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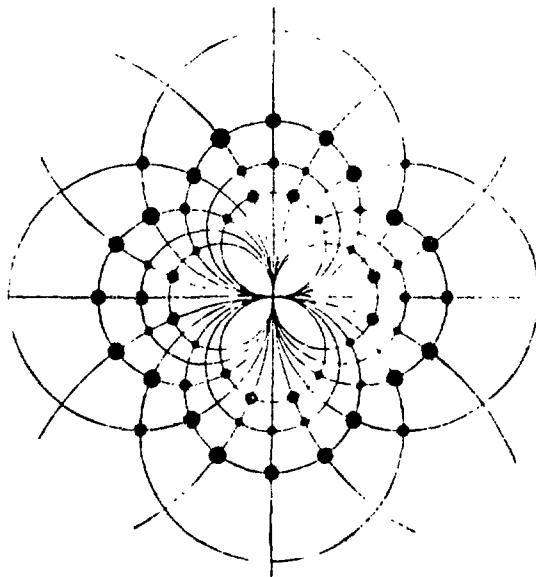
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URANIUM DEPOSITS OF AUSTRALIA TO 1975

Compiled by S. Spannari



Canberra, 1979

## INTRODUCTION

The purpose of this bibliography is to fill a present gap in the existing bibliographies and uranium information services in Australia prior to 1975. Since then the Australian Earth Science Information Service (AESIS) has begun to produce bibliographies covering both published and unpublished Australian materials.

Hence, this bibliography is intended for the students and the practicing geologists interested in retrospective accounts of Australian uranium deposits, particularly the unpublished materials in the Australian Capital Territory.

The confidentiality and inaccessability of some of the unpublished uranium information meant a more selective coverage than was intended. Nevertheless, the references included will be useful in assessing the geological aspects of the areas covered and hopefully assist in further exploration efforts, particularly of vein unconformity type uranium deposits. Some abstracts are included to add value to the references.

### Scope/Content

1. All types of material are included.
2. All uranium provinces are covered to 1975.
3. Included are descriptions of occurrences, mineralogy, ore genesis, structural controls, economic geology of uranium deposits.
4. Excluded are
  - a. Mining and metallurgy of uranium.
  - b. Exploration reports, e.g. company reports.
  - c. Surveys, preliminary investigations, e.g. seismic, radiometric, geochemical surveys.
  - d. Environmental aspects of uranium.
  - e. Controversial materials.

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Selection criteria/Limitations

- Deposits of economic interest at the time were selected by their content, illustrations of ore bodies, maps and bibliographies. Heavy emphasis has been made on Northern Territory and Queensland uranium deposits, where the early exploration activities were carried out by the BMR.

Indexing/Abstracting Tools used.

The following bibliographic aids were consulted.

- Australian Science Index
- Australian Public Affairs Information Service
- Australian National Bibliography
- Bibliography and Index of Geology
- Geotitles Weekly
- Engineering Index
- Australian Earth Science Information Service

Also the Bureau of Mineral Resources, Library, Canberra catalogues and internal lists were used.

Supplementary Reading

Australian Bureau of Mineral Resources, Geology and Geophysics Library. Bibliography no. 4: Uranium in Australia, 1975-78.

GENERAL

- (1) DODSON, R.G., 1972. Some environments of formation of uranium deposits in Uranium Prospecting Handbook, edited by S. Bowie. London, Institute of Mining and Metallurgy, p. 33-46. 622.349.5  
URA
- discusses regional distribution of uranium in Australia, such as conglomerate and sandstone type deposits with account and description of each province. Also discusses ore genesis e.g. Alligator Rivers Region suggests syngenetic origin dependant on leaching of U from massive source with subsequent deposition in suitable environment and deposition from mineralized solutions introduced by igneous activity is considered.
- (2) INGRAM, J.A., 1974. Uranium deposits. Canberra, Australian Government Publishing Service, 1974. S55  
AU  
(Bureau of Mineral Resources: Mineral Resources Report, 6). Bibliography: p. 43-52.
- describes all uranium deposits in Australia arranged by type e.g. Non-Stratabound deposits. Subarranged by prospects name (known) badly set out without contents page or an index - 128 references given.  
Useful if prospects, fields, deposits known by their name.
- (2a) RADE, J.A., 1959. Structural control of uranium mineralization in Australia. Geological Magazine v. 96, no. 3, p. 177-190. S551(410)  
GEO
- Structure is the chief factor controlling location of uranium mineralization, both locally and regionally, e.g. N-E faults, shearing along anticlines, and extensive shattering. Uranium is formed in late hydrothermal phase - fills open fissures and is closely associated with structural environment that facilitates this type of deposition - important for future prospecting - and understanding uranium ore genesis.

