




**SEDIMENTARY URANIUM:
HOW IT WAS FIRST DISCOVERED IN THE FROME
EMBAYMENT**

**5th Sprigg Symposium
“Regolith: Mineral Deposits & Environment”**

**Presentation
by
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“On the flanking Lake Frome Plains, drilling by Petromin NL, Exoil N.L. and Transoil N.L. has established the presence of uranium and radon gas in what is now regarded as a new sedimentary uranium province”

Annual Report SA Department of Mines 1969-1970



Questions to ask

What happened at this time to bring about this new discovery?

What favourable events took place? Were they commercial, economic, bureaucratic, scientific or coincidental?

What new geological understanding was gained?

Were there any new technologies involved?



Early time line

Uranium discovery in SA

- 1890 First record of Uranium in South Australia
- 1905 D. Mawson notes presence of sedimentary uranium in US, but suggests exploration in “granite country” in Australia
- 1906 Uranium/Copper association in Moonta mine
- 1906 Uranium rush to Radium Hill
- 1910 Uranium exploration boom at Mt Painter



Early time line Uranium in SA

- 1929 E. de Hautpick raises possibility of sedimentary uranium in SA and publishes a pamphlet promoting its potential.
- 1944 Mineral Chemist R.G. Thomas suggests sedimentary uranium potential in Frome Embayment.
- 1948 R.C. Sprigg visits sedimentary uranium deposits in US.
- 1953 S.B. Dickinson attends US sedimentary uranium symposium and visits US mines.
- 1954 A.W.G. Whittle considers all SA uranium to be formed by late stage igneous phenomenon associated with granites.
- 1954-1961 Operation of Radium Hill mine

Why search for sedimentary uranium in the 1960s?

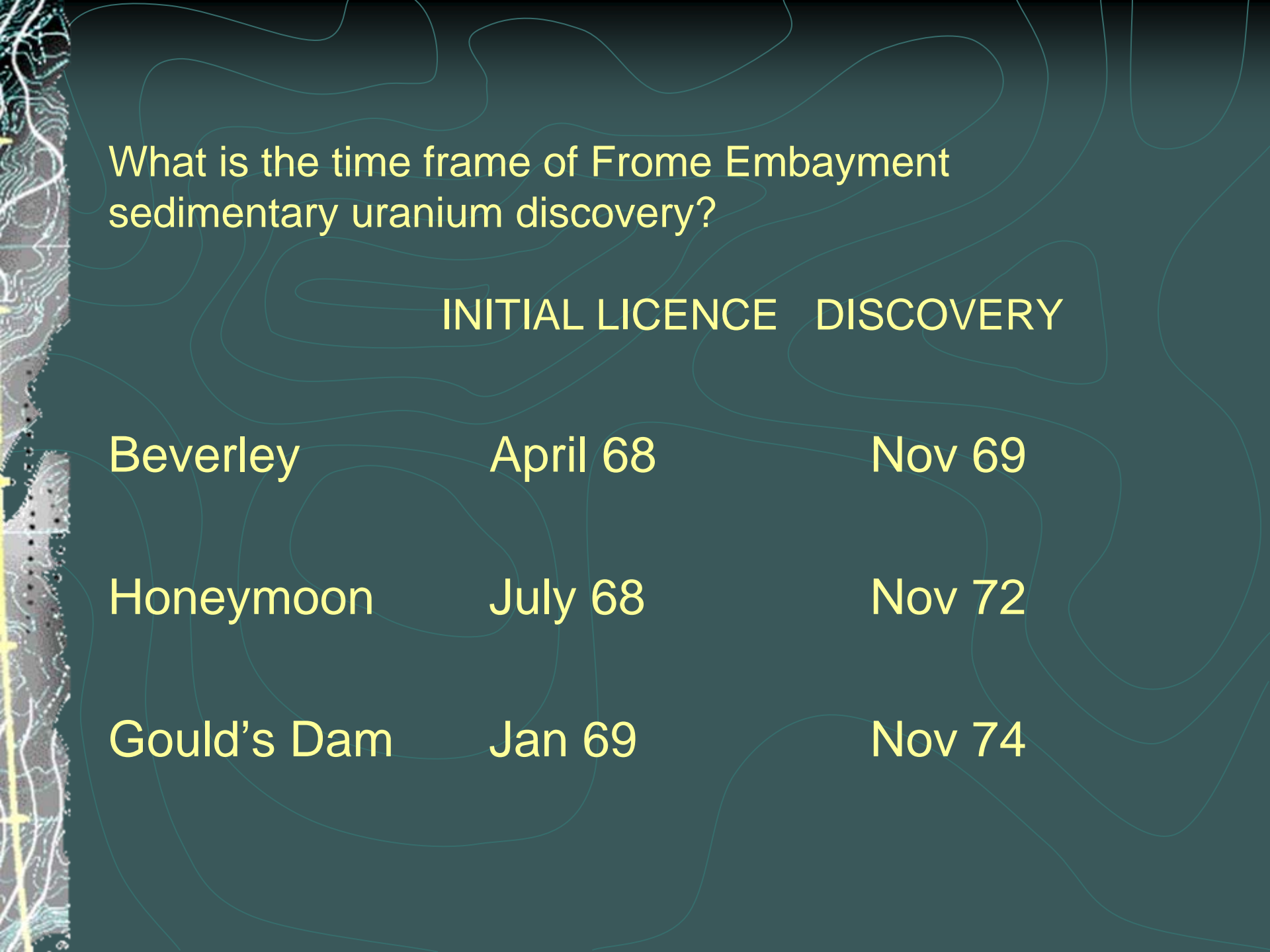
- Commercial opportunity for nuclear power generation from 1966.
- Commonwealth export controls relaxed in early 1967.
- Nickel Boom developing (1969-1970)
- US sedimentary U companies had SA interest from 1967.
- US visits by SA geologists from 1967-1968
- Exploration techniques improving eg down hole logging
- Rapid success (Beverley 1969)



