EXPLORATION

REPORT FOR PERIOD

1ST JULY 96 – 30TH JUNE 97

FOR AUTHORITY 546
EXPLORATION REPORT FOR PERIOD
1ST JULY 1996 – 30TH JUNE 1997
FOR AUTHORITY

Introduction

Following on from report of activities to 30/6/96 Thenerdite and Schoenite Trials. A proposal to develop a significant sized pilot plant for Thernadite and Schoenite production was stalled, following an application to AusIndustry small business for assistance, approved in principal by Canberra, which came to a sudden halt when we could not guarantee tenure to the site proposed for development of a sizeable pilot plant. At the same time the AusIndustry business network program prepared and approved in December 1996 for a partnership development between NT Evaporates, Gorey and Cole, and Rhodes Contracting to operate a water boring and pump test arrangement, provide earthmoving and transport expertise and facilitate a management group to operate a pilot plant, collapsed for the same reason. No security of tenure for the proposed development site.

Funding for any future development cannot be obtained where the end result of exploration, trials and anticipated commercialisation is subject to an unknown outcome for tenure security, in the event of success.

NT Evaporates determined to produce some outcome, returned to a site not suitable for commercialisation, as brine quantity is inadequate and trialed a small plant to produce mirabilite, dry the product and obtain assay reports from Amdel and others.

The success of this demonstration scheme is reported herein.

Gypsum

Three major Gypsum sites within the Eldunda pastoral lease area were examined in early 1996 and following analysis undertaken by Amdel and the Berrima Research Institute it was determined that a drilling program be undertaken at a site adjoining the Eldunda homestead, which was carried out on 11/7/97.

A full report was prepared for mines and Energy files, and acknowledged on 9th Sept 97. A copy is attached.

On 29/4/97 An application for removal of Gypsum to allow industry testing of the finished product was sought. It was approved in May for a shipment of two thousand tonnes for distribution.

Further testing has shown the Eldunda deposit to be of high quality for use in Agriculture, Horticulture, Cement production and Calcining purpose.

Marketing progress is continuing and we have sought a rationalisation of freight subsidy from the Minister of Primary Industries and Fisheries. correspondence attached.
EXPLORATION AND RESEARCH

Brine Resource

Following approval on 28/4/97 to proceed with a demonstration trial for Mirabilite production in the area of Lake 64, preparation and planning proceeded in May to clean an old trench in a small playa north of lake 64 and to prepare earth works for pan preparation.

The site required development of plastic lined pans to receive Brine pumped directly from the playa trench, with brine standing at 0.400 meters.

The pan dimension finished up with a floor area of 3.5 metres x 8 metres x 0.300 metre depth. With draining racks of shade cloth to receive the Mirabilite Crystals.

Trials were run to test the liners, pump capacity, Brine flow capacity and specific gravity.

Climatic conditions required maximum ground temperatures of + 07 deg Centigrade. and Brine S.G of 1.2 to meet minimum specification for precipitation.

The first production run commenced at 10pm and 2 pans were filled to a level of 0.200 metres.

At Sunrise the Brine in the ponds was removed leaving a display of mirabilite Crystal.

The Crystal was transferred to a drainage trough.

The Result

Total Brine treated was 11.2 cubic metres. From which approx 1680 kg of Mirabilite Crystal was produced.

Repeating the trial produced similar results however, as the trench brines were lowered, we believe the pump eventually pulled in some of the Solidium Chloride crystal in the trench, which affected the quality of the later product.

The first sample was analysed by Amdel and a copy is attached for your information.

Conclusion

The trial shows the possibility of producing mirabilite from certain Brine types is not difficult to the standard shown in the report.

A large demonstration system will require better infrastructure on site and improved control of Brine reserves to prevent Chloride contamination.
The source brine requires to be stored in ponds approximately 1.200 metre depth to precipitate Sodium Chloride and then transferred to conditioning ponds with a depth of 0.600 metres to condition the brines to minimum of SG 1.2 and preferably SG 1.6.

Production can then commence in large pans with Brine at 0.200 metre depth when ambient temperatures are from +70deg C to −5deg C to precipitate Mirabilites Crystal.

The remaining bittern should be reclaimed and stored for conditioning to produce Schoenite.

All ponds and holding tanks require to be of substantial material with concrete or similar floors where machinery is required.

Drying of Mirabilite Crystal to produce Thenaeditite in natural conditions is possible, however an engineered system with bagging facility is regarded as essential to prevent dust contamination.

**Proposal for 1997/1998**

Further development and exploration of the Eldunda Gypsum deposits is required.

1. A more intense drilling program to
   1.1 Confirm the analytical quality
   1.2 To test for overburden depth
   1.3 To determine depth of Crystalline (seed) Gypsum suitable for industrial use.

2. Demand for agricultural Gypsum is a growth industry for N.T and negotiations are in progress with contractors and transport operations to establish regional deposits for bulk supply.

3. It is essential that a government sponsored method of dealing with sacred sites and native title issues be pursued to allow small industries access to deposits and seek funding for ongoing development.

4. Access to development funds to assist in the brine resource is becoming critical to continued development and research. Resolution to the vexing question of tenure in the hands of explorers and developers is vital to future resource development funding.

5. N.T.E is considering a proposal to develop known Brine reserves. But require some assurance on tenure and will wait for N.T legislation on native title to be clarified before proceeding.

6. Exploration of the Calatta lake region is to continue east west from Mt kitty Dam region to locate Brine reserves and anticipated flow rates, For future pump testing and logging.
Other Matters

1. Indications of new markets for Sodium Sulphate are clouded by recent happenings in SE Asia. We may seek to look at other products as a supplementary industry ie. Schoenite for trace elements to Agricultural Fertiliser.

   An assessment of the Brine resource was reported by Lew Barnes, Chief Geologist. A copy is available for your information.

3. A report initiated by NTDM is attached in reference to 2

4. A report on ground water consultant services from Dames and Moore is also attached.


Ian Builder
NT Evaporites
Partner
EXPLORATION AND R&D

1ST JULY 1996 – 30TH JUNE 1997

Exploration Gypsum Sites 1,200
Working Gypsum deposit to sample 600
Drilling program 2 days, 2 men ifo Desert drill service 2,262
Support and sample services 350
Working Gypsum deposit stockpile 200 tonnes 1,200
Loading Roadtrain for Darwin 150
Travel – Darwin 900
Mechanical Repairs and plant check 150
Analysis samples 240
Fuel and repairs 350

7,402 7,402

Exploration Brine Resource
Survey of Brine Resources and 500
Trenching at Lake 64 2 days 600
Earthworks of Lake 64 2 days 300
Preparation of plans 170
Reports and Correspondence ifo Workzone 205
Sampling and Analysis 350
Fuel and Repairs 580
Plant, pumps and levellers 280
Piping and Hoses 380
Posts and Rails 400
Plastic and Shadecloth 120
Water drums and container 480
Meals and Accommodation 300
Equipment and Sundry 700
Travel consultant’s Adelaide 5,365 12,767

Administration costs for period 15,000
Accounting fees 1,100 16,100

Accounting costs for period 28,867

Ian Builder
NT Evaporites
Partner
INVOICE

DATE: 13 AUGUST 1997

TO: NORTHERN TERRITORY EVAPORITES
PO BOX 1165
ALICE SPRINGS NT 0871

Herewith please find invoice for work performed at Eulunda Station in accordance with requests from Site Representative - Ian Builder.

11/7/97 6.5 hours of aircore drilling @ $100 / hour $650.00
12/7/97 4 hours of aircore drilling @ $100 / hour $400.00
Mobilisation - 404 kms @ $3 / km $1,212.00

TOTAL $2,262.00

Paid 25/7/97
CR: 688.
MINERAL CHEMISTRY

Amdel Laboratories Ltd
A.C.N. 009 076 555
PO Box 338
Torrensville SA 5031

Gate 3 Osman Place
Thebarton SA 5031

Phone: (08) 8416 5300
Facsimile: (08) 8234 0321

DATE: 15/07/97

O: Mr I.H. Builder

COMPANY: N.T. Evaporites

AX NO: G9530490

ROM: G3090404

Our Ref: 7AD1720

YOUR REF:

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MESSAGE: FINAL RESULT'S FOLLOW

16/07 '97 WED 10:35 FAX +61 8 8234 0321

Amdel

ANALYTICAL REPORT

SAMPLE Cl

MIRABILITE 1 8.98%

MIRABILITE Sample from Extraction Process undertaken at Lake 64 (Third Flaga North) in June '97
NORTHERN TERRITORY EVAPORITES

PARTNERSHIP
EMILY ENTERPRISES PTY LTD
A.C.N. 009 641 927
NORVALE PTY LTD
A.C.N. 009 645 372

P.O. Box 1165
Alice Springs N.T. 0871
Telephone: (08) 895 34290
A.H: (08) 895 23686
Facsimile: (08) 895 30921

NORTHERN TERRITORY EVAPORITES JULY 1997
REPORT ON GYPSUM DEPOSIT
ERLDUNDA OLD AIRSTRIP

DRILLING PROGRAM

REFERENCE
Kulgera R.F. 1-250000 sheet number 87/3
133.12’east and 25.15’south

LOCATION
Approximately 2 kilometres west of Stuart Highway and 4 kilometres south from
Lasseter Highway turn off to Ayers Rock.

DESCRIPTION
Playa type area, vegetated with rising dunes east, west showing exposed gypsum.

DRILL HOLES
18 holes drilled to depth of from 4 metres to 6 metres by reverse air circulation with samples
taken at each metre of depth. Drilling stopped when clay deposit was reached, in all cases
except one hole, C3 which was drilled to 30 metres through clay from 5 metres. Water was
produced from this hole and stands at 3 metres.

Holes were drilled at approximately 200 metre intervals as shown on the attached sketches
showing site plan of drill pattern and elevation above the swelling clay basement encountered.

RESERVES
Estimated total gypsum reserves, clear of clay contamination is approximately 1.23 million cubic metres
available for extraction.
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<th>2 Metre</th>
<th>3 Metre</th>
<th>4 Metre</th>
<th>5 Metre</th>
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<td>GYP</td>
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**ANALYSIS**

Samples for assay have been submitted as grab samples over the depth of drill holes as follows:

A3 to 4 metres  
B2 to 3 metres  
B1 to 4 metres  
B4 to 4 metres  
B5 to 6 metres  
B6 to 4 metres  

Results are not yet to hand.
DEPT. PRIMARY INDUSTRY & FISHERIES
Berrimah Agricultural Research Centre
Chemistry Section

LABORATORY REPORT

Laboratory Job No : M97_0062
Project : Erldunda gypsum
Order Number : B. Kilgariff
Notes : Results on "dry basis" to Ian Builder. Samples screened with 2mm sieve. Oversize and undersize ground to < .5mm before analysis.

Report For : Northern Territory Evaporites
Contact : Ian Builder

<table>
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<th>Sample</th>
<th>Identification</th>
<th>Lab No</th>
<th>Ca</th>
<th>Gypsum</th>
<th>S</th>
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UNITS % % %
DET.LIM 0.02 0.5 0.02
SCHEMЕGYPSUM GYPSUM GYPSUM

Mr. V Kawaijenko Principal Chemist

Page 1 of 1

Date Received: 01/08/97
Date Completed: 11/08/97
Date Reported: 11/08/97

Erdunda Station, 
via Alice Springs N.T.

Attn: B. Kilgariff

Dear Bern,

Please find listed below the Grading Results achieved from the Gypsum sample obtained from your deposit on the 21/8/98.

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<th>Source</th>
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<tbody>
<tr>
<td>Sampled by</td>
<td>B. McRae</td>
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<tr>
<td>Sample No.</td>
<td>RM/130/98</td>
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<tr>
<td>Laboratory</td>
<td>Alice Springs</td>
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<tr>
<td>Test Date</td>
<td>25/8/98</td>
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<table>
<thead>
<tr>
<th>Sample Size</th>
<th>% Passing</th>
<th>% Retained</th>
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</thead>
<tbody>
<tr>
<td>4.75</td>
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<td>0</td>
</tr>
<tr>
<td>2.36</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>1.18</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>.600</td>
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<td>.150</td>
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<td>46</td>
</tr>
<tr>
<td>.075</td>
<td>28</td>
<td>72</td>
</tr>
</tbody>
</table>

This material was crushed up by hand in the Laboratory and as you can see is extremely fine. I have also performed another test on the material which will be indicative of the material as won and loaded on transport.
This would be indicative of the material as screened over on 8mm screen on the screening plant.

<table>
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<tr>
<th>Source</th>
<th>Erlinda Station</th>
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<tbody>
<tr>
<td>Sampled by</td>
<td>B. McRae</td>
</tr>
<tr>
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<td>RM/130/98</td>
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<tr>
<td>Sample Size</td>
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<table>
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<th>Sieve Size</th>
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<td>1.18</td>
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<td>.075</td>
<td>25</td>
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</table>

As you can see the material as screened and loaded into transport is slightly coarser than the material hand crushed in the Lab. This does however give you a good indication of particle size for your perspective clients.

Regards,
CSR READYMIX,

Brenton McRae,
AREA MANAGER ALICE SPRINGS
DEPARTMENT OF MINES AND ENERGY
RESOURCE DEVELOPMENT

DARWIN
Centrepoint Building, 40-50 Smith Street Mall
GPO Box 2901, Darwin NT 0801

FACSIMILE TRANSMISSION

TO:  IAN BUILDER  FROM:  MANAGER MINERAL DEVELOPMENTS

COPY:
FAX:  89 530921  PHONE:  (08) 8999 5429
DATE:  18 June 1998

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SUBJECT:  PAGE 1 OF 2

Ian
As discussed in our recent telephone conversations, I have arranged a meeting with Doctor Malcolm Cox at the Qld University of Technology in Brisbane at the end of this month. Malcolm is a hydrogeologist and lectures at the Uni. According to Peter Beier (NT Geological Survey) Malcolm is an expert in his field.

As we have agreed, the big question hanging over the Evaporites project is the question of sustainable brine flows which Arakel states, in all his reports, has still to be tested. This is where Malcolm can hopefully shed some light. The question is really what is supplying the playas. In terms of sustainability is it the deeper underlying aquifers that are the important source or is it the groundwater flows closer to the surface? What I am after from him, is advice on what would be the best program to put in place to find the answers to this question and of course, the bottom line, of how much such a program would cost.

The Department would then have to decide what is its next step in tying to assist the project.

I would like to give Malcolm as much information as I can possibly get so that he can gain a good first pass understanding of the project. As part of the reporting requirements of holding the Exploration Licences, NTEvaps was required to submit annual reports on its work program. The Department has 3 reports submitted by Arakel on behalf of NTE and these are on closed file. The reports are as follows:
- Annual Report for Exploration Licences EL 5689 and EL 5801, Kulgera 1:250,000 Map Sheet, Northern Territory - Report for March 1990 - March 1991 period by A.V. Arakel, April
1991. (Includes Additional Work carried out on EL 6509 since August 1990 and EL 7060 since November 1990).

These reports will be useful for Malcolm to read and your written permission to photocopy these and give to Malcolm is required. As well, I also have the following report that I photocopied in the expectation that David Lock would be providing comments;


If you have no objections I intend to give this to Malcolm as well.

Would you fax your written permission for me to provide Malcolm with these reports either tomorrow or early next week. I will be leaving for Brisbane Sunday week.

Regards,

GREG SCOTT

Confirmation allowing you to provide information in terms of publications mentioned above to be provided.

A condition is a requirement to complete the attachment of Agreement to contain the use of the information documents and to ensure the return of the paper material in due course to your department.

Signed at Alice Springs on 18/6/98 by

N.T. EUPORTES.
DEPT MINES AND ENERGY
DARWIN, N.T.

ATTENTION: Scott 8009 5191

RE: Hydrological Survey and Exploration - Resource Brines

Further to our discussion of 11/5/98, I am sending quote received on 6/5/98 from James v. Moore, Perth, for a groundwater brine assessment study consideration.

The purpose is to endeavour to locate the "modern" geologic areas where a hard brine flow may be tapped for long-term extraction at high volume. This would allow for brine resources to be conditioned within a suitable diurnal bed. As a reservoir back up to the shallow systems as are currently working with.

At the same time we require to confirm that a previous proposal collection of suitable sulphate brines at the Caralia sinus is surveyed and assessed to ensure that a resource capability is feasible for commercialisation of sodium sulphate.

Thanks for your ongoing interest.

[Signature]

Date: 11/5/98
Fax Sheet

To: Cena Oldfield
Company: Gorey Rome
Fax Number: 08 89 52 7017

From: George Domahidy
Date: 6-2-97
Subject: Proposal

No. of Pages: 6 including this cover

Dear Cena,

Attached please find a draft of our proposal. There are a few minor edits that will be corrected tomorrow.

Thanks,
George.

This facsimile transmission is intended for the persons named above. If you are not one of those persons we do not waive any privilege attaching to this facsimile transmission, and any disclosure or use of this transmission by you is prohibited. If you receive this transmission in error please notify the sender immediately and return the original transmission by mail.
6 February 1997

Gorey and Cole Drillers Pty Ltd
66 Smith Street
ALICE SPRINGS NT 0870

Attention: Mr Craig Oldfield, Manager

Dear Sir,

PROPOSAL
PROVISION OF GROUNDWATER CONSULTING SERVICES
ASSESSMENT OF BRINES - KARINGA CREEK
N.T. EVAPORATES

Thank you for your request for Dames & Moore to present a proposal to provide groundwater consulting services to assess the brines from the Karinga Creek drainage system.

1.0 INTRODUCTION

N.T. Evaporates (NTE) are proposing to extract salt chemicals from brine resources in the Karinga Creek drainage system located about 250km southwest of Alice Springs in the Northern Territory. NTE have secured Exploration Licences (EL’s) that cover a large portion of the drainage system. This drainage system includes salt lakes and previous investigations have identified the presence of large volumes of highly saline groundwater below the drainage. It is proposed to use the groundwater to produce a range of salt chemicals through use of natural energy.

It is proposed to conduct a drilling programme to assess the extent of the groundwater resource and to locate areas suitable for the development of test production bores.

Dames & Moore has been requested to provide cost estimates to undertake a data review, conduct a site inspection and select sites for drilling.

We would supervise the commencement of the drilling programme and assist in developing a logging and reporting code for future drilling.

Dames & Moore’s proposed Scope of Work, Personnel and Cost Estimate are outlined below.
2.0 SCOPE OF WORK

Dames & Moore will undertake the following tasks:

- review of available data, from sources such as Power and Water Authority (Alice Springs), Department of Mines and Energy and NTE records;
- conduct site visit;
- select sites for test drilling and supervise exploratory drilling;
- develop logging system and code with drillers to allow drilling programme to be monitored and managed from Perth;
- prepare a report presenting the results of the drilling and testing programme.

3.0 PERSONNEL

We propose that the study will be undertaken by Mr George Domahidy, Consultant-in-Charge, Geoscience and Environmental Engineering. Mr Domahidy is a hydrogeologist with 16 years experience, primarily in projects involving groundwater supplies and dewatering. He has previously worked on numerous projects in the Northern Territory and Western Australia assessing groundwater supplies from salt lake systems. Mr Domahidy's curriculum vitae is attached in Appendix A.

4.0 COST ESTIMATE

Dames & Moore proposes to undertake the study on a time and expense basis, in accordance with our Schedule of Charges and Agreement for the Provision of Consulting Services, copies of which are attached. The cost presented below are estimates, and we would expect the actual amount to be within ±10% of the estimated amount.

PROJECT MANAGEMENT, DATA REVIEW, SITE INSPECTION, DRILL SUPERVISION AND REPORTING

G. Domahidy, Consultant-in-Charge days @ $1,000/day 9,000.00

REBILLABLES

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Cost</th>
</tr>
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<tbody>
<tr>
<td>Air Travel</td>
<td>Perth - Alice Springs - Perth</td>
<td>1,078.00</td>
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<tr>
<td>Miscellaneous Expenses</td>
<td>(Minor Travel )</td>
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<td>Communication</td>
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<tr>
<td>Drafting and Support Staff</td>
<td>6 hours @ $55/hr</td>
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</tbody>
</table>

TOTAL ESTIMATED COST $10,559.00

This cost estimate assumes that the client will provide accommodation, meals and vehicles for travel to and from site.
We could commence the project within 7 days of receipt of formal authorisation.

Should you have any further queries or wish to discuss any aspects of our proposal, please do not hesitate to contact me.

Yours faithfully
DAMES & MOORE

G. Domahidy
Consultant-in-Charge
Geoscience & Environmental Engineering
AGREEMENT FOR THE PROVISION OF CONSULTING SERVICES

1. THE SERVICES

1.1 Dames & Moore shall provide to the Client the consulting services described in the attached Proposal for Consulting Services dated 6 February 1997 reference 37-97-038.

1.2 The Client shall provide to Dames & Moore a comprehensive briefing and all information, documents and other particulars concerning the Client's requirements for the project.

1.3 With the Client's prior approval, which approval shall not unreasonably be withheld, Dames & Moore may engage on the Client's behalf other expertise to assist Dames & Moore in specialist areas. The Client accepts responsibility for all monies reasonably payable for such other expertise.

2. FEES

2.1 The Client shall pay to Dames & Moore the Fees and the Reimbursable Expenses set out in the Proposal for Consulting Services.

2.2 Invoices will be issued as frequently as every four weeks and are payable upon receipt.

2.3 Interest of 1.5% per month (but not exceeding the maximum rate allowable by law) may be payable on any amounts unpaid after 30 days, payment thereafter to be applied first to accrued interest and then to the principal unpaid amount. Any legal fees or other costs incurred in collecting any amount unpaid after 30 days shall be paid by the Client.

COPYRIGHT

3.1 Copyright in all drawings, reports, specifications, bills of quantities, calculations, software and other documents ("the documentation") provided by Dames & Moore in connection with the project shall remain the property of Dames & Moore. However, provided Dames & Moore has been paid in full by the Client, the Client alone shall have a licence to use the documentation for the purpose of completion, operation and maintenance of the project, but the Client shall not use the documentation in connection with another project or for a purpose for which the documentation was not originally intended.

3.2 The supply of any documentation to the Client prior to full payment being made does not give rise to any implied licence for the Client to use that documentation. Any documentation made available by Dames & Moore prior to payment of its invoice(s) is made available for the sole purpose of being used as a basis for discussions with Dames & Moore and may not be disclosed in whole or in part to any other entity without the permission of Dames & Moore.

WARRANTY AND LIABILITY

4.1 In providing the services, Dames & Moore shall exercise the degree of skill, care and diligence normally exercised by its peers in the consulting profession at the time the services are rendered. No other warranty or representation, either expressed or implied, is included or intended in its proposals, contracts, or documentation.

4.2 Dames & Moore shall rectify at its cost any defect or omission in the services performed or required to be performed under this Agreement of which the Client gives written notice to Dames & Moore specifying the defect or omission within one year from the date of invoice for the final amount claimed by Dames & Moore for the particular services.

Otherwise but excepting other specific limits on liability herein the liability of Dames & Moore, whether under the law of contract, tort or otherwise, for any damage, loss, cost or expense of any nature ("damages") and whether or not caused by the negligence of Dames & Moore, its servants or agents and arising out of or incidental to the services performed or required to be performed under the Agreement shall not exceed an amount equal to the fee charged to the Client by Dames & Moore for the services giving rise to the damages up to a maximum of one million dollars and the Client shall and does release Dames & Moore from and indemnify Dames & Moore, its servants and agents against any such liability in excess of such limited liability, howsoever arising.

Before making any claim against Dames & Moore, its servants or agents in respect of any corrective action required in any works as a result of defects or omissions in the services performed or required to be performed under this Agreement, the Client shall give written notice to Dames & Moore specifying that part of these works requiring rectification and shall give Dames & Moore a reasonable opportunity to rectify or cause to be rectified that part of the works requiring corrective action. Without limiting any other provision of this Agreement, Dames & Moore shall be deemed to have been discharged from, and so accepts no liability for, and the Client shall and does indemnify Dames & Moore, its servants and agents against:

1. any claim for damages whatsoever which is made after the expiration of one year from the date of invoice for the amount claimed by Dames & Moore for the particular services from which the damages arise; and
2. any loss of profits or other indirect or consequential damages whatsoever arising out of or incidental to the services performed or required to be performed under this Agreement.
AGREEMENT FOR THE PROVISION OF CONSULTING SERVICES

4.3 Dames & Moore’s liability for injury or loss arising from any toxic, irritant, pollutant or waste gases, liquids, or solid material exposure resulting from Dames & Moore’s performance or non-performance of the services shall not exceed one million dollars. Similarly, any liability for injury or loss arising from radiation, nuclear reaction, or radioactive substances or conditions shall not exceed one hundred thousand dollars.

4.4 Dames & Moore’s comprehensive general and automotive liability shall not exceed two million dollars.

4.5 Increased liability limits may be negotiated upon the Client’s written request, prior to commencement of the services, and the Client’s agreement to pay an additional fee.

4.6 The Client agrees to defend, indemnify and hold Dames & Moore harmless from any claim, liability or defence costs in excess of the limits determined above for injury or loss sustained by any party from the exposures as described above and allegedly caused by Dames & Moore’s performance or non-performance of the services. In the event the Client makes a claim against Dames & Moore, at law or otherwise, for any alleged error, omission or other act arising out of the performance or non-performance of the services, and to the extent the Client fails to prove such claim, then the Client shall pay all costs, including legal fees, incurred by Dames & Moore in defending against the claim.

TERMINATION

5.1 The Client may terminate its obligations under this Agreement:

1. in the event of substantial breach by Dames & Moore of its obligations hereunder, which breach has not been remedied within 14 days of written notice from the Client specifying the breach and requiring the breach to be remedied, or

2. upon giving Dames & Moore 28 days written notice of its intention to do so, whereupon Dames & Moore shall be reimbursed for all services rendered including work in progress and all costs reasonably incurred as a result of such termination.

5.2 Dames & Moore may at its option suspend or terminate its obligations under this Agreement:

1. in the event of:
   (1) monies payable to Dames & Moore hereunder remaining unpaid for more than 30 days after being due for payment;
   (2) any other substantial breach by the Client of its obligations hereunder, which breach has not been remedied within 14 days of written notice from Dames & Moore specifying the breach and requiring the breach to be remedied, or

2. upon giving the Client 28 days written notice of its intention to do so.

DISPUTES

6.1 Should this Agreement fail to expressly address any particular issue which may arise in the professional relationship which exists between Dames & Moore and the Client as a result of the Agreement, then the provisions of the “Guideline Terms of Agreement between Client and Consulting Engineer for Professional Services” as published by the Association of Consulting Engineers Australia (ACEA) and which are current at the date of the Proposal for Consulting Services shall apply.

6.2 Any dispute between the Client and Dames & Moore shall first be the subject of mediation by a person nominated by the President for the time being of the Institution of Engineers Australia before either party may institute legal action.

6.3 This Agreement shall be governed by and interpreted according to the laws of the State in which the services or relevant parts of the services were performed and the parties submit to the jurisdiction of the Courts of that State.

[GNED by the parties hereto]

DAMES & MOORE PTY LTD (ACN 003 293 696)

[Signature]

G - FEB - 1997

Date

CLIENT NAME

[Name]

Duly Authorised Person)

[Signature]

[Title]

ACN

[Number]

Date

[Number]
8 April 1998

Mr I. Builder
NT EVAPORITES
PO Box 1165
ALICE SPRINGS NT 0871

Dear Ian

Thank you for your very complete briefing on the Eridunda Lakes evaporite project. Based on this briefing, and on discussions with officers of the Department of Mines and Energy, the following areas have been identified as requiring further work prior to undertaking a full feasibility study:

1) Resources evaluation. Sufficient work must be undertaken to ensure that groundwater and surface brines of suitability quality are available over the long term (at least 10 years). This work is critical to the future of the project.

2) Verification of the initial pilot plant study to confirm the proposed processing route. A large scale pilot plant study would be required to obtain sufficient and appropriate technical data.

3) Determination of both capital and operating costs. This can only be done when the processing route is determined.

4) Market surveys. Previous surveys must be updated particularly in light of the current crisis in Asian economies. Information on the market in Australia and New Zealand is confusing and to some extent contradictory. We are also aware that the glass industry is attempting to substitute soda ash and gypsum for sodium sulphate. If successful this replacement may have a significant impact on the size of the market in Australia.

Without doubt Item (1) relating to resource evaluation is the most important matter to be resolved as quickly as possible, certainly before any significant expenditure is incurred in other areas.

I consider that this resource assessment will require drilling relatively close spaced holes over an area of several square kilometres, monitoring the groundwater levels, and the groundwater and brine geochemistry over a period of time, possibly two years. Pump testing selected drillholes at regular intervals will also be required. The work would have to be supervised by a hydrogeologist with experience in groundwater geochemistry. NIML certainly has no experience in this area and we would have to engage Consultants.
It is estimated that this resource assessment work will cost in the order of $150,000 to $300,000 depending on the size of the area to be tested.

Given that the Development Group within NIML is fully committed to a number of major projects, both within Australia and overseas it has been decided that the company will not be involved in grass roots exploration for industrial minerals, and will only entertain investing in projects that have reached the feasibility and/or development stage.

Unfortunately this means that NIML must decline your invitation to invest in the Erlunda Lakes Evaporite Project, at this stage. However, we are prepared to review this decision if the project can be advanced to the feasibility stage.

As the NT Government is most anxious to develop mineral, and in particular industrial mineral, projects in the Territory I suggest that you approach the NTDME to assist with the resource assessment stage of the project. NTDME in collaboration with the Australian Government Survey Organisation, have considerable experience in groundwater assessment in Central Australia and should be able to provide experienced personnel to supervise the groundwater/brines assessment. Hopefully NTDME would also at least partially fund the drilling program.

NIML would appreciate being advised of progress on this project and receiving further reports if and when the resource assessment is completed.

I enclose a completed Confidentiality Agreement to cover information that you have previously supplied to NIML, and any data that you may provide in the future.

NIML wishes you well in your endeavours to advance this project and trust that we are given the opportunity to become involved if the project proceeds to development.

Thank you, and Bernie Kilgariff for your hospitality during my recent visit to Alice Springs.

Yours sincerely
NORMANDY INDUSTRIAL MINERALS LTD

LEW BARNES
CHIEF GEOLOGIST
Mr Ian Builder
NT Evaporites
PO Box 1165
ALICE SPRINGS NT 0871

Dear Ian

RE: EVAPORITES AND GYPSUM

As I advised you, I recently gave a presentation to senior officers of the Department on the history of the evaporites, what were the stumbling blocks, the current situation including market considerations on sodium sulphate and the scope of work proposed by Dr Malcolm Cox from the Queensland University of Technology for a hydrogeological study.

The aim of the presentation was to get some consensus of opinion as to where the project was heading and what assistance, if any, the Department could provide. The central issue was the $90,000 study proposed by Malcolm. The meeting discussed variations on this study in an effort to get the same result for less expenditure including doing some of the work in house.

However, it was felt that even if such a study were completed it would not be a guarantee of attracting the joint venture interest which is vital to the development of the project.

This was supported by the high risk factor associated with the sodium sulphate market, the principal product on which the project economics is based. My view is that the market is small in Australia, there is the competitive factors of large overseas producers already supplying the Australian market, synthetic producers of sodium sulphate (by-product of some industrial processes such as the manufacture of rayon) upgrading to meet the specifications for the detergent market and the alternative products not requiring sodium sulphate as a filler such as the concentrated and liquid...
detergents. The potential is there for an over supply situation to exist in the market and downward pressure on prices.

Taking all this into consideration the decision taken at the presentation was that the Department could not justify expenditure on further studies given it has other priorities for its limited human and financial resources.

The Reserve and the Authority granted to NT Evaporites is to remain to enable you and Bern to continue with the testing and exploration and efforts to attract outside capital if you wish to do so. NT Evaporites will have to renew the Authority, as it would normally have to do when renewal becomes due.

I have attached the scope of work envisaged by Malcolm Cox for a hydrogeological study for your information. I think it provides a useful second opinion to assist you and Bern in your deliberations regarding the future of the evaporites project.

In regard to the gypsum, Bob Adams and myself met with Terry Morato and Stewart Hagan from Burdekin Lime and discussed their interests. It is clear that any developments apart from resource assessment, which is already permitted, will require grant of a mining tenement.

Grant of a mining tenement requires the procedures of the Native Title Act to be followed; this is either the existing right-to-negotiate procedure or the alternative Territory procedure for the grant of mining interests over pastoral lease land over which native title may exist. The alternative Territory procedure is yet to be approved by the Commonwealth Attorney General and it could be a considerable time before the procedure can be utilised.

While grant of tenure pursuant to the right-to-negotiate procedures of the Native Title Act requires the endorsement of the Chief Minister for the Territory to be involved, you may care to consider following that pathway to expedite grant of a title.

Terry and Stewart were advised that these were the options that exist.

If you have any questions please do not hesitate to call me.

Yours sincerely

GREG SCOTT
MANAGER MINERAL DEVELOPMENTS

3 November 1998

cc Bern Kilgariff
COMMENTS AND ASSESSMENT
NT EVAPORITE PROJECT

Dr Malcolm E Cox
School of Natural Resource Sciences
Queensland University of Technology
Brisbane

Background

I was approached by Mr Greg Scott of the economic projects unit of the Mines and Energy Department of NT in regard to the evaporite deposits and brines of the Curtain Springs-Karinga Creek drainage system. This system is in south-central NT near the SA border and has been held under several Exploration Licences for a number of years.

A substantial amount of money has been spent on testing aspects of these systems, notably the evaporite deposits themselves, and on experiments evaporating the minerals form the brines themselves. The economic and marketing aspect was also considered. The NT M & E Department is currently interested in the possibility of removing sodium sulphate (Na SO4) from the system, for commercial sale.

After examining the various reports on previous work M & E NT concluded that the hydrology of the system is still not well understood, and approached me for some comment on this, and a possible staged scheme of assessment.

Following are comments on previous work, a view of the current status of the project, and comments on a hydrological investigation. Two factors need to be considered,

(a) the enclosed comments are a personal view,

(b) this assessment does not include or consider the feasibility of extracting salts or the market potential,

(c) I have not been to this field location.

Material Examined

Copies of a number of reports on activities on the EL's were made available to me and were examined:

1988 - 1989, annual report, A.V. Arakel

I conducted a brief literature research, plus used my own references, and located the following
publications which I have quickly inspected:


1989. Hydrogeology and groundwater resources of the Lake Amadeus Basin and Ayers Rock region, NT. BMR report 230 (Jacobson, McDonald, Jankowski)


Assessment of Activities on EL’s from Reports

These reports tend to focus very much on the playa lake system itself, the evaporite material, the particular salt minerals, and the chemistry of the water in the lakes. I conclude the following of these reports:

(a) they focus specifically on the lakes, for which a large data set of in situ physico-chemical measurement has been made (i.e. conductivity, pH, Eh, temperature), and detailed mapping of lakes.

(b) a very large number of surface samples and shallow core (typically 1.5 m) samples were collected and analyses by methods such as XRD (X-ray diffraction).

(c) a large number of water samples (small and bulk) were collected form the lakes. Small samples were laboratory analysed for water chemistry; large sample were used in evaporation / salt extraction experiments.

(d) there is one table of water chemistry for some groundwaters of the broader region.

(e) most of the information on geology, geomorphology, drainage systems, and hydrogeology is based on the various other publications available. This type of information in the EL reports is very generalised and virtually the same in each report.

(f) there is a certain amount on the salt extraction methods / techniques but again very generalised, and brief. These sections do not appear to discuss the many problems which did occur (which has been confirmed by QUT staff who were involved).
(g) some reports contain a certain amount of information about, and comment on the economic viability, and markets for the salt products. I found this very generalised and unclear.

**Comment on Type of Work Done**

The aim of the work presumably has been to determine if certain salts can be extracted from these systems. Specifically this would be from the brines themselves. Consequently, I am a bit confused as to why so much focus and very detailed investigations were put into the playa lakes and the existing deposits. This also involved a substantial expenditure. As I do not follow the relevance of calculating the existing volumes of salts, as these are not going to be mined (?)

Water, specifically groundwater, is the mineral carrying medium from which the salt would be extracted. Therefore, the occurrence of the water should be understood.

What was not developed in the investigations was any real development of understanding the hydrological system, which must include the following:
- geology
- geomorphology
- surface drainage system
- hydrogeology (i.e. groundwater recharge, migration, bodies, discharge)
- groundwater chemistry
- groundwater isotope chemistry

The published papers provide outcomes of some extremely good hydrogeological studies in the general region, however, they are mostly too far to the west (Ayers Rock to Curtin Springs), or too far north (Alice Springs), or only of superficial extent in the area of the EL’s.