- (3) RICH, R.A., 1975. Vein-type uranium deposits. S53.495  
 Colorado, Energy Research and Development RIC  
 Administration, chapters 2, 6 and p. 253-269.
- good chapters on the distribution of uranium in igneous, sedimentary and metamorphic rocks etc. ch.2 on characteristics of vein type uranium deposits i.e. geological setting, age of deposits, mineralogy vein paragenesis, wall rock alteration, etc. ch.6 on origin of vein type deposits and a description of Australian uranium deposits with a list of Australian references.
- (4) Metallogenic map of Australia and Papua New Guinea Map sales  
 1:500,000. Canberra, Bureau of Mineral Resources, only.  
 Geology and Geophysics, 1972.
- shows uranium metallogenic provinces -

NEW SOUTH WALES

- (6) WILLIS, J.L., 1974. Uranium, by J.L. Willis and B.P.J. S551(944)  
 Stevens. Sydney, Department of Mines. (New South NEW  
 Wales. Geological Survey. Mineral industry of  
 N.S.W., 43).
- mode of occurrence, deposits in New South Wales - a descriptive, general characteristics and associations.
  - includes a selected bibliography.

NORTHERN TERRITORY

- (8) BERKMAN, D.A., 1968. The geology of the Rum Jungle uranium deposits in Symposium on Uranium in Australia, Australasian Institute of Mining and Metallurgy, Rum Jungle, N.T., Papers. Darwin, 1968, p. 32-44. 622.34.5  
 SYM
- deposits occur in, or near black pyritic slates of the Lower Proterozoic Golden Pyke Formation, near the contact with underlying Coomalie Dolomite. Mineralization probably younger than granitic complexes in the area and structural-stratigraphic control of ore deposition is used as a basis for uranium exploration. Also minor prospects and ore genesis discussed.

- (9) CONDON, M.A., 1955. Sedimentary environment as a control of uranium mineralization in the Katherine-Darwin Region, Northern Territory. Canberra, Aust. Govt. Print. Office. (Australia. Bureau of Mineral Resources, Geology and Geophysics, Report 24). S55  
AUS
- the empirical relationship between uranium mineralization and silicified limestone breccia important in directing prospecting and increasing rate of discovery. Indications of syngenetic uranium mineralization; precipitation of uranium and other metallic ions postulated where physical properties of sea water most likely to change rapidly and where plankton likely to concentrate. Significance of concentrations from solutions in other geosynclines.
- (10) CROHN, P.W., 1968. The mines and mineral deposits of Katherine-Darwin Region. Canberra, Aust. Govt. Print. Off. (Australia. Bureau of Mineral Resources, Geology and Geophysics, Bulletin 82). S55  
AUS
- comprehensive descriptions of uranium deposits with an extensive bibliography, p. 249-272 of published, unpublished references, and maps (1 mile geological series). Standard 1:250,000 maps listed under authors of their explanatory notes. Four maps included altogether.
- (11) HEIER, K.S., 1966. Thorium, uranium and potassium concentrations in granites and gneisses of the Rum Jungle Complex, Northern Territory, Australia. Economic Geology, v. 61, pt. 1, p. 563-571. S553  
ECO
- concentrations 10.3 ppm U, 45.7 ppm Th which is more than twice average concentration in granites. High concentration of Th, U also in younger granites within the areas. Also discusses the ore genesis and their occurrences as detrital Thorianite in conglomerate layers within sediments especially to South of Rum Jungle Complex.

- (13) NEEDHAM, R.S., 1974. The reinterpretation of the geology of the Alligator Rivers Uranium Field, Northern Territory. *Search*, v. 5, p. 397-399. S5(94)  
SEA
- discusses new understanding of ore genesis as a model for greater mineral potential.
- (14) NEWTON, H.J., 1958.\* The occurrence of uranium in the Milestone Authority to prospect, Wollogorang District, Northern Territory in Australasian Institute of Mining and Metallurgy. Stillwell Anniversary volume, Dec. 1958, Melbourne, p. 177-188.
- describes mode, genesis, occurrence of province of dispersed uranium mineralization in Upper Proterozoic Rocks.
- (15) NOAKES, L.C., 1949. The geological reconnaissance of the Katherine Darwin Region, Northern Territory, with notes on the mineral deposits. Canberra, Aust. Govt. Print. Office. (Australia. Bureau of Mineral Resources, Geology and Geophysics, Bulletin 16). S55  
AUS
- geological investigation report, account of stratigraphy of rocks and a summary of economic geology.
- (16) PRITCHARD, C.E., 1965. Uranium ore deposits of the South Alligator River in McAndrew, J., ed. Geology of Australian Ore Deposits, 2nd ed., 8th Commonwealth Mining and Metallurgy Congress, Melbourne, v. 1, p. 207-209. S622  
COM
- geology and mineralization.
- (17) RADE, J.A., 1971. Uranium deposits of Westmoreland and Arnhem Land. Australian Mining, v. 63, p. 62-64. S622(94)  
AUS
- geology and ore genesis and mineralization over-estimated.



