Submission
No 18

FORMER URANIUM SMELTER SITE, HUNTER'S HILL

Organisation: Hunter's Hill Council

Name: Mr Barry Smith

Telephone: 9879 9431

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Hunter's Hill Council

Submission

Upper House Inquiry

Former Uranium Smelter Site, Hunter's Hill

June 2008

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Contents

The following submission is made in response to the General Purpose Standing Committee No. 5 inquiry into and report on the Radium Hill uranium smelter site in Nelson Parade, Hunter's Hill.

Introduction

The site in Nelson Parade, Hunter's Hill has been the subject of considerable media attention and speculation since the beginning of this year. Continued speculation and misinformation have created a significant sense of ill ease and stress within the local community.

Council considered a report concerning claims that Hunters Hill contains a secret nuclear waste dump and resolved as follows:

Min. No. 32/08 RESOLVED on the motion of Clr Quinn, seconded Clr Astridge that:

1. Council write to the Minister for the Department of Environment & Climate Change and Minister for Health requesting:

    (a) The complete removal of all contaminated material from 7-9 Nelson Parade and the foreshore of 11, 13 and 15 Nelson Parade, provided that this can be done safely and to an appropriate site.

    (b) The provision of a current risk assessment, or other current and appropriate information, on Nos. 7, 9, 11, 13 and 15 Nelson Parade, that will provide Council and the residents of Nelson Parade and Hunters Hill with certainty about the safety of these sites.

To date the Council has not received a satisfactory response to these requests, nor have the sites in question been adequately re-tested to enable a current risk assessment to be undertaken.

Background

Radium Hill was Australia's first uranium mine and was even a producer of radium for the Curies in France. Prospector A. J. Smith, who at first thought the heavy dark rock to be an ore of tin, discovered the first sign of uranium mineralisation at Radium Hill in 1906.

The Radium Hill Co. took over the claim, and six hundred tonnes of ore were mined by 1911. Other companies worked without success, and by the end of

the First World War five shafts had been sunk and abandoned. The ore concentrate was treated in New South Wales and Victoria to yield a few hundred milligrams of radium and a several hundred tonnes of uranium by-product.

In 1908 commercial mining began to extract radium for medical uses (e.g. - as a cancer therapy). A small mill onsite pre-concentrated the ore, with the output processed at Hunters Hill, Sydney. Uranium is a waste product, also used in ceramics and paints*. (Uranium In Australia: A Detailed Timeline1869 to 1969 Compiled by the SEA-US Webmaster)*

The mill also processed the uranium for the purpose of extracting radium to be used in clock and watch making and occupied a site covering numbers 5, 7, 9 and 11 Nelson Parade, Woolwich for a few years from 1908 to possibly only 1911.

These are fairly well known and acknowledged facts. This facility was not in any way a nuclear processing operation, but certainly did leave deposits of radioactive residue waste in certain locations. These locations are made particularly clear in a report prepared by Egis Pty Ltd in 1999, based on a study undertaken by Sinclair Knight and Partners on 1987. (Appendix 1)

Gavin Mudd in '*The Legacy of Early Uranium Efforts in Australia, 1906-1945: From Radium Hill to the Atomic Bomb and Today*', Historical Records of Australian Science, 2005, 16, 169-198, CSIRO Publishing, states that in 1978 the NSW State Government announced proposals to remove 3000 tonnes of radioactive waste from six blocks of land. The project stalled as no permanent disposal site could be found.

This in stark contrast to the quantities stated in the Egis report

1. "…a small amount (3-4 cubic metres) of contaminated soil was transferred from No. 5 and 11 to No. 7 and 9.

2. "…around 7 September 1992, following demolition of the houses on No 7 and No 9, …the 'hot spot' of radioactive contamination under the kitchen area of No 7 (which was the source of the radon hazard identified by Scott, 1977) was supposedly dug up, sealed in 200 L drums and relocated to the Lidcombe site of DOH Radiation Health Services Branch".

3. “…removed a smaller amount of extra soil from near the pool on No 5 Nelson Parade sometime between 8 February 1993 and 25 February 1993”.

The current proposal by GHD suggests that 1250 cubic metres as a guide to the amount of material to be removed.

What seriously concerns Council and the community, are:

1. The wide and varied estimates of the volume of contaminated material
2. The exact sites upon which contaminated material is situated
3. The levels of radiation emanating from these sites
4. How and when the sites will be remediated.

The terms of reference for this inquiry are addressed in the following submission and are directly related back to the above concerns.

(a) Any rehabilitation or remediation of the site previously undertaken

Rehabilitation and remediation of the site previously undertaken is best described by Gavin Mudd in '*The Legacy of Early Uranium Efforts in Australia, 1906-1945: From Radium Hill to the Atomic Bomb and Today*', Historical Records of Australian Science, 2005, 16, 169-198, CSIRO Publishing. (Appendix 2)

In considering this area it is worth visiting the historical picture provided by Gavin Mudd in respect of the remediation efforts of the 1980's as contained under the heading of – 'The Legacy: Urban Radioactive'. *(p. 186-189).*

1913 Liquid wastes probably discharged into harbour, solid wastes stored or dumped nearby.

1965 Proposed changes to residential development saw several walls and terraces constructed and solid wastes and contaminated liquids used as fill *(please refer to evidence from Graeme Camp)*

"Although several locations showed high gamma dose levels and some radium uptake in plants and vegetables, the site was determined to be safe for residential use and investigations ceased in 1966." *(p. 187)*

1976 In light of new issues the NSW Health Commission re-investigated the site. *"It was now thought that the main reason for concern was possible exposure to radon and its radioactive progeny, not gamma radiation as previously thought." (P187)*

Radiation exposure was found to be significantly above the then public standard of 5 mSv per annum.

Soil samples were also found to be elevated in thorium consistent with uranium processed and it was suggested that over time the decay of the thorium would lead to more radium and therefore radon.

What is very significant here is that Mudd states that *" ...this situation is different from common forms of radioactive waste that gradually decline in specific radioactivity over time, whereas that at Woolwich would slowly increase." (p. 188)*

1978 NSW State Government announces proposal to remove 3000 tonnes of radioactive waste from six blocks of land.

Project stalls as no permanent disposal site can be found.

1982 Government directive sees NSW Department of Health purchase three blocks of land. One of these was "…remediated and 'made safe', with the contaminated soil removed and transferred to the adjacent block s for storage." *(P188)*

It is presumed that this reference is to No. 11 being made safe and the contaminated material transferred to No. 7 & 9.

No. 7 and 9 were fenced off, re-vegetated and warning signs erected.

1992 Houses remaining on No. 7 and 9 were demolished.

In considering the extent of contamination and radