

HERITAGE ASSESSMENT REPORT

NAME: Radium Hill Townsite and Pioneer Cemetery

PLACE NO.: 21246

ADDRESS: Maldorky Station, Barrier Highway, East of Olary

DESCRIPTION

Remains of the township and pioneer cemetery associated with the Radium Hill mine site. The most substantial remains of the site are the 2million gallon (9ML) concrete water tank on the hill overlooking the town, ruins of visitor's accommodation, the Catholic Church and school, and the swimming pool. The town layout is still clearly evident with paved roads lined with eucalyptus trees. Concrete pads, piers, steps to the houses and some remnant garden edgings are all that remain of the residential accommodation and other facilities. Modern interpretive photo plaques have been placed around the site.

The cemetery is located about 1.5kms northwest of the township and contains several graves and interment sites surrounded by a wire fence with entrance portal including flagpole.

EXTENT OF LISTING

Radium Hill Townsite and Pioneer Cemetery as contained within a polygon with the following points:

1	140°36.200'E	32°20.517'S
2	140°37.161'E	32°20.428'S
3	140°37.161'E	32°19.640'S
4	140°36.288'E	32°19.310'S

Components of High significance in the context of the place:

All components of Radium Hill townsite and the Cemetery are contained within the bounded area and are considered of high-significance. Currently identified components include remaining fabric of:

- 2million gallon concrete water tank
- Swimming pool and surrounds
- Senior Staff Housing
- General Manager Housing
- Single men's cubicle blocks
- Retail Store
- Uniting Church
- Post Office
- AIM Hospital
- Married Daily Paid Housing
- Golf Club House
- State Primary School
- Tennis Courts
- Roman Catholic Church and School
- Pre-school
- Marchant Oval
- Staff Quarters
- Pengilly's Garage

- Open Air Cinema
- Milling's Drinks
- Sheehans Store
- Replica A J Smith Monument (replaced stolen fabric)
- Wet Canteen
- Large Hall
- Pre School
- Bituminised streetscape and layout including remnant eucalyptus plantings
- Pioneer and later gravesites and fabric of the Pioneer Cemetery, including the fencing, entrance gates and flag-pole.

Components of Moderate significance in the context of the place:

There are no identified components considered to be of moderate significance.

Components of Low significance in the context of the place:

- Modern interpretive plaques

Extent of listing should specifically exclude these components:

- Tikalina Station and Maldorky Station homesteads, associated outbuildings, fencing and any structure associated with the use of the station as a pastoral property.
- A corrugated-iron shed and an Old Gaol relocated from the Radium Hill town-site to immediately adjacent the Tikalina Station homestead, forming the Radium Hill Heritage Museum.
- Radium Hill mine-site including plant remains, tailing heaps & dams (Reserved for Purposes of a Repository for Low-Level Radioactive Materials under the care, control and management of the Minister for Mines and Energy)

ASSESSMENT OF HERITAGE SIGNIFICANCE

Statement of Heritage Significance

Associated with the site of the first discovery of uranium in South Australia in 1906, Radium Hill Townsite and Cemetery are significant for their association with South Australia's position in the western alliance in the early post-war world climate. The associated Radium Hill mine was developed to meet a joint agreement with the US and UK for supply of uranium for military purposes, Radium Hill was personally promoted by South Australia's Premier, Thomas Playford, who saw uranium as a means to fuelling his ambitious plans to industrialise the state.

Although only a short-lived project (1954-61), the ruins of the town and the associated cemetery remain as evidence of South Australia's (and Australia's) first commercially viable uranium mining venture and the state's only extant early post-war mining town.

Comparability / Rarity / Representation:

Mining town-sites are well represented in the South Australian Heritage Register and generally constitute a cultural landscape encompassing the Mines and processing equipment as well as domiciles and other buildings demonstrating the lives and works of people in these historically remote communities. Notable places include:

- **Burra State Heritage Area (SHA16183):** *The Burra State Heritage Area is of significance to the economic and social history of South Australia, and is a testament to the success of copper mining in the area. In the late 1840s, the Burra Mine made South Australia the most prosperous colony in Australia. At one stage the mine was the second largest producer of copper in the world. Comprising the mining area and a complex of what were originally separate townships which are now merged into one, the area provides evidence of early mining, industrial and urban functions with Welsh and Cornish influences.*

- **Blinman Mine & Mine Manager's Cottage (SHP13888):** *The Blinman Mine and its associated Mine Manager's Cottage represent the most productive copper mine in the Northern Flinders Ranges and a centre for smelting operations for the surrounding minor workings early this century. They also illustrate the persistent efforts by unsuccessful mining companies during the latter part of the 19th century and early 20th century to further realise the mineral potential of South Australia. (Flinders Ranges Heritage Survey, 1995)*
- **Talisker Silver Lead Mine, including remains of Shafts, Manager's Residence, Store Rooms, Engine and Jigger House, Calciner, Winding Engine, Remains of Chimney and Smelt Furnace, Talisker Conservation Park (SHP12552):** *The former Talisker Silver Mine is of highest cultural significance as a largely intact example of historical silver mining practises embodying Cornish mining traditions and mine construction techniques. It is also important as a tangible example of the settlement pattern and economic development of the Fleurieu Peninsula.*
- **Prince Alfred Copper Mine Precinct (26450):** *The Prince Alfred Copper Mine Precinct, including mine, smelter and township complex, is of State heritage significance because it demonstrates many aspects of 19th Century immigration, technology transfer and mining practice in South Australia, in particular mining practices imported from Cornwall, and the adaptation of a Cornish immigrant community to life in an isolated rural location.*
- **Appealinna Mine Ruins & Miner's Hut, Ikara-Flinders Ranges National Park (SHP12025):** *Mining began on this site in 1858 when malachite, copper and some diopside and cuprite were extracted from shallow depths, but the mine was abandoned in 1860. There were several attempts to re-open it, but most of these were affected by the problems of remoteness and scarcity of timber. It was described by the government geologist in the early 1900s as the best of the smaller copper mines. The site is representative of the mining history of the Flinders Ranges which was the alternative industry to pastoralism in the region. It is possible that the hut was built during the first few years of mining. Very few miner's huts have survived in the State. (Flinders Ranges Heritage Survey, 1995)*
- **Mongolata Gold Battery, remains of Cyanide Works, Eating House and Dugouts and former Byles' Mine, Mongolata Goldfield (SHP11004):** *Discovered in 1930, the Mongolata goldfield is the last of the significant gold mines to be developed in South Australia. The site is important as one of only two gold fields discovered and established in the Depression years of the late 1920s and 1930s when many unemployed people were assisted by Government initiatives to turn to gold mining. Intact examples of mining technology of that era remain on the site, including a stamp battery and mine tunnels and shafts, while ruins of an eating house and dugouts illustrate the living conditions of the miners.*
- **Inneston Gypsum Mining Precinct, comprising lake bed, cottages (including Gatehouse Lodge), stores, stables, Manager's & Engineer's residences, ruins of crushing plant, factory, processing areas, tramway & explosives magazine, Innes National Park (SHP12835):** *Inneston Gypsum Mining Precinct is significant as the remains of the only early 20th century gypsum mining complex and associated settlement in South Australia. It is an example of an isolated, self-sufficient mining community involved in the quarrying, processing and transporting of gypsum and its by-products in the years prior to the intensive mechanisation of these operations. (HSA 9/2000)*