- (18) RHODES, J.M., 1965. Geological relationships of the Rum Jungle, Northern Territory. Canberra, Aust. Govt. Print. Office. (Australia. Bureau of Mineral Resources, Geology and Geophysics, Report 89). . S55  
AUS
- six units distinguished in the Granite complex in order of decreasing age -
  - Metasediments not intruded by granites of Rum Jungle Complex as previously thought, but rest unconformably on eroded surfaces of older rock - during later period of folding and low-grade metamorphism, the metasediments were domed around the granitic basement.
- (19) ROBERTS, W.M.B., 1960. Mineralogy and genesis of White's Orebody, Rum Jungle Uranium Field, Australia. Neues Jahrbuch für Mineralogie, Abh. v. 94, pt. 2, p. 868-889. S549  
NEU
- Uranium associated with sulphides of copper, cobalt, lead contained in graphite, quartz, sericite, schist of Lower Proterozoic age, due to hydrothermal processes. Descriptions of mineralizations, evaluations of uranium copper genesis of the area -
  - includes a map of Rum Jungle; 1m = 1"
- (20) SPRATT, R.N., 1965. Uranium ore deposits of Rum Jungle in McAndrew, J., ed. Geology of Australian Ore Deposits. 2nd ed. 3th Commonwealth Mining and Metallurgical Congress, Melbourne, v. 1, p. 201-209. S622  
COM
- geology, main ore deposits and its controls.

- (21) TAYLOR, J., 1968. Origin and controls of uranium mineralization in the South Alligator River in Symposium on Uranium in Australia, Australasian Institute of Mining and Metallurgy, Rum Jungle, N.T. Papers. Darwin, p. 32-44. 622.34.5  
SYM
- deposition of uranium influenced structurally by faulting and lithologically by carbonaceous shales and sandstones. Mineral assemblages suggest mesothermal-epithermal epigenetic mode of origin. Source of uranium in deep seated magmatism expressed at surface in widespread pene-contemporaneous vulcanicity - discusses principal ore deposits, geology, mineralization etc.
- (21a) THREADGOLD, I.M., 1960. Mineral composition of some uranium ores from the South Alligator River area, N.T. Melbourne, Commonwealth Scientific and Industrial Research Organization. (Australia. C.S.I.R.C. Mineragraphic Investigations. Technical Paper, 2). S549  
AUS
- primary and secondary uranium minerals - occurrence similar to Colorado type.
- (22) WALPOLE, B.P., 1968. Geology of the Katherine-Darwin Region, Northern Territory by B.P. Walpole, et al. Canberra, Aust. Govt. Print. Office. (Australia. Bureau of Mineral Resources, Geology and Geophysics, Bulletin, 82). S55  
AUS
- comprehensive geological description of the area.
- (23) WALPOLE, B.P., 1965. Katherine-Darwin metalliferous province by B.P. Walpole and P.W. Crchn. in MacAndrew, J., ed. Geology of Australian Ore Deposits, 2nd ed. 8th Commonwealth Mining and Metallurgical Congress, Melbourne, v. 1, p. 168-175. S622  
COM
- geology and factors controlling mineralization of the individual deposits.

- (24) DODSON, R.G., 1973. Uranium in the Pine Creek geosyncline, Australia. Bureau of Mineral Resources, Geology and Geophysics, Record 1973/54 (unpublished).

EMR  
COMPACTUS

- discusses the geology, occurrences, genesis, grade of uranium ore in Pine Creek Geosyncline; South Alligator River, Ranger and Koongarra, Rum Jungle, Nabarleck and other occurrences.

- (25) DODSON, R.G., 1974. Uranium mineralization in the Rum Jungle-Alligator Rivers Province, Northern Territory, Australia. Bureau of Mineral Resources, Geology and Geophysics, Record 1974/37 (unpublished).