In summary, the hydrogeology of the area of the basin from Curtin Springs east to the Eridunda - Stuart Highway has not been investigated in any detail. This area should include the ranges to both the south and to the north.

**Is Further Work Warranted**

A fundamental question is whether mineral salts can be effectively extracted, and which salt. As I understand the current situation,

(a) NaSO₄ is the target salt as there is a ready market for it,

(b) the lease-holders consider that they can effectively extract this salt.

On this basis, I would then consider that a hydrogeological study on the basin is warranted. This study would be to establish a knowlegde of the groundwater regime, from the aspect of both hydrochemistry and hydrology (flow). The aim would then be to develop a groundwater model for the area. Such as model should have two components (a) conceptual, and (b) numerical. The conceptual model would be based on a series of north-south cross-sections.

Examination of the topographic maps provided shows that there exists a large numer of
groundwater bores and wells each side on Karinga Creek: north (Mt Ebenezer Range - Mt Sunday Range) and south (Musgrave Range ? in the border zone). These should all best tested and selected ones water sampled, and analysed. Actual field-based geological mapping should be done (or confirmed), with a view to water movement.

Some fundamental aspects to confirm:

• where does the groundwater recharge

• what are the flow paths

• how many levels, or bodies, of groundwater are there, do they mix anywhere (there may be three levels, including a deep one)

• the role of geology on groundwater movement (important are the sandstones, and the karstic nature of some calcrites)

• depth to shallow water table; is deeper groundwater under some artesian head

• what is the salinity (plus pH and temperature) of different groundwaters

• what is the chemical composition of the different groundwaters, and what is the form and sclae of the chemical evolution of the groundwaters along flow paths

• idea of the age of the different waters

Concept of Approach

The water in the playa lakes are the brines that are the end products of migration and evaporation. Those water are often hyper-saline, and of Na-CI character. These may not be the optimum watres to be considered. It would appear that within the basin as a whole, groundwaters with a dominant chemistry of Na-SO4 are intermediate along the migration path, and so may occur back from the actual playas. These water are also of lower salinity, plus may be accessed on better ground, and outside the hostile playa environment. The development of a hydrogeological model will enable determination with the groundwater system where these waters would likely occur.

Such a preliminary study could be done without drilling. Major costs would be chemical and isotope analyses. The outcome would then provide enough information to decide what the next step would be, and whether further expenditure is warranted. The next step could include drilling. This stage may need to consider, depth to the groundwater body, type and size of drillhole, will drillholes block from salt deposits, effects of corrosion etc.

QUT Involvement in Investigation

Following the above comments, the School of Natural Resources, QUT, could develop the hydrogeological study as post-graduate research, and I would be willing to act in the role of supervisor. A budget would need to be available to provide a scholarship, plus cover field and analytical expenses. (I believe that some tax break (100% ?) is available for research
support).

My belief is that the best approach would be to develop a MAppSc or PhD program around the investigation. My preference would be for a 3 year PhD program. The investigation can therefore be approached in stages.

Stage I: Data base compilation
   Part A: compile and organise all available data, from all likely sources
   1. topography / drainage
   2. geology
   3. surface water physico-chemical
   4. surface water chemical analyses
   5. groundwater bores/wells - bore data, water level data
   6. groundwater bores/wells - chemical analyses

   Part B: Data reduction
   develop maps of data, preliminary groundwater contours
   data at this stage should be organised in a format that enables a GIS approach
   preliminary interpretation of groundwater geochemistry
   incorporate geological logs of deep water bores, if available
   incorporate information in the published investigations (e.g. BMR/AGSO)
   obtain any suitable remote sensing data (e.g. satellite imaging)

Stage II: Field program
   field visit to area
   confirm geological data base information (add as needed)
   sampling of water bores as required, for further water chemistry, plus stable isotope
   samples, and sample for water dating
   groundwater measurements on water bores
   in-fill / confirmation field geological mapping
   laboratory chemical analyses

Stage III: Modelling
   develop all data into GIS format
   add data to groundwater model using MODFLOW
   mineral solubility modelling using water analyses
   develop hydrochemical model of groundwater
   develop conclusions of hydrogeological system and water chemistry
   identify potential test drill sites

   at this time a decision would need to be made whether funds should be put into drilling,
   and a Stage IV developed.

Research program budget outline
   Stage I
   PhD scholarship 17,500
   scientific supervisor 2,500
   purchase maps, data 3,500
   computer 2,500
   total: 26,000

Stage II
PhD scholarship 17,500
scientific supervisor 2,500
travel/accom (2 persons) 5,820
water chemistry/isotopes 12,000
rock/mineral analysis 2,700
    total: 40,520

Stage III
PhD scholarship 17,500
scientific supervisor 2,500
computer software 1,350
travel/accom (1 person) 1,250
(to Darwin to present results) 750
miscellaneous / reporting 750
    total: 23,350

Total: $89,870

Investigations and Funding

The EL report for the year 1990/1991, for the 4 EL's lists the expenditure for that year as follows

    R & D  126,673
    Exploration  148,227

Total: $274,900

No data is provided for expenditure for the 1988/1989 and 1989/1990 periods, but it is reasonable to assume a similar order. A proposal is included for 1991/1992 of $215,000 (but funds were apparently not made available).

Estimated total for 3 year PhD research program: $89,870