (21 March)
- Attended Executive workshop on Salinity Mapping program, Canberra (22 March)

1) Update on student complement

With administrative support I have begun the preparation of a database of all students in LEME. The database has searchable and rankable ordering of all students and allows simple update, printing and review. I am aware that the precise details of students, supervisors and projects is not currently accurate or up-to-date. I will be checking the data against known. In the near future the student details will go on the web for easy access by all.

2) MTEC shortcourses and workshops

- Regolith Geology & Geochemistry – (Melbourne) – Graham Taylor – 4-8 March
- Landform and Regolith mapping workshop – (Broken Hill) Steve Hill and Ian Roach, 29 March – 4 April – very successful with 21 students

3) Shortcourse and workshops other than MTEC

- Hyperspectral/ENVI workshop (Adelaide) Alan Mauger (PIRSA), Vicki Stamoulis *PIRSA) and Megan Lewis (AU Soil and Water). Planned for 15-19 April

INCOME

None

SIGNIFICANT EVENTS

None

ISSUES AND COMMENTS

None

OUTLOOK AND WORKPLAN FOR THE NEXT QUARTER

- Attend Benalla Conference
- Help to prepare strategic plan
- Assist with advertisement and appointment of cash-funded and in-kind lecturers at Adelaide University
- Appoint administrative support staff for Adelaide node

- Continue update of student database, respond to student requests for extensions, support etc. Fix view of students within Themes
- Assist with organisation of LEME support for students to attend 16th AGC
- Visit students and staff at Perth and Canberra Nodes
- Attend and make presentation at MTEC workshop (Adelaide, 26-28 June)
- Begin to organise Education and Training committee to develop educational strategies and philosophy
- Develop program of student interaction across nodes, but within Themes, develop computer communication and Internet chat areas
- Prepare and present lectures on LEME education and training philosophy for Adelaide University seminar series, 16th AGC, MTEC
- Encourage development of new workshops and courses (Geophysics, GIS etc)

3. ASSISTANT DIRECTORS - CENTRE CULTURE AND LIAISON

3.1 Assistant Director, Perth and Deputy Chief Executive Officer: Professor Norm Uren, Curtin University of Technology, Perth

From 2 January to 4 February I assumed the position of Acting CEO for CRC LEME during Ray Smith's absence on leave. During this period three Program Leader positions were finalised, a Submission was made to the WA Government in relation to seed funding for WA based LEME researchers, and a Centre Overview paper was produced by the Executive for the CRC Secretariat, as support document for the 1st Year Visit (12 and 14 February).

DEVELOPMENT OF CENTRE CULTURE

- Perth 'node' meetings of staff and students have occurred regularly every second Monday, at morning tea time in the Geophysics Curtin students common room.
- The Perth Strategic Planning Workshop for staff and students, 15 March, was well attended with some 44 LEMERs and six visitors from the CRCs for Predictive Mineral Discovery and Plant Based Management of Dryland Salinity, the Geological Survey of WA and UWA. This proved to be an excellent opportunity for Perth people to meet the Program Leaders from the 'east' and to be involved in the planning process and to promote LEME research to the visitors.
- Norm Uren attended a half-day Corporate Leadership Seminar given by Professor Roger R. Collins through the Australian Institute of Management. One major point was the classification of management issues depending on the stage of maturity of the business or enterprise being undertaken.

COMMUNICATION WITHIN PERTH / WA

Because of the close proximity of Curtin Geophysics and CSIRO Exploration and Mining within ARRC and with Curtin Geology 5 minutes away, daily face to face contact between Leaders, staff and students is

easily achieved. Program Leaders are clearly establishing their own links with their researchers, not only in Perth but across the country. With reports and information promulgated from Head Office to all LEME, it has not been necessary, at this stage, to set up any sort of 'Perth based' communique's.

ISSUES

Following my heavy involvement during the beginning of the year, I am now mostly concentrating on my Department commitments. I am not aware of any major issues. LEMERs should feel free to contact me if they have any queries, or feel I can assist.

3.2 Assistant Director, Canberra: Dr Brad Pillans, Australian National University, Canberra

DEVELOPMENT OF CENTRE CULTURE

The fortnightly LEME seminar series at Geoscience Australia continues successfully, and acts as a focus for Canberra node staff.

The Strategic Themes planning workshop, that was held on 13th March at Geoscience Australia, replaced our normal quarterly node meeting. The workshop has had a significant positive effect on centre culture, with many staff and students now having a greater sense of "belonging" to the LEME team.

COMMUNICATION WITHIN CITY/REGION

Individual core parties such as ANU and UC have regular get-togethers over morning tea. I attended most of the ANU meetings and one at UC. I also have regular discussions with Colin Pain and staff at GA.

All node staff and students are in regular email contact, of course

ISSUES

I have not visited the Sydney LEME staff as yet. I would strongly recommend that the incoming Assistant Director do so on at least an occasional basis. Nor have I interacted with the BRS staff to any great extent – once again, the incoming AD should be able to do better!

VEHICLES: There is an urgent need to rationalise vehicle use in Canberra. At the moment each core party has its own vehicles – some are leased, some are owned, and usage costs are both variable and high. As leader of the E&T portfolio, Graham Taylor had a policy of making vehicles available to students, through the E&T program, at minimal cost. I'm not sure where that policy stands now.

3.3 Assistant Director, Adelaide: Mr John Keeling, PIRSA, Adelaide.

WORK PLAN

Facilitate LEME strategic planning workshop in Adelaide. Continue planning for LEME participation in 16th AGC. Node meetings and seminars.

PROGRESS

- Successful strategic planning workshop held in Adelaide. Enthusiastic response and feedback on research directions, especially from students. Strengthened links for collaborative research with CRC for Plant-based management of Dryland Salinity
- Around 17 papers received for presentation at the 16th AGC "State of Regolith Research Symposium" plus 8 poster presentations. This does not include LEME papers offered for presentation in other symposia at the conference. A listing of all LEME contributions will be prepared and circulated widely prior to the conference commencing on 30 June 2002. Through E&T Program coordination we are seeking to maximise LEME student participation in the conference.
- The strategic planning workshop for staff and students in Adelaide, 14 March, served as an Adelaide node meeting. All LEME Program Leaders participated. Students are preparing presentations for visits by Program leaders in April. Regular node meetings are essential and will recommence in May.

ISSUES

Change of government in SA has been followed by a restructure of PIRSA involving transfer of some staff in Sustainable Resources to a new Department of Water, Land and Biodiversity Conservation. While this does not affect LEME staff directly, the changes may impact on executive decision making in the salinity mapping programs in SA.

OUTLOOK

Node meetings and seminars to recommence in May. Strong LEME presence assured for 16th AGC.

4. OPERATIONS

4.1 Business Manager : Mr Gary Kong, CSIRO Exploration and Mining, Perth

SAFETY

No work related lost time injuries, accidents or major threats of such were reported.

WORK PLAN (AND ASSOCIATED PROGRESS AND OUTCOMES) FOR THE QUARTER

1) Organisation of Visit of Chairman of Governing Board (17, & 18 January 2002)

To facilitate the visit of the Chairman and provide support where required

- Visit took place and all executives were involved (CEO was on recreational leave).

2) Position of Program 5 Leader (Education & Training)

To organise the finalisation of offer and communicate outcomes to the Governing Board

- Upon endorsement of the Board on 27 February, Associate Professor Patrick James of Adelaide University was offered the position on the CRC LEME Executive as the Program 5 Leader (Education & Training)

3) Future of the Visual Resources Unit (VRU)

To oversee the preparation and compilation of Business Plan for the Visual Resources Unit

- Business Plan was prepared and circulated to Executives for comments and inputs
- Negotiations with CSIRO Exploration & Mining took place in February and proposal of underwriting 50% of the running costs (ie. Approx \$90K) of the VRU for Year 2 was circulated to Executives for endorsement.
- In order to utilise resources efficiently and effectively, the proposal of underwriting 50% of the running costs of the VRU for the 12-month period of Year 2 was approved by the Board.

4) First Year Visit – Centre Visitor: Professor Gerry Govett (12 February 2002)

To participate in discussions with Professor Govett in relation to commercialisation strategy, and resources and budget

- The visit took place at the CRC LEME Headquarters at the Australian Resources Research Centre on 12 February 2002. Positive feedback was given by Professor Govett.

First Year Visit – Expert Panel of CRC Secretariat (14 February 2002)

To participate in the preparation of Centre Brief to Expert Panel and to participate in discussions with the Panel regarding commercialisation strategy, resources and budget

- As judged by the Panel's written report, as well as comments during presentations and discussion, the First Year Visit went well.

5) Scholarship Payments

To liaise with Core Party Universities re Scholarship Payments and the associated administrative arrangements for the scholarship funds

- Contact points for handling scholarship payments were established at core party universities
- Scholarship funds were provided to students via the respective universities.

6) Reimbursement of expenditure to Core Participants

To liaise with Core Participants regarding reimbursement of expenditure incurred in carrying out LEME2 activities and to set up appropriate mechanisms

- Upon receipt of monthly statements and invoices, reimbursements were made to Core Participants (while LEME Accountant was on sick leave)

7) Preparation of Position Papers:

- Application of Operating Budget for Program Leaders (21 January 2002)
- Operating Funds for Scholarship (21 January 2002)
- Streamlined Approach for Small Projects (11 February 2002)
- Future of the Visual Resources Unit (15 February 2002)
- Application of WA State Government Funds (18 February 2002)

8) Year 1 Budget

To complete Year 1 detailed budget following Board approval of Project Schedules and incorporating financial and staffing information incorporated within the schedules

- Year 1 detailed budget was completed by early January, based upon Project Schedules approved at the November Board Meeting. It was despatched to Executives 21 January, with a copy (with overview and explanatory notes) to the Board on 5 February

9) Trade Mark Registration

To register the new LEME logo as Trade Mark for Intellectual Property purposes.

- Trade Mark was successfully registered in January

Business Name Registration

To submit applications to ensure the name of CRC LEME is registered in all States

- Applications submitted

10) Submission for WA State Government funds via WA Department of Industry and Technology (formerly Department of Commerce and Trade)

To complete the submission on time to secure funding from WA State Government

- Submission was prepared with Operations Manger in consultation with Curtin University and CSIRO (taking into account centre needs and equity of the two core participants)

11) Report on Cash Funds provided to the University of Canberra (1 July 1995 – 30 June 2001): 6 Yrs

To meet the requests of Professor Alan Cripps, Pro Vice Chancellor (Research and International)

- Report was provided as per request. It provides effective indication to University of Canberra in terms of Return On Investment

12) Higher Education Research Data Collection

To provide advice to each of our participating universities of the eligible cash research funds LEME has recorded as passing to the participating universities during the financial year 1 July 2000 to 30 June 2001

- Certified statements were provided to participating universities on time

13) Executives Workshop and Executive Committee Meeting (12 March 2002)

- To prepare relevant papers to facilitate the workshop and meeting
- Executive workshop and meeting held in Canberra was proven to be a success and a good promotion of Centre Culture

14) Board Meeting (21 March 2002)

- To prepare and submit relevant papers to Board on time
- Papers submitted were concisely structured and prepared
 - Minutes were circulated for endorsement 3 days after the Board Meeting

15) Staged Implementation of Cash Funded Appointments (Years 2 – 5)

- To stage the implementation of appointments taking into account the guiding principles from the Governing Board
- Work in progress

16) Year 2 Operating Budget

- To prepare guidelines and action plan for executives
- Work in progress

MANAGEMENT, DEVELOPMENT OF SYSTEMS AND POLICY

Policy developed in line with position paper submitted:

- Streamlined Approach for Small Projects (11 February 2002)
External contracts for research under \$30K could be approved by the CEO without the need for a formal contract while purchase orders or other forms of written documentations would be used to formally substantiate the prospective research activities. Attempts will be made to draft agreements that cover risk elements in such contracts.
- Future of the Visual Resources Unit (15 February 2002)
With a view to utilising resources efficiently and effectively, the proposal of underwriting 50% of the running costs of the VRU for the 12-month period of Year 2 was approved by the Board. All participants were encouraged to utilise the services provided by the VRU.

HUMAN RESOURCES

- CEO and his PA/Centre Support Officer were both on annual leave from 1 January to 4 February 2002.
- Mr John Mills, LEME Accountant was on sick leave 10 January to 4 March 2002.
- Dr Nigel Radford commenced his duties as Program 2 Leader on 11 February 2002.
- A/Professor Pat James commenced his duties as Program 5 Leader on 27 February 2002.
- Mr Martin Davidson commenced his duties as Communication Officer on 4 February 2002.
- Ms Pearl Phillips, Headquarters part-time office assistant commenced her sick leave from mid February – she broke her hip and would be unable to work for 10 weeks.

- As per the staged implementation of cash funded appointments, staff contracts are being extended and respective core participants are contacted in writing to confirm funding arrangements.

FINANCES

- The Projected external income for Year 1 is slightly ahead of the target shown in the Commonwealth Agreement.
- Income details for Commercial Project P618 are yet to be confirmed by CSIRO.
- Financial statements are not yet available, as Geoscience Australia had not yet submitted monthly expenditure statements (1 July 2001 to 31 March 2002) to headquarters. [Note: submitted 26 April]

COMMERCIALISATION

Contracts:

- BHP Billiton Ltd - Groundwater for the Ravensthorpe Nickel Project \$5,000.
- Triako Resources Ltd - Collaborative Project on the Regolith at Mineral Hill: \$16,170.
- GeoScience Australia (Urban Geoscience Division) - Scoping Regolith/Environmental Work for a Perth Cities Project: \$26,600.

OUTLOOK

- Planning for Year 2 Operating Budget
- Implementation of Cash Funded Appointments
- Monitor In-Kind Commitments of Core Participants
- Preparation of Procedures Manual
- Student Agreement
- Annual Report and preparation of Annual Financial Statements
- Year end audit

4.2 Operations Manager: Mr Paul Wilkes, Curtin University of Technology, Perth

ACTIVITIES

1) Student documentation

In the intervening period between E & T program leaders, I produced a spreadsheet showing all CRC LEME students, their supervisors, scholarship and operating funding, and likely start and end dates. With the arrival of Pat James in the E & T role maintenance of this spreadsheet has passed to Pat. The spreadsheet is very useful for Budget planning and as an information source.

A revised Position Paper on Student Operating Funds was circulated to Execs on March 8.

2) Budget operating spreadsheet

As part of the budget process for year 1, I created a spreadsheet with all the operating

expenses for all programs. Most of the work for this was done in December 2001 but minor revisions occurred during January 2002. John Mills used this as a starting point in creating the official year one budget. A similar process will be used during April / May 2002. to create the year 2 budget.

3) Ross Fardon visit

Ross visited ARRC in the week of January 14-18 and had sessions with a number of senior staff members including myself.

4) 1st year CRC visit

Norm Uren, Gary Kong and I produced a briefing document ready for the 1st year Centre Visit (14 February) and separate visit (12 February) by the Centre Visitor (Prof Gerry Govett). The Centre Visit went very well and received a favourable report.

5) Themes writeup and organisation

Following discussions in late 2001, further work was done of the concept and description of themes ready for discussion at the Strategic Workshops held in March with staff and students at Adelaide, Canberra and Perth and the Workshop with the Board on March 21, 2002 in Canberra. I participated in all 4 workshops.

6) WA Government infrastructure grant submission

A substantial document was prepared by Gary Kong and myself for submission to the WA Government Department of Commerce and Trade, for infrastructure funding, based on the WA participation in CRC LEME. This submission is for \$ 451,000, spread unequally over 3 years.(\$ 300,000 in year 1, \$ 76,000 in year 2, \$ 70,000 in year 3 and \$ 5,000 on final report). A combined and integrated list of equipment was drawn up between Curtin and CSIRO as the WA partners in CRC LEME. The first installment is expected by June 30, 2002. The document was submitted on 1 March to Dr Rod Thiele, Deputy Director R & D, Curtin University and Consultant to Commerce and Trade.

7) 16th AGC – Adelaide – July 2002

Equitable funding for participation of presenting staff and students was worked out during February and registrations arranged for those who had not registered separately.

This covers participation by 28 staff members and 11 students. Details are available as a spreadsheet from Paul.

8) Revised project schedule summary pages

Following the November 2001 Board meeting, I produced a revised Project Schedule Summary proforma that will be used for future project approvals. This was accepted at the March 2002 Board meeting. Proformas and examples are available for the two-page Project Schedule Summary and the rest of the project schedule documentation from Paul or Sue.

9) Skills audit

Design of a skills audit was done during this quarter and by end of March about 75 % of the responses had been received. The skills audit comprised a spreadsheet to be completed by all Research Scientists and Technical

support staff and a short CV for all staff. The compiled spreadsheets for each core party are a useful summary of the technical skills available through CRC LEME and are useful in planning future projects.

10) Draft Strategic Plan 2002 - 2008

Work is in progress on this document, which should be complete by about April 26.

This is being written by Ray, Pat and myself but derives considerable input from Program Leaders through material produced for the various Strategic workshops.

OUTLOOK FOR THE NEXT QUARTER

include :

- Draft budget for year 2
- Complete Draft Strategic Plan
- Operational Plan for year 1
- Attend Benalla conference April 30 – May 2

4.3 Centre Support Officer: Mrs Sue Game, CSIRO Exploration and Mining, Perth

1. WORK PLAN FOR THE QUARTER

- Ongoing - PA assistance to CEO; Executive Committee meeting coordination and arrangements; support for Business Manager; LEME Publications; maintenance of Head Office facilities
- LEME NEWS 22
- Update LEME 2 staff and student contact records and PR records
- Revamp and manage LEME filing system and archive LEME 1 and prior.

HO STAFFING

- CEO Ray Smith and PA Sue Game on Leave during January.
- Part time administrative assistant, Mrs Pearl Phillips on leave most January, then unfortunately broke her hip w/c 18 February and is not expected back to normal duties until end May. Following short-term assistance from Agency Temp Staff, Ms Jennie Campbell, seconded from CSIRO, is assisting the HO team for as long as required.

PROGRESS AGAINST WORK PLAN

1) PA to CEO - ongoing.

- CEO involved with the appointment of E&T Program Leader, advertising for Assistant Directors Canberra and Adelaide, Strategic Planning Workshops (13-15 March), Board Meeting and Workshop 21 March, travel to Strategic Planning meetings, Canberra, Melbourne, Adelaide, Sydney.
- 1st Year Visit from CRC Program Panel - Visitor Prof Gerry Govett 12 February, followed by Mr Richard Jones and Mrs Belinda Hughes on 14 February. Assisted in preparation of documents, coordinated program and other arrangements for the day.

2) Executive Secretary - ongoing.

- During the period Executive met per teleconference 7 Feb, 15 Feb, 27 Mar and had one formal meeting (which Secretary attended) on 12 March in Canberra. This was preceded by an Executive Workshop on "Setting up operations for an effective CRC". Documents/agendas prepared, minutes/notes provided.
- CEO, Program Leaders, Operations Manager and Communications Officer presented on Strategic Themes and research direction and received input at three planning workshops in Canberra, Adelaide and Perth (13,14 and 15 March). Extensive travel arrangements and coordination required for this 'tour' with Exec Sec booking and paying for Executives travel and accommodation, etc.
- Exec Sec has been responsible for the travel arrangements for the newly appointed Program 2 Leader (Nigel Radford) and Communications Officer (Martin Davidson), and for the Operations Manager (Paul Wilkes) and the Business Manager (Gary Kong).

Note: During March 2002, over \$21K was expended via the Exec Sec Diners Card mainly on Executive travel applicable to the Centre Management budget.

3) Support for Business Manager - ongoing.

Main activity was production and despatch of Board papers for meeting 21 March. Booked travel for various Board members and organised venue and catering for meeting.

4) LEME Publications

- Sales - The Regolith Glossary – 8 copies; Regolith 98 – 3 copies, Open File Reports - 2. (*Note - in April, we have sold already as many LEME Publications as during the first quarter*)

- Statutory Copies of the following reports sent late March:

Open File Report 82 (Volume 1 – Text, Volume 2 – Appendices 1-4 and Volume 3 – Appendices 5-14) – Geochemical Orientation Surveys and Regolith Geology in the S.W. Arunta Province, Northern Territory (Argos Project);

Open File Report 83 – Geochemical Orientation Soil-lag Traverse at the Garland Gold Mine, Winnecke Goldfield, Northern Territory;

Open File Report 84 – Geochemical Orientation Soil-lag Traverse at the Edwards Creek Base-metal Prospect, Strangways Range, Northern Territory;

Open File Report 118 – Regional Regolith Mapping Around Alice Springs, Northern Territory;

Open File Report 120 – Geochemical Exploration in Regolith-Dominated Terrain, North Queensland: Final Report;

Open File Report 121 – Dispersion into the Southern Cross Formation around the Scott and Cindy Lodes, Pajingo – N.E. Queensland;

Open File Report 122 – Charters Towers – North Drummond Basin Field Excursion: Field Guide

Note. A further 8 new reports were sent out in April. Temporary assistance via an Agency was organised for Dr Ian Robertson to assist in preparing manuscript copy for approx 10 new OFR releases, which will be ready during May. The sale and maintenance of OFRs will increase if the products are advertised/promoted by the Communications Officer.

5) LEME NEWS No. 22

As Editor of LEME News (pending appointment of Communications Officer) received material during November/December but was unable to process due to other priorities. Broke holiday during January for three days to prepare the News for the printer - proofread and authorised production. Despatched 800+ copies during February.

6) Maintain staff and student contact records and PR records

- Major update of staff / student contact list during March, personnel names sourced from budget papers, then circulated to Executives and administrators for input. Updates have taken place and now have say 95% of staff student contacts, including email, as of end March. *Note: Further update and circulation will occur following the skills audit identifying previously unlisted staff*
- PR mailing list continually updated. HO can continue to maintain the DB for all, if required.

Issue: PR mailing list now needs a major overhaul in view of strategic directions, new focuses, new collaborators, environmental aspects and so on.

7) LEME Head Office Filing

- Commenced in late March to set up LEME 2 HO filing system, in accordance with Chart and parameters (Trim software) required by CSIRO Records Manager (CSIRO being CRC LEME Centre Agent). Progressively opening new files and recording appropriate documents, to include Business Manager and Accounting records.
- Archiving has commenced, within the CSIRO parameters, of LEME 1 and old CSIRO Area Evaluation Group files. These will be passed to the CSIRO Records Manager for statutory retention.

8) Ongoing - maintenance of Head Office facilities.

- Set up office, furniture, supplies and ordered computer equipment for Program 2 leader, Dr Nigel Radford. Supporting Nigel as required until appointment of his assistant.
Set up office, furniture, supplies and ordered computer equipment for Communications Officer, Martin Davidson. Assisted during Martin's first few weeks with background information, procedures, documentation and so on. Arranged his travel.
- Ordered LEME stationery with new Logo for HO and branches and despatched supplies.
- Ongoing ordering of stationery and supplies. for HO and others.

OUTLOOK - FORWARD PLANNING

- LEME Procedures manual. Set up outline and format, then coordinate progressive content as the Executive puts procedures/policies in place.
- Maintain at least 5 hours per week devoted to the filing for the foreseeable future.
- Meetings of the User Advisory Councils - assist Chairmen to convene first meetings during May/June. 13 June proposed for Minerals Advisory Council meeting
- Interviews and appointment of Assistant Directors Canberra and Adelaide.

4.4 Communications: Mr Martin Davidson, CSIRO Exploration and Mining, Perth

Martin commenced with LEME on 4 February 2002, he is based at CSIRO Exploration and Mining, ARRC, Perth.

WORK PLAN

- Familiarisation with LEME
- Evaluate requirements of position and plan systems
- Establish computer systems - hardware/software to suit requirements
- Web site development
- Develop contact network
- Supply media outlets with material

WORK DONE

- Long delay in **hardware** delivery - 12 weeks - hence some hold up in establishing software systems. Hired equipment in the interim.
- **Web site development:** Overhaul of format and content - implementation delayed due to prior agreements made to existing site manager (Ian Roach), and Martin's absence due to illness (three weeks).
- Attended and presented at Strategic Planning Workshop node-wide series (13,14,15 March)
- Attended two-day CRC Communicators' Workshop, Canberra (21-22 March) Established contacts. Introduced to systems for addressing communicators' tasks. How aware of shared communications' resources and pooled knowledge available.
- Establishing databases of LEME content (news, staff contacts, event's calendar, publications) that can be fed into dynamic web site pages: ie web site is continually and promptly updated.
- Coordinating internal CRC LEME signage standardisation

WORK PLAN FOR NEXT QUARTER AND ONGOING

- Finalise internal LEME signage placement
- Establish LEME library of digital assets - graphics, photos, multimedia elements - for streamlined management
- Begin collating contacts and material for series of media releases and articles
- New web site to be published in early May.
- Commence work on annual report - review work plan/timetable
- Produce next edition of LEME Newsletter
- Expand and refine web site, particularly commercial sales, considering LEME online shop front.
- Establish web links from all relevant external sites
- Intensive lobbying of Internet search engines to increase web presence
- Expand list of pertinent media outlets and feed regular series of media releases and articles
- Produce generic information leaflet for distribution
- Produce comprehensive (1) "Communication Strategy Paper", (2) "Media Guide" and (3) "Communications Policy"

- End -