EMR  
COMPACTUS

- determines geological setting of deposits as all Lower Proterozoic and correlates geology of uraniumiferous areas with each other. Three origins of mineralization given. 1) syngenetic enrichment in carbonising sediments during Lower Proterozoic, 2) concentration in favourable places from mineral solutions mobilized during major igneous tectonic event, 3) relocation of uranium by circulating solutions through leaching and redeposition not far away -

- Useful for understanding geology and ore genesis in one of the main uranium provinces in Australia.

- (26) FRANKOVICH, F.J., 1953. Preliminary report on Brodribb uranium deposit, Northern Territory, Australia. Bureau of Mineral Resources, Geology and Geophysics, Record 1953/23 (unpublished).

EMR  
COMPACTUS

- early exploration activity revealed increasing radioactivity with little depth found in very porous environment subject to intense leaching and oxidation, such as hematite pods within radioactive lateritized slates. Brodribb entirely different from Rum Jungle deposits.

- (27) LORD, J.H., 1956. Report on the investigation of the uranium discovery near Mosquito Creek, Northern Territory. Australia. Bureau of Mineral Resources, Geology and Geophysics, Record 1956/114 (unpublished). BMR  
COMPACTUS
- a progress report to Darwin Uranium Group, monthly report on Development and Geology. Warramunga Group of early Proterozoic age uranium discovery situated in break in quartzite ridge - secondary mineralization in intensely sheared and brecciated acid volcanics. Ore reserves 5000 tons surface to 60 ft down, grade not known, decreases with depth est. 0.2-0.25%  $U_3O_8$  ore body limited in extent, development doubtful; primary mineralization doubtful.
- (28) NEEDHAM, R.S., 1972. Progress report, Alligator River Party, Northern Territory, 1972 (Jim Jim Region) Australia. Bureau of Mineral Resources, Geology and Geophysics, Record 1975/31 (unpublished). BMR  
COMPACTUS
- mainly geological interpretation and stratigraphy of rocks, some economic geology
  - includes maps [parts of] Jim Jim 1:50,000 Mundogie 1:50,000
- (29) NEEDHAM, R.S., 1978. Progress report, Alligator Rivers Party, N.T., 1972 (Oenpelli Region) by R.S. Needham, et al. Australia. Bureau of Mineral Resources, Geology and Geophysics, Record 1975/39 (unpublished). BMR  
COMPACTUS
- mainly geology and occurrence of uranium - only economic uranium deposit is at Nabarlek. Black Rock prospect warrants further investigation. Both occur within a migmatite complex zone of Nimbuwah Complex.
  - includes maps [parts of] Oenpelli 1:50,000 Wellington Range 1:50,000, Goomadeer 1:50,000, East Alligator 1:50,000.

- (30) NEEDHAM, R.S., 1973. Alligator Rivers Region Environmental Fact-Finding Study; geological and geophysical reports. Australia. Bureau of Mineral Resources, Geology and Geophysics, Record 1973/208. (unpublished). BMR  
COMPACTUS
- discusses several major uranium deposits and prospects, their occurrence, mineralization, potential and published reserves of  $U_3O_8$  in 1973 -
  - Includes a Geology of the Alligator River Region, Northern Territory 1:250,000 map.
- (31) WILKES, P.G., 1974. Results of radiometric surveys in the Alligator River and Cobourg Peninsula area of the Northern Territory. Bureau of Mineral Resources, Geology and Geophysics, Record 1974/164 (unpublished). BMR  
COMPACTUS
- results of uranium and thorium concentrations from samples highest in laterites associated with Gilruth Volcanic Member of Kombolgie Formation.
- (32) Katherine-Darwin Region, Northern Territory. 1:500,000. 2nd edition. Australia. Bureau of Mineral Resources, Geology and Geophysics, 1967. Map sales only.
- a synthesis of one of Australia's uraniumiferous areas compiled after 10 years field work done by BMR - Companies did their own mapping prior to this map.
- (33) Rim Jungle District, Northern Territory. 1:63,000. Special Sheet, 1st ed. Canberra, Bureau of Mineral Resources, Geology and Geophysics, 1960. Map sales only.
- (34) Geological map South Alligator River area, Northern Territory. 1:100,000. Canberra, Bureau of Mineral Resources, Geology and Geophysics /1969?. Map sales only.