Radium Hill Townsite is rare as a post-war (c1950) example of a mining township, laid out by the Government rather than by private enterprise. The above sites also include remnants of the mines and mining plant in the listing.

The nearby Radium Hill mine-site is not included in this listing, and is under legislative protection as a low level radioactive material repository.

Assessment against Criteria (Under Section 16 of the *Heritage Places Act 1993*):

Applying the guidelines for State heritage significance discuss whether the Place meets one or more criteria under section 16 of the *Heritage Places Act 1993*.

For further guidance regarding the criteria please see the 'criterion tests' in this document:

<http://www.environment.sa.gov.au/files/sharedassets/public/heritage/her-gen-assessment-criteria-guide.pdf>

(a) it demonstrates important aspects of the evolution or pattern of the State's history.

In considering this criterion, I have had regard to the provided Guidelines for State Heritage Places that note:

The place should be closely associated with events, developments or cultural phases which have played a significant part in South Australian history. Ideally it should demonstrate those associations in its fabric.

Places will not normally be considered under this criterion if they are of a class of things that are commonplace, or frequently replicated across the State, places associated with events of interest only to a small number of people, places associated with developments of little significance, or places only reputed to have been the scene of an event which has left no trace or which lacks substantial evidence.

Radium Hill Townsite and Cemetery demonstrates important aspects of the evolution and pattern of the State's history, particularly the role of the State in supporting the Commonwealth's wartime Uranium exploration and industrialisation.

Radium Hill, named for its radioactive deposits in 1906, was South Australia's first uranium mine. Intermittently mined for the then more valuable radium for over 40 years, its importance to South Australia was only truly realised after the world was thrust into the nuclear age with the test detonation of the Trinity bomb at New Mexico in July 1945.

Prompted by a formal request from the United Kingdom to the Commonwealth government in 1944 to investigate potential uranium deposits which would meet war time needs, commercially viable deposits were located and tested at Radium Hill during the late 1940s. The search for, and development of, uranium in South Australia was fully supported and encouraged by Premier Thomas Playford who saw the mineral as a power source to fuel his ambitious plans for industrialising the state. To this end, Playford himself was involved in negotiations with the US Atomic Energy Commission and the Combined Development Agency of the US and UK to supply uranium from Radium Hill to these allies for their weapons programs. This resulted in a seven year contract, with the Americans substantially funding the development of Radium Hill and the associated treatment plant at Port Pirie in return for supplies of uranium oxide.

The status of uranium in the late 1940s and 1950s was reflected in changes to the Mining Act to accommodate uranium and thorium and in the development of an Act specifically relating to the mining of uranium in 1949.

The rapid growth and development of Radium Hill reflects the urgency and short term nature of the project's contract, but also the high level of importance placed on it by all parties. No expense was spared in developing methods for extracting the uranium from the complex ore mined at Radium Hill, and an extensive and well built mine site and township were created in one of South Australia's more remote areas.

The townsite reflects its temporary nature and is now only interpreted through the remaining foundations, piers, semi-demolished structures and glass bottle garden borders. The intact watertank on the hilltop provides a dominant focal point that clearly articulates the former scale of the townsite as well as its more intangible significance of a thriving community townsite with cemetery in a remote location.

On consideration, the place **fulfils** this criterion.

(b) it has rare, uncommon or endangered qualities that are of cultural significance.

In considering this criterion, I have had regard to the provided Guidelines for State Heritage Places, that note:

The place should demonstrate a way of life, social custom, industrial process or land use which is no longer practised, is in danger of being lost, or is of exceptional interest. This encompasses both places which were always rare, and places which have become scarce through subsequent loss or destruction.

Places will not normally be considered under this criterion if their rarity is merely local, or if they appear rare only because research has not been done elsewhere, or if their distinguishing characteristics have been degraded or compromised, or if they are at present common and simply believed to be in danger of becoming rare in future.

Radium Hill Townsite and Cemetery constitutes a rare example of a 1950s township created in conjunction with the nearby mine. The township's distinguishing characteristics are too degraded to be considered to retain the qualities that would otherwise interpret its cultural significance.

The place is **not** considered to fulfil this criterion.

(c) it may yield information that will contribute to an understanding of the State's history, including its natural history.

In considering this criterion, I have had regard to the provided Guidelines for State Heritage Places, that note:

The place should provide, or demonstrate a likelihood of providing, information that will contribute significantly to our knowledge of the past. The information should be inherent in the fabric of the place. The place may be a standing structure, an archaeological deposit or a geological site.

Places will not normally be considered under this criterion simply because they are believed to contain archaeological or palaeontological deposits. There must be good reasons to suppose the site is of value for research, and that useful information will emerge. A place that will yield the same information as many other places, or information that could be obtained as readily from documentary sources, may not be eligible.

The remains of structures at Radium Hill are typical of the 1950's and were heavily salvaged after the decommissioning of the township and minesite. It is not expected that any information that may contribute to an understanding of the State's history, that is not visible or already available through documentary sources will be yielded.

The place is **not** considered to fulfil this criterion.