Time line

Sedimentary Uranium in SA

- 1967 Kerr McGee Corporation starts exploring for sedimentary uranium on Eyre Peninsula.
- 1968 Petromin and Kerr McGee start sedimentary uranium exploration in Frome Embayment.
- 1969 Discovery of Beverley deposit
- 1972 Discovery of Honeymoon deposit
- 1974 Discovery of Gould's Dam deposits



What is the time frame of Frome Embayment
sedimentary uranium discovery?

	INITIAL LICENCE	DISCOVERY
Beverley	April 68	Nov 69
Honeymoon	July 68	Nov 72
Gould's Dam	Jan 69	Nov 74



Kerr McGee

(US based and first sedimentary uranium explorer in SA)

Exploration approach

Eyre Peninsula (August 1967 – March 1969)

Aerial radiometric surveys (November – December 1967)

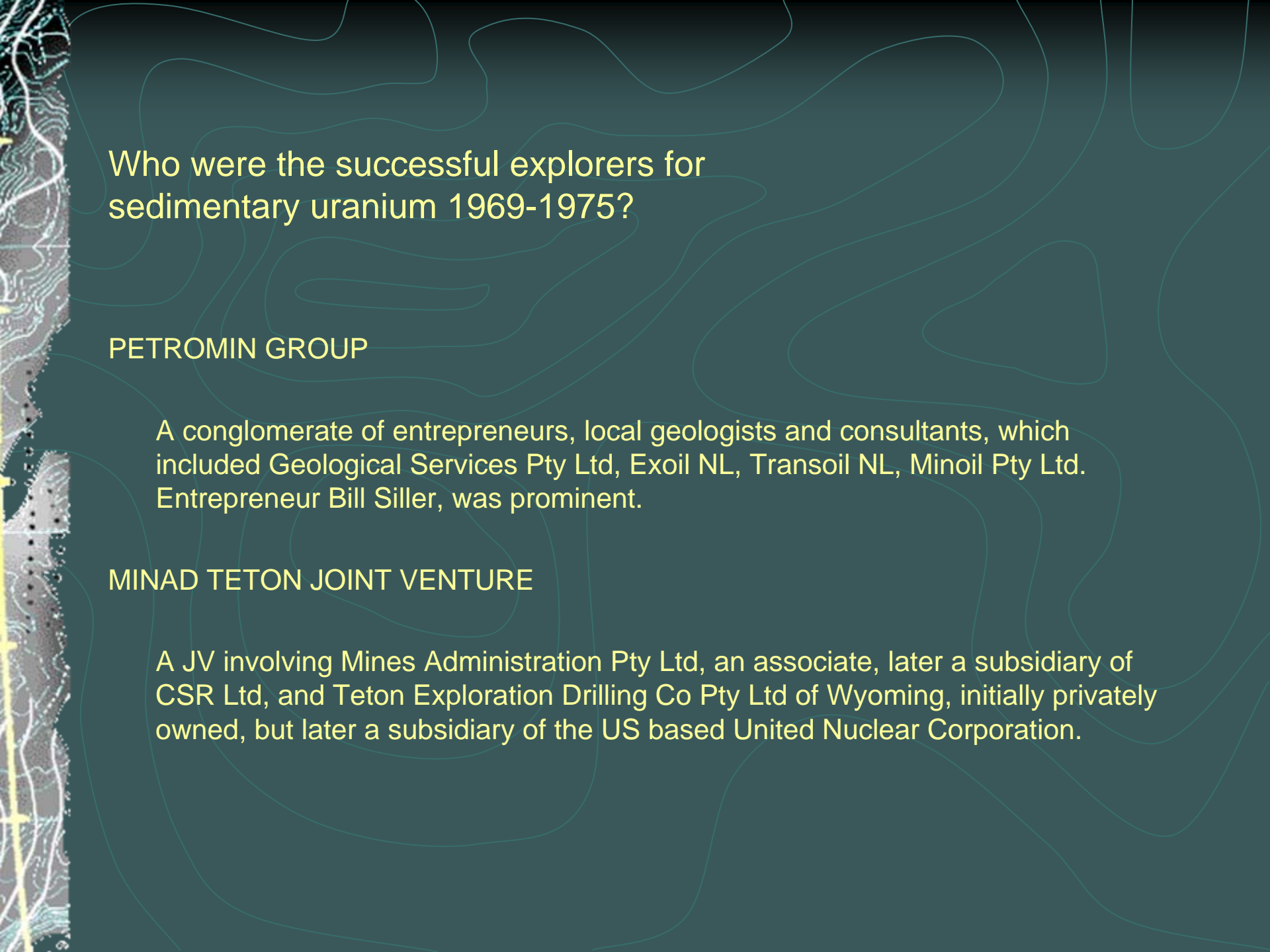
Field mapping and ground check of anomalies

Non cored rotary drilling programme (72 holes) of Cenozoic relying primarily on down hole gamma, resistivity and self potential logs (July – August September 1968)

Frome Embayment (July 1968-July 1969)

Aerial radiometric surveys.

Non core rotary drilling (9 holes) of Quaternary and Mesozoic succession north of the Beverley licence areas