QUEENSLAND

- (35) BROOKS, J.H., 1960. The uranium deposits of North-Western Queensland. Brisbane, Dept of Mines. (Queensland. Geological Survey. Publication, 297). S551(943)  
QUE
- geology and descriptions of all more important known occurrences found over a wide area - commercial potential and further investigation suggested for many localities, e.g. Westmoreland.
- (35a) BROOKS, J.H., 1972. Uranium exploration in Queensland, 1967-71. Brisbane, Department of Mines. (Queensland. Geological Survey. Report 60). S551(943)  
QUE
- review of exploration, reserves, in PreCambrian of northwestern Queensland. Largest deposits in Westmoreland area. Partly Supplementary information to the publication "The uranium deposits of North Western Queensland" (Brooks, 1960) compiled from open file company reports and published reports of mining companies. Discusses distribution of each deposit, with useful locality sketch maps of uranium occurrences in Queensland, as well as a list of open file company report references.
- (36) HUGHES, F.E., 1968. Uranium ore deposits at Mary Kathleen, by F.E. Hughes and D.L. Munro in Symposium on Uranium in Australia, Australasian Institute of Mining and Metallurgy, Rum Jungle, N.T. Papers. Darwin. 622 34.5  
SYM
- mineralization epigenetic related to contact metasomatism from late phase emanations from the Mount Burstall granite. Deposition in breccia-conglomerate and within the axial zone of folded structure - based on revised structural interpretation, detailed mapping of progressive exposures in open-cut and re-examination of diamond drill cores.

- (37) MATHESON, R.S., 1956. Mary Kathleen uranium deposit, Mount Isa-Cloncurry district, Queensland, Australia, by R.S. Matheson and R.A. Searl. Economic Geology, v. 51, p. 528-540. S553  
ECO

- mineralization is epigenetic and related to granitic intrusion. Main minerals occurring in garnetized zone in group of calc-silicate rocks of early Proterozoic age. Deposits regarded as replacement of high temperature origin, classified as pyrometasomatic deposit - a preliminary account of the geology and mineralization of the area.

- (38) WHITTLE, A.W.G., 1960. Contact mineralization phenomena at the Mary Kathleen uranium deposit. Neues Jahrbuch für Mineralogie. Abh., v. 94, p. 798-830. S549  
NEU

- rare metasomatic variety of uranium deposits. Fine grained uranite disseminated through orthite-apatite enriched rocks forms the ore which is contained within garnetiferous skarn. Ore body not continuously mineralized, consists heterogeneous aggregates of ore shoots. Formation of ore and skarn result of late magmatic anomalies of differentiated granodioritic intrusions emplaced in calc-magnesian metaseds. Resulted in widespread formation of new minerals, silicates, e.g. garnet, feldspar and orthite. These produced extensive skarns in which metallic sulphides and uranium were deposited.

#### SOUTH AUSTRALIA

- (40) CALLEN, R.A., 1975.\* The stratigraphy, sedimentology and uranium deposits of Tertiary rocks, Lake Frome area, S.A. South Australia. Department of Mines and Energy /unpublished/ Report RB 75/103; also submitted as M.Sc. Thesis - University of Adelaide (unpublished).

- Economic geology of uranium deposits in the Frome Embayment, South Australia.

- (41) DICKINSON, S.B., 1954. Uranium deposits in South Australia, by S.B. Dickinson, and others. Adelaide, Dept of Mines. (South Australia. Geological Survey Bulletin 30). S551(942)  
SOU
- comprehensive coverage of geology, mineralogy and petrology of the Radium Hill mining field, Crockers Well uranium deposit, Mount Pointer, Mount Lofty Range.

WESTERN AUSTRALIA

- (43) LANGFORD, F.F., 1974. Supergene origin for vein type uranium ores in the light of West Australian calcrete-carnotite deposits. Economic Geology, v. 69, p. 516-526. S553  
ECC
- uranium occurs as carnotite (from weathering of nearby granite) in vugs and fractures in calcrete. Vanadium important in fixing uranium as insoluble carnotite and appears to have been derived from surrounding laterites. Since calcretes are surficial and recent origin the uranium is similarly found. Genetic importance to origin of sedimentary deposits of Colorado type, however surficial origin for uranium in pitchblende vein deposits also explains their spatial/temporal relationships to unconformities and uranium rich granitic complexes.

SUPPLEMENT

- (45) POHL, D.C., 1970.\* The geology of the uranium prospects of the Westmoreland area, North-western Queensland. B.A. (Hons.) Thesis - Macquarie University (unpublished).



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 No. 6 Tin-bearing granites.  
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 No. 8 A Basic reading list in Palaeontology.  
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