(d) it is an outstanding representative of a particular class of places of cultural

significance.

In considering this criterion, I have had regard to the provided Guidelines for State Heritage Places, that note:

The place should be capable of providing understanding of the category of places which it represents. It should be typical of a wider range of such places, and in a good state of integrity, that is, still faithfully presenting its historical message.

Places will not be considered simply because they are members of a class, they must be both notable examples and well-preserved. Places will be excluded if their characteristics do not clearly typify the class, or if they were very like many other places, or if their representative qualities had been degraded or lost. However, places will not be excluded from the Register merely because other similar places are included.

Radium Hill Townsite and Cemetery are of the class of mining landscape. There are many examples of mining landscapes in South Australia; including the early Cornish mining sites that clearly articulate their significance to South Australia.

Due to the removal of the majority of fabric after the closure of the Radium Hill township, there is no fabric that would interpret the townsite or cemetery as a good representative of the class.

The place is **not** considered to fulfil this criterion.

(e) it demonstrates a high degree of creative, aesthetic or technical accomplishment or is an outstanding representative of particular construction techniques or design characteristics.

In considering this criterion, I have had regard to the provided Guidelines for State Heritage Places, that note:

The place should show qualities of innovation or departure, beauty or formal design, or represent a new achievement of its time. Breakthroughs in technology or new developments in design would qualify, if the place clearly shows them. A high standard of design skill and originality is expected.

Places would not normally be considered under this criterion if their degree of achievement could not be demonstrated, or where their integrity was diminished so that the achievement, while documented, was no longer apparent in the place, or simply because they were the work of a designer who demonstrated innovation elsewhere.

The remains of structures and layout of Radium Hill Townsite and Cemetery are typical of the 1950's and do not represent a high degree of creative, aesthetic or technical accomplishment or an outstanding representative of particular construction techniques or design characteristics.

The place is **not** considered to fulfil this criterion.

(f) it has strong cultural or spiritual associations for the community or a group within it.

In considering this criterion, I have had regard to the provided Guidelines for State Heritage Places, that note:

The place should be one which the community or a significant cultural group

have held in high regard for an extended period. This must be much stronger than people's normal attachment to their surroundings. The association may in some instances be in folklore rather than in reality.

Places will not be considered if their associations are commonplace by nature, or of recent origin, or recognised only by a small number of people, or not held very strongly, or held by a group not widely recognised, or cannot be demonstrated satisfactorily to others.

The Radium Hill Townsite and Cemetery have strong and direct cultural associations with its former residents. The significance of the community of Radium Hill is only recognised by a small number of people in South Australia.

The place is **not** considered to fulfil this criterion.

(g) it has a special association with the life or work of a person or organisation or an event of historical importance.

In considering this criterion, I have had regard to the provided Guidelines for State Heritage Places, that note:

The place must have a close association with a person or group which played a significant part in past events, and that association should be demonstrated in the fabric of the place. The product of a creative person, or the workplace of a person whose contribution was in industry, would be more closely associated with the person's work than would his or her home. Most people are associated with many places in their lifetime, and it must be demonstrated why one place is more significant than others.

Places will not generally be considered under this criterion if they have only a brief, incidental or distant association, or if they are associated with persons or groups of little significance, or if they are associated with an event which has left no trace, or if a similar association could be claimed for many places, or if the association cannot be demonstrated. Generally the home or the grave of a notable person will not be entered in the Register unless it has some distinctive attribute, or there is no other physical evidence of the person's life or career in existence.

Radium Hill Townsite and Cemetery is indirectly associated with Premier Thomas Playford (1938-1965) who saw the search for and development of Uranium as a power source to fuel his ambitious plans for industrialising the state.

However, Premier Thomas Playford was associated with many places in his 23 years as premier and there is no fabric that would demonstrate this association, which is only now demonstrated through documentary evidence and oral history.

The place is **not** considered to fulfil this criterion.

DESIGNATION (under section 14(7)(b) of the *Heritage Places Act 1993*)

Statement of Archaeological Designation:

Radium Hill was the site of significant salvaging after the decommissioning of the township and mine-site. It is not expected that archaeological remains that could yield information of significance to the State will be yielded.

Additionally, due to the continuing remediation of radioactive material in the area by the Department of State Development, archaeological designation of the Radium Hill Township and Cemetery is not recommended.

BRIEF HISTORY OF PLACE:

The following is reproduced from: Laurence, S (DEWNR), *Assessment of Heritage Significance: Former Radium Hill Uranium Mine, Township Site and Cemetery, Maldorky Station, Barrier Highway, Via Olary* [DRAFT]

Discovery and early mining

A prospector, A J Smith, unwittingly made the discovery of uranium in the remote Olary district of South Australia in 1906. In March of that year he pegged out a claim covering outcropping veins of a heavy dark rock which he thought to be an ore of tin (Drexel, p. 284). Smith sank a shaft to 70 feet (21m) and worked the mine (which became known as Smith's Carnotite Mine) for two years until his claim lapsed in 1908.

The dark ore was given the name 'davidite' in recognition of T W Edgeworth David, Professor of Geology at Sydney University, by Douglas Mawson, then Lecturer in Mineralogy and Petrology at the University of Adelaide, on a field trip to the area in 1906. He also proposed the name 'Radium Hill' for the site. The davidite was found to contain, amongst a complex mix of other minerals, radium and uranium. In 1910 uranium-bearing minerals were also discovered at Mount Painter, in the Flinders Ranges area (Drexel, p. 289).

Following the lapse of Smith's lease the claim was taken up by the Radium Hill Company which sunk more shafts and eventually extracted 350 milligrams of radium and about 150 kg of uranium. This venture ceased with the outbreak of World War One in 1914. Mining operations at Radium Hill were begun again in 1923 by the Radium and Rare Earth Treatment Company NL who worked the site until 1931. Plants to treat the radium were established in the field and at Adelaide and Sydney and small quantities of radium were sold overseas to what was a strictly limited and highly competitive market. The uranium and other minerals associated with the processed ore were largely treated as waste products (Dept of Mines, 1955).

Even though the cost of pure radium bromide in the early years of the 20th century was £400,000 per ounce, the early mining ventures at Radium Hill were relatively unsuccessful. The remote geographical location, the lack of water and the difficulties of extracting the radium from what was a highly complex ore combined to limit their viability (Dept of Mines, 1955).