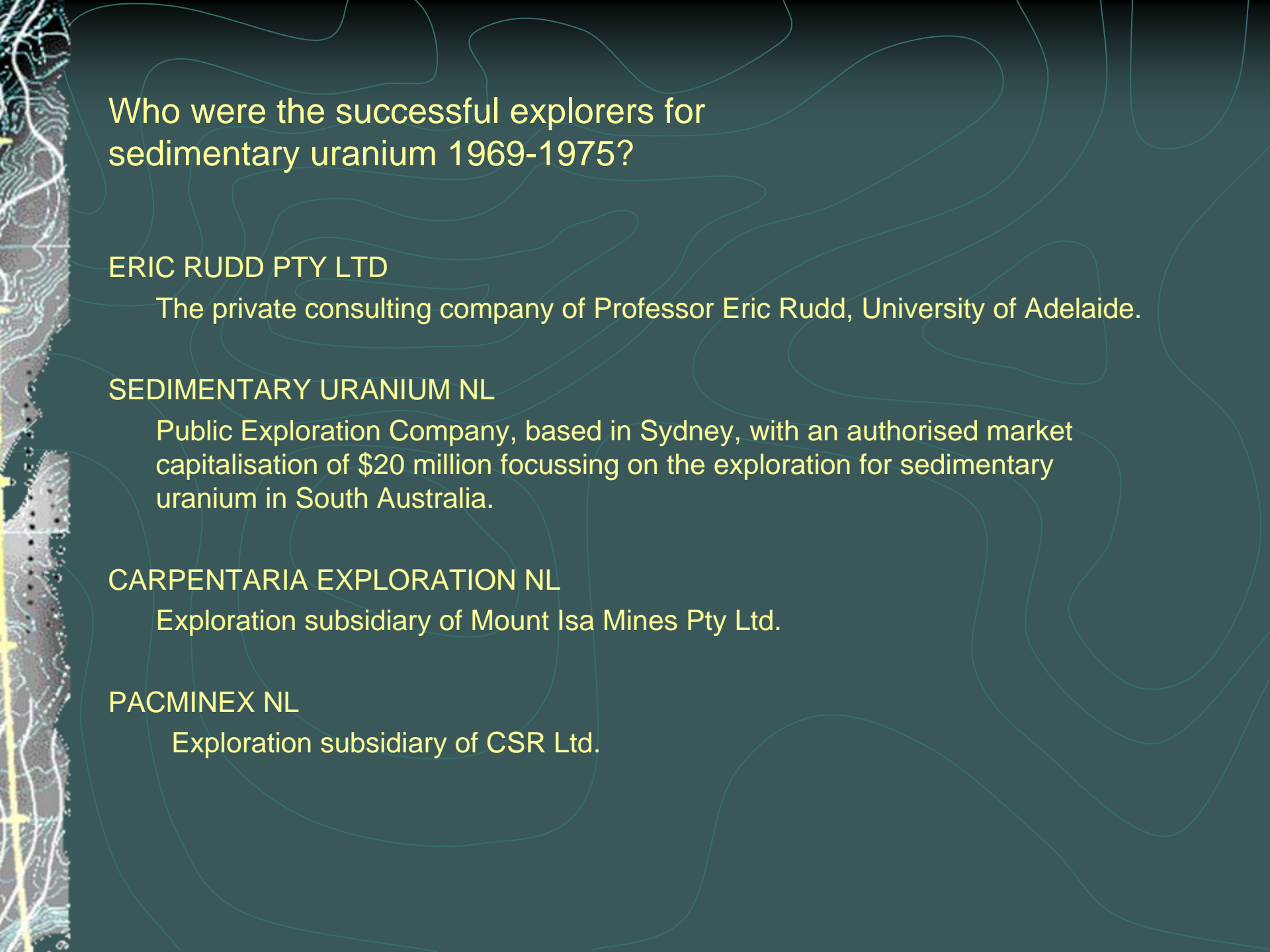
Who were the successful explorers for sedimentary uranium 1969-1975?

PETROMIN GROUP

A conglomerate of entrepreneurs, local geologists and consultants, which included Geological Services Pty Ltd, Exoil NL, Transoil NL, Minoil Pty Ltd. Entrepreneur Bill Siller, was prominent.

MINAD TETON JOINT VENTURE

A JV involving Mines Administration Pty Ltd, an associate, later a subsidiary of CSR Ltd, and Teton Exploration Drilling Co Pty Ltd of Wyoming, initially privately owned, but later a subsidiary of the US based United Nuclear Corporation.



Who were the successful explorers for sedimentary uranium 1969-1975?