No mining occurred at Radium Hill until 1940 when a two year Special Mining Lease was taken up by the Australian Mining and Smelting Co Ltd (a subsidiary of the Consolidated Zinc Corporation). However, within a year the company had realised that the treatment and marketing of ore 'involved many problems which could not be solved cheaply or speedily' and surrendered its lease (Dept of Mines, 1955; O'Neil, p. 73).

Until the world was thrust into the nuclear age with the detonation of the test atomic bomb known as Trinity in New Mexico on 16 July 1945, the commercial use of uranium was limited to providing colouring for ceramic products and very minor quantities of uranium metal (Harrington, p. 2).

Lead up to 1952 Joint Agreement

The mid 1940s saw a new interest in Radium Hill.

In 1944, as the significance of uranium for defence purposes was becoming known even before the detonation of Trinity, the government of the United Kingdom requested the

Federal government to undertake 'urgent, intensive' investigations of the uranium deposits at Mount Painter and Radium Hill, with the aim of meeting war-time needs (Dept of Mines, 1955; O'Neil, p. 7).

Geological surveys began in June 1944, with a focus on 'deposits which could be considered as possible producers of significant quantities of uranium without delay, rather than deposits which required deep underground development and presented unsolved metallurgical and chemical problems.' (Harrington, p. 3). The mineralogical complexity, and therefore treatment difficulties, of the ore from Radium Hill meant that Mount Painter was considered to better meet these requirements and several small low-grade deposits were revealed during investigations there, but the Mount Painter project was abandoned by the South Australian government in 1950 (O'Neil, p. 75; Drexel, p. 289).

The world's attitude to uranium and nuclear energy was changed forever in that moment on the morning of 6 August 1945 when Hiroshima was levelled by an atomic bomb. A few months later in South Australia amendments to the *Mining Act 1930* were passed. These amendments, assented to on 22 November 1945, vested the ownership of the minerals uranium and thorium in the Crown and generally gave the Minister full control of the mining, treatment and use of those minerals. Without a licence from the Minister, the possession, use, selling and disposing of uranium and thorium was an offence (*Mining Act Amendment Act, 1945*).

By 1947 the focus on establishing uranium deposits had turned to Radium Hill, where the exploration was progressed 'in the expectation of proving a sufficient quantity and grade of ore to fulfil the limited, but growing, overseas demand.' (O'Neil, p. 77). This work, undertaken by the Department of Mines, involved the de-watering of the existing mine and drilling to collect ore samples and determine development options. In Adelaide, laboratories were established with the purpose of providing the chemical, mineralogical, radiometric and metallurgical input (Johns).

One of the main aspects of this developmental work was to determine the chemical and analytical method for accurately measuring the amount of uranium present in ore samples and concentrates. It took nearly two years to develop a suitable process: firstly testing and then rejecting the existing chemical fusion process which had been used to produce uranium; then to try a process which involved the decomposition of the ore by fluorides; experimenting with a nitric acid process and finally the development of the sulphuric acid-ion exchange method (Dept of Mines, 1955).

Continuing exploration at Radium Hill revealed sufficient ore to justify the development of shafts and drives and in 1949 the construction of a crushing and sampling plant, using a magnetic separator to minimise use of water, was approved (Dept of Mines, 1955).

Late in that same year an Act specifically relating to the mining of uranium was passed by the South Australian Parliament. The *Uranium Mining Act, 1949* gave the Minister of Mines the power to open and work mines for the mining of uranium, to store, use, sell or dispose of uranium taken from those mines, to acquire property (compulsorily if necessary) and to undertake any further action in regards to the acquisition of uranium. However, some clauses were more restrictive. The Minister was not permitted to sell or dispose of uranium without first consulting with the Prime Minister, and strict secrecy provisions prevented employees divulging information obtained in the course of their work (*Uranium Mining Act, 1949*).

At Radium Hill about 40 men were employed in the continuing development of the mine and processing plant. A machine shop, power house, pilot metallurgical concentrator and associated administrative and public buildings were built between 1950-51. A separate

branch of the Department of Mines, known as the Radium Hill Project, was established in mid-1950 (Harrington, p. 4).

The search and development of uranium mining in South Australia was fully supported by Premier Thomas Playford who saw the potential of uranium, particularly as a power source, as a means of fuelling the industrialisation of the state. His interest in uranium for industrial purposes was in contrast to the Federal Government's interest in uranium for defence purposes and he 'staunchly resisted any attempt by the Federal Government to obtain control of Radium Hill.' (O'Neill, p. 78-79).

A pivotal point in the development of the Radium Hill mine was the visit by Playford to the United States in August 1951. He was accompanied by his secretary and Mr S B Dickinson, Director of Mines, with the overt purpose of arranging steel and electrical supplies, but also to undertake 'a special mission, the nature of which has not been disclosed.' (*Advertiser*, 13 August 1951, 2b).

This 'mission' took the form of negotiations with the US Atomic Energy Commission and the Combined Development Agency (CDA) (a joint US-UK authority whose responsibility was to ensure an adequate supply of uranium for Western allies' weapons programs) for the sale of low-grade uranium oxide from Radium Hill (O'Neil, p. 87; SAPP 26, 1955, p. 5). Playford held the upper hand: in the tense climate of world affairs at the time, the Americans wanted a long-term secure supply of uranium and were happy to pay for it, to the tune of £4 million (\$7.2 million) for 'development work at Radium Hill and a uranium treatment plant at Port Pirie.' (O'Neil, p. 88). Playford's negotiating skills paid off:

The Radium Hill agreement Playford soon struck with them must rank as the easiest and most generous in the history of uranium negotiations. The Americans explained to Playford that their uranium requirements for weapons production were large and would continue to be so for the indefinite future... They assured Playford that the intended rate of production of 200 tons per annum would not unduly deplete reserves... The ore price, based on production costs, and paid two-thirds in dollars, one-third in sterling, was to prove the highest the Americans ever paid in this Cold War period. The Americans did not even bother to send their own experts to gain first-hand knowledge of the Radium Hill deposit until later, relying instead on the estimates of the South Australian Bureau of Mines [sic]. By the end of the agreed 7 year contract, the Americans must surely have regretted such impetuosity.

Cawte, p. 47-48

As part of the agreement South Australia was to provide £1 million to develop Radium Hill and a treatment plant at Port Pirie and £4 million was to be lent to the project by the United States (Cawte, p. 48).

In March 1952 a technical mission from the United States visited Australia to discuss development of deposits at Rum Jungle in the Northern Territory and to inspect the Radium Hill deposits (Hardy, p. 34). In April of the same year an agreement to develop and purchase the Radium Hill uranium deposits for a period of seven years was signed between the CDA, the Commonwealth Government and the State Government (National Archives; Hardy, p. 36; SAPP 26, 1962).

An amendment to the 1949 *Uranium Mining Act* in 1952 further strengthened the secrecy provisions in the 1949 Act. This had implications at Radium Hill where all workers had to sign 'an oath or affirmation' and were not permitted to 'possess any sketch, photograph, plan, model, note or record' of a prohibited area (O'Neil, p. 102). The mine site was fenced and even plans and drawings of mine operations and equipment had to be locked away in a specially provided strong room every night. The security measures even impacted

operations at the Department of Mines. Within the Department the Project was 'shrouded in secrecy', with its own separate budget, separate accounting system, separate record keeping, its own security staff and security clearances for those involved (O'Neil, p. 105). In reality, according to one source, the security risk was minor: the ore was low grade, quantities involved were relatively small, information regarding it would have been of no particular value to allied or enemy causes and it was perhaps a 'gross overkill of a fairly minor project in world terms. But it was a major project for South Australia and the Department of Mines.' (O'Neil, p. 106).

In the meantime the search for uranium continued elsewhere in South Australia and Australia. Low quality deposits were located at Crockers Well, Mount Victoria, Houghton, Myponga and Port Lincoln in South Australia, and in the Northern Territory the development of the Rum Jungle deposit – itself the subject of an agreement between the Commonwealth Government and the CDA in January 1953 – coincided with that at Radium Hill (Hardy, p. 34).

Radium Hill was not the first mining venture that Playford had promoted. From 1941 he was pushing for the development of the Leigh Creek coalfields, discovered in 1888, for the benefit of both the State and the Commonwealth, and battled for some years with the Commonwealth government for financial support. Production started at Leigh Creek in February 1944 and a model mining town was designed, located well away from the mining site. This, the only other early post-war mining town established in South Australia, was demolished and the residents relocated to a new site further south in 1974 (Klaassen, pp. 139-50).

Development of the mine and township

The months following the signing of the Joint Agreement saw the execution of plans to bring the Radium Hill mine into full production, centred on the:

development and preparation of the mine for the extraction of ore, the sinking of the main production shaft, the operation of a pilot mill to treat development ore and produce uranium concentrates, the construction of mining plant, concentrator, service buildings and residences, the construction of the water pipeline from Umberumberka, electricity supply lines and a railway line.

SAPP 26, 1955, p. 5

The status of Radium Hill was reflected in the formal establishment of the Radium Hill Project as a separate branch of the Department of Mines, with its own authorities and budget, concentrating specifically on the mining and chemical treatment of the uranium ore (O'Neil, p. 89, 92).

Full scale mining and processing at Radium Hill began in 1954, following the substantial development work, and the mine was officially opened by His Excellency the Governor General, Field Marshall Sir William Joseph Slim on 10 November 1954 (Dept of Mines, 1954).

The British testing of atomic bombs in South Australia at Emu Field in October 1953 and Maralinga in September 1956 did not appear to have a direct impact on development and work at Radium Hill, perhaps because the two situations were controlled by different bodies: Radium Hill by the South Australian government and the United States; the atomic testing by the Commonwealth Government and Britain.

The Mine

An extensive system of underground shafts and drives was developed connected to the 420 metre deep main shaft, following the lodes of ore which generally dipped from 30 to 70 degrees with an average width of 1.2 metres. Levels within the mine were built at 30m intervals to the 180m level and then at 45 metre intervals down to 400m. The longest underground drive extended over 900 metres from the main shaft along a lode of about 1,800 metres (McLeary, p. 28).

Ore was hauled to the main shaft where it was brought to the surface by a winding plant attached to a headframe 39 metres high. It was immediately crushed and stored in a 2,000 ton concrete ore bin before being moved to the mill for processing. Ventilation was provided by a large upcasting exhaust fan operating in combination with the downcasting main shaft (Harrington, p. 6).

Methods of mining were typical of narrow stope mines in Australia in the 1950s. The rock was drilled with hand guided pneumatic drills, blasted, collected in air powered boggers or dropped through chutes to lower levels and loaded into small rail trucks towed by battery locomotives and taken to the main shaft for lifting to the surface (McLeary, p. 28).

Some processing of the ore was undertaken at Radium Hill. Once elevated to surface level, the ore was crushed in a two stage process to 70mm and then to 25mm. The main mill and treatment area were located to the south of the main shaft and crusher house. For the first time in Australia the heavy media gravity milling process was used to separate the tailings from the hard rock ore (Norton Jackson, chief metallurgist) and the concentrate finely ground in a ball mill in preparation for flotation, which separated the uranium enriched concentrate from the waste material. This was then thickened and loaded into rail trucks for transport to the Port Pirie plant (McLeary, p. 31). Tailings were dumped some distance from the mine to the south and southwest of the mill.

The Port Pirie plant, which had been established in 1955 in conjunction with the Radium Hill mine processed about 120,000 tons of concentrate from Radium Hill through an acid leach and ion exchange process to produce 850 tons of yellowcake (uranium oxide U_3O_8) (McLeary, p. 23).

A cluster of ancillary buildings was constructed around the headframe and mill area. There were administrative and technical buildings, a compressor house, main store, fuel depot and transformer station. There were also structures associated with the rail link from Broken Hill. A 240 volt power line was laid by the Electricity Trust to a transformer station at Radium Hill before the production phase of the mine commenced. Water collection dams had been constructed to the north of the mine, but a pipeline from the Umberumberka Reservoir, 85 kilometres away near Broken Hill, was installed to meet the demands of the mine and the township.

The Township

The township was developed over a period of time between 1949 and 1952. It was laid out on the northern side of a low rise which separated it from the mine site. There were three separate residential precincts in the town which were relatively distinct from each other. The General Managers house was located on a rise overlooking the township and, in the distance, the mine. Immediately below this were four residences for senior staff and a small group of houses for other staff as well as a complex for official visitors.

Separated from the staff area by a creek, recreation area and civic centre, were the single men's quarters, which consisted of 'blocks' of small transportable cubicles surrounding larger ablution blocks. Married personnel were housed in individual houses, each on separate blocks, in another section of the township.

The recreation area was located in open space by the creek that ran through the middle of the site, and comprised an oval and soccer field, tennis courts and the pre-school and state primary school. A rough 'bush' golf course was located on the northern outskirts of the town. Beyond this the cemetery formed a neatly fenced plot surrounded by the natural bush.

Although the town was, for its time and location in the remote northeast of the state, relatively well equipped and civilised, there were some negative aspects to living there:

[It] was constructed on the old-fashioned kind of mining town concept, where the mine manager lived in the big house on the top of the hill and the senior staff flanked it with various houses just slightly smaller in size, down to the routine staff at the lower level and the daily paid staff all set up in an entirely different segment of the town.

Interview with Bruce Webb, 16.10.1992, cited in O'Neil, p. 97

The township was designed by the South Australian Housing Trust and 145 dwellings, mainly prefabricated, were built by the Trust's contractors between 1949 and 1952 (Marsden, S., p. 218). Early on, the new weatherboard house[s] had three bedrooms, a kitchen and lounge and [were] equipped with kerosene fridge, stove and lamps, until a power generator supply, which closed down between midnight and 6am, was established in 1951. Later an electricity supply was connected. Other housing was prefabricated and brick. Food supplies and other provisions arrived weekly from Olary, the nearest town. Water, a perennial problem in the bush, was in erratic supply....

O'Neil, p. 98

The situation with the water supply improved with the laying of the pipeline from the Umberumberka Reservoir which fed large tanks on the hill between the mine and the town. The regular supply of water meant that a swimming pool, could be built on the same hill, overlooking the town which was able to boast a number of services and facilities by the mid 1950s: an Australian Inland Mission Hospital, post office, police station, barber shop, two churches, store, service station, cool drink factory and 'wet' canteen and drive-in cinema. The social life of the town was also important to its residents. Numerous sporting clubs made use of the facilities and a wide variety of clubs and organisations were also supported, including Buffalo and Masonic Lodges, drama group, scouts, church fellowships and Sunday Schools, CWA, a camera club, magicians club and a Social Club which formed a close knit community spirit.

The town eventually contained 165 houses and 220 two man cubicles. The peak population in the town was 1,200, with 867 recorded as living in the town in 1961 (McLeary, p. 36; Kakoschke, p. 3), many of them post-war European immigrants who had found work opportunities at Radium Hill.

Closure of the mine

Just over seven years after the signing of the contract to establish the Radium Hill mine, the South Australian Government closed it down, despite Premier Playford's effort to find new buyers, but the expensively produced South Australian uranium 'could never compete in a world uranium glut.' (Cawte, p. 93). Even within Australia, there were, by then, other uranium mines in production using open-cut methods of mining which significantly reduced production costs over those of deep underground mining (Harrington, p. 5). The open cut at Rum Jungle continued to be mined until 1971, well beyond the CDA contract which had established it. Mary Kathleen in Queensland, discovered in 1954 was mined between 1956 and 1963 and was re-opened in the 1970s.

Notification of the closure of Radium Hill was made in October 1961 and production of ore at Radium Hill officially ceased on 15 December 1961 (SAPP 26, 1962; *News*, 5 October 1961, p. 1).

In the months following the closure the residents moved out and much of the infrastructure and buildings were dismantled and removed. By Easter 1962 the main shaft had been capped.

The largest visible remains at the mine site are now the substantial concrete ore bins and primary crusher facility, the bunds of the fuel depot and the tailings heaps, surrounded by numerous concrete footings and fragments of machinery parts and building cladding. The most substantial remains in the township are the 2 million gallon (9ML) concrete water tank on the hill overlooking the town, ruins of the visitors accommodation, the Catholic Church and school, and the swimming pool. The town layout is still clearly evident with paved roads lined with eucalyptus trees. Concrete pads, piers, steps to the houses and some remnant garden edgings are all that remain of the residential accommodation and other facilities.

In August 1975 a 247ha area incorporating the mine site was gazetted as being exempted from the *Mining Act*, which prevents any further mining on the site. This same area was gazetted on 2 April 1981 as 'Reserved for Purposes of a Repository for Low-Level Radioactive Materials' and was placed under the care, control and management of the Minister for Mines and Energy (SAGG 28 August 1975; 2 April 1981). A small quantity of low level waste was subsequently buried within the main tailings dump just south of the mine area.

Following the closure of Radium Hill, three other significant uranium deposits have been discovered in South Australia: Beverley (1969: mined from the late 1970s); the Honeymoon deposit (1972); and Olympic Dam (1975: commenced production 1987).

Chronology:

Date	Event
1906	AJ Smith discovers uranium-ore in the area of Olary
1906	Douglas Mawson field trips to the area and names the ore 'davidite'
1908	Smith's mineral claim lapses and is taken up by the Radium Hill Company
1914	Production stop during World War One
1923-1931	Radium and Rare Earth Treatment Company NL works the site
1940-42	Australian Mining and Smelting Co Ltd works the area
1944	United Kingdom requested the Federal government to investigate uranium Deposits at Mount Painter and Radium Hill for wartime purposes
1945	Test of Trinity atomic bomb in New Mexico Hiroshima was levelled by an atomic bomb Amendments to the <i>Mining Act 1930</i>
1947	Renewed exploration of deposits at Radium Hill
1949	Construction of a crushing and sampling plant Passing of the <i>Uranium Mining Act, 1949</i> Construction begins on Radium Hill Township
1951	Negotiation with US Atomic Energy Commission and the Combined Development Agency (CDA) by Premier Thomas Playford in the United States
1952	Technical mission from the United States visits Australia

1954	Following development of Radium Hill, full scale mining and processing begins
1961	Closure of mine-site and decommissioning of Township
1975	Mine site gazetted as being exempted from the <i>Mining Act</i>
1981	'Reserved for Purposes of a Repository for Low-Level Radioactive Materials'
2006	State-heritage assesses mine-site, townsite and cemetery and defers report awaiting site management and remediation plan by the Department of Mines
2015	Townsite and Cemetery nominated for the SA Heritage Register
2016	Joint DEWNR/DSD site visit to Radium Hill

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 - 28 August 1975, p. 1127
 - 2 April 1981, p. 1018
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www.naa.gov.au/the_collection/cabinet/1952_cabinet_notebooks/1952_events_issue_s.html
- The Radium Hill Historical Association
www.radiumhill.org.au

NAME: Radium Hill Townsite and Pioneer Cemetery

PLACE NO.: 21246

SITE RECORD:

FORMER NAME: Smith's Carnotite Mine, Radium Hill,

DESCRIPTION OF PLACE: Radium Hill town-site remains and the pioneer cemetery. Excludes the Radium Hill mine-site.

DATE OF COMPLETION: 1949-1961

STATE HERITAGE STATUS: **Description:** Nominated
Date: 16 Dec 2015

LOCAL HERITAGE STATUS: **Description:** N/A
Date: N/A

CURRENT USE: **Description:** Interpretive Site
Dates: c2000

PREVIOUS USE(S): **Description:** Mining township
Dates: 1949-1961

ARCHITECT: **Name:** Department of Mines
Dates: c1950

BUILDER: **Name:** Department of Mines
Dates: c1950

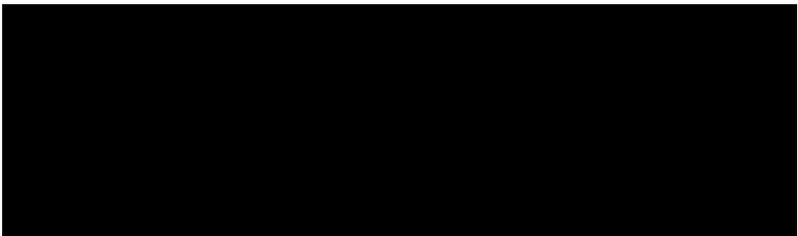
SUBJECT INDEXING: **Group:** Insert Group Type
Category: Insert Category Type

LOCAL GOVERNMENT AREA: **Description:** Pastoral Unincorporated Area

LOCATION: **Unit No.:** N/A
Street No.: 402
Street Name: Maldorky Road
Town/Suburb: Oulnina
Post Code: 5440

LAND DESCRIPTION: **Title Type:** CL
Volume: 1338
Folio: 32
Lot No.: H835400 BL1192
Section: Block 1192
Hundred: Olary

OWNER:



NAME: Radium Hill Townsite and Pioneer Cemetery

PLACE NO.: 21246



RADIUM HILL TOWNSITE AND CEMETERY (LAND PARCELS)

N ↑

Maldorky Station, Barrier Highway, East of Olary

Site plan generally indicating the boundary and important components of the place.

LEGEND

- Proposed or nominated boundary of place
- Cadastral boundary

NAME: Radium Hill Townsite and Pioneer Cemetery

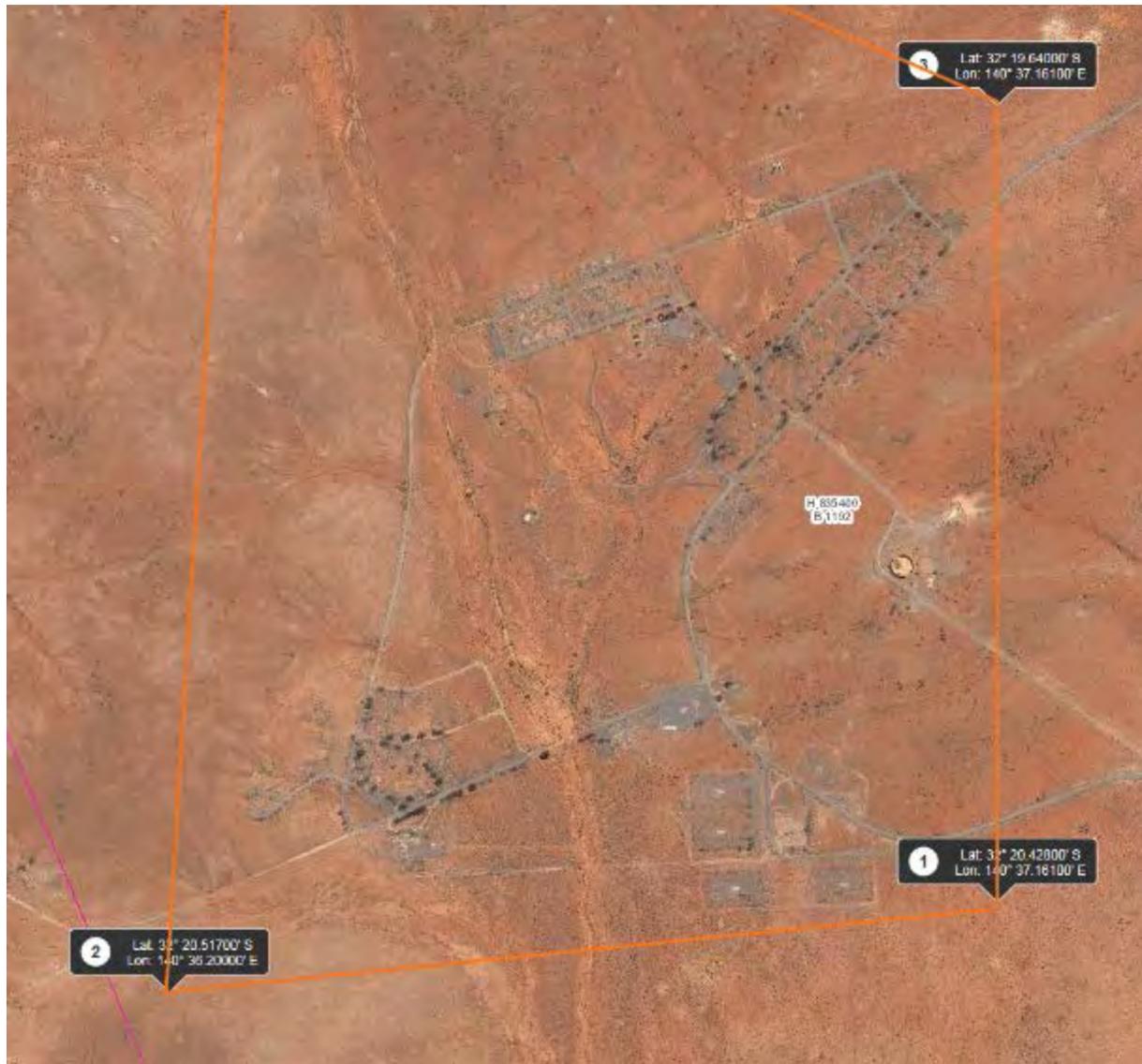
PLACE NO.: 21246



RADIUM HILL TOWNSITE AND CEMETERY AND MINE SITE (SOUTH WEST) N ↑
Maldorky Station, Barrier Highway, East of Olary
Site plan generally indicating the boundary and important components of the place.

LEGEND

— Proposed or nominated boundary of place



RADIUM HILL TOWNSITE

N ↑

Maldorky Station, Barrier Highway, East of Olary

Site plan generally indicating the boundary and important components of the place.

LEGEND

- Proposed or nominated boundary of place
- Cadastral boundary



RADIUM HILL CEMETERY

N ↑

Maldorky Station, Barrier Highway, East of Olary

Site plan generally indicating the boundary and important components of the place.

LEGEND

-  Proposed or nominated boundary of place
-  Cadastral boundary

PHOTOS

NAME: Radium Hill Townsite and Pioneer Cemetery

PLACE NO.: 21246



Replica Memorial commemorating the discovery of Radium Hill by Arthur John Smith (original was reportedly stolen), 2million Gallon Tank on hill in background.



2million Gallon Tank on hilltop



Remains of General Managers residence



Remains of visitor's accommodation

NAME: Radium Hill Townsite and Pioneer Cemetery

PLACE NO.: 21246



Survey marker with Maldorky ranges to rear



Radium Hill Pioneers Cemetery entry portal



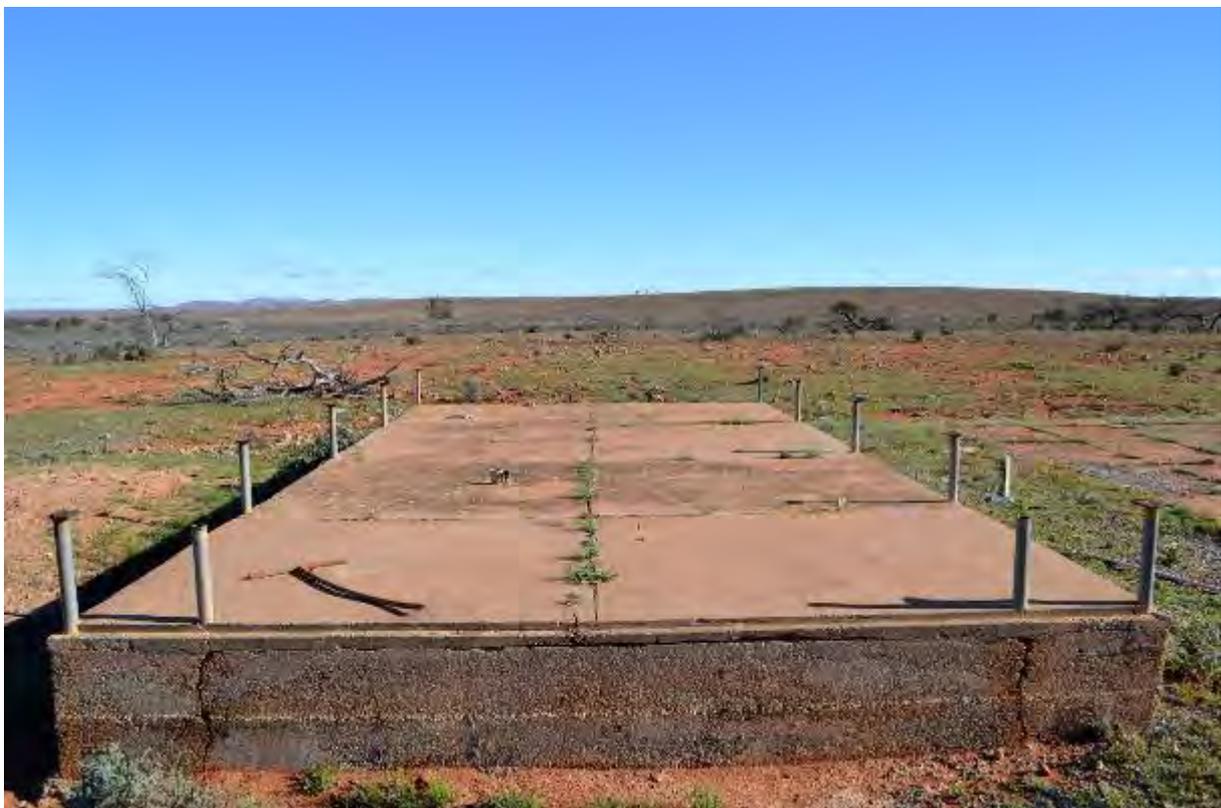
Radium Hill Pioneers Cemetery gravesites



Radium Hill Townsite Tennis Courts



Extant garden borders constructed of glass bottles



Golf clubhouse foundation



Remains of Catholic Church



Remains of Catholic Church

NAME: Radium Hill Townsite and Pioneer Cemetery

PLACE NO.: 21246



Remains of Schoolhouse



Remaining bituminised road, note: avenue of eucalypts

NAME: Radium Hill Townsite and Pioneer Cemetery

PLACE NO.: 21246



Remaining bituminised road, note: avenue of eucalypts



Swimming pool remains



Associated mine-site looking from swimming pool



Site of former Uniting Church, Note: interpretive photo plaque



Site of former drive-in theatre (foundations to rear), Note: interpretive photo plaque



Remains of Post Office, Note: interpretive photo plaque



Concrete floor posts from 'Single men's cubicles'



Foundation of Wet Canteen



Water-tank stands associated with removed residential accommodation



View from Trig point of townsite and water tank



Trig point post for Radium Hill