ERIC RUDD PTY LTD

The private consulting company of Professor Eric Rudd, University of Adelaide.

SEDIMENTARY URANIUM NL

Public Exploration Company, based in Sydney, with an authorised market capitalisation of \$20 million focussing on the exploration for sedimentary uranium in South Australia.

CARPENTARIA EXPLORATION NL

Exploration subsidiary of Mount Isa Mines Pty Ltd.

PACMINEX NL

Exploration subsidiary of CSR Ltd.



Beverley Discovery

- April 1968 First exploration licence over Frome Embayment by Petromin Group adjacent Mt Painter block
- September/
October 1968 Additional exploration acreage obtained by Petromin Group
- October 1968 Aerial Scintillometer Survey shows anomalies along modern watercourses
- February/
June 1969 Reconnaissance drilling found anomalous uranium
- November 1969 First hole “closer to range” intersects Beverley deposit



Honeymoon Discovery

- July 1968 Carpentaria Exploration takes out Exploration Licence on and adjacent Olary region. Initial focus on basement rocks.
- August 1969 Anomalous uranium in groundwater from water wells. Aerial anomalies also determined along drainage system.
- End 1971 Carpentaria determination of South Eagle prospect.
- September 1972 Carpentaria Joint Venture with Minad-Teton JV
- November 1972 Minad JV discovers Honeymoon resource noting that alteration characteristics, radioactivity and sandstone thickness in a buried paleochannel as critical indicators
- September 1973 Minad / Carpentaria JV with Sedimentary Uranium NL in adjacent Exploration Licence
- September 1974 Detailed report on Honeymoon resource by all JV partners.



Gould's Dam Discovery First Stage

- | | |
|----------------|---|
| January 1969 | Eric Rudd Pty Ltd takes out Exploration Licence. |
| Jan- June 1969 | Examination of extant water well records.

Collection of new water well samples for radioactivity testing.

Re-examination of existing petroleum aeromagnetic surveys, tentative determination of paleochannels.

Examination of existing holes for lignite and evaporites. |
| Late 1969 | Ten Hole drilling programme, close to mineralisation. |
| February 1970 | Exploring for 'fronts' in the sands between oxidised and unoxidised areas. |
| Mid 1970 | Anomalous uranium bearing sediments determined |



Gould's Dam Discovery - Second Stage

- February 1971 Exploration Licence taken out over same area by Pacminex with Rudd maintaining an interest and acting as consultant.
- Rest of 1971 Experimental geophysical surveys including gravity, resistivity and magnetics by Government together with additional low level magnetics and scintillometer survey
- February 1972 Paleodrainage determined
- September 1972 Farm in by Esso Minerals
- January 1973 Completion of 53 hole drilling program by Esso without success. Withdrawal from JV.
- February 1973 Pacminex report anomalous uranium
- November 1973 Minad-Teton JV
- November 1974 Discovery of Gould's Dam deposits

A vertical strip on the left side of the slide shows a topographic map with contour lines and a yellow vertical line. The map is partially cut off on the left edge.

Role of Government

- Ongoing interest in Uranium eg Bulletin on Mt Painter 1971
- Report on water resources in Frome Embayment 1965
- Subsequent contribution of staff to exploration
- Field Mapping 1970-1990
- Stratigraphic Drilling 1972 with follow-up stratigraphic base.
- Associated age determinations via palynology from 1973.
- Experimental ground geophysical surveys 1971
- Environmental assessment
- Stored data



What were the successful ingredients of sedimentary uranium exploration 1968-1975?

- Supporting regulatory regime
- Rapidly established US links providing technical, financial and market support
- A mix of large companies, new companies, associated consultants
- Inspiration from universities viz Professor Eric Rudd
- Experienced locally based geologists
- Joint ventures including up to 4 separate parties
- Close liaison with State Government, which provided regional mapping, drilling, experimental geophysics etc
- Availability of risk capital often from companies associated with petroleum
- Persistence and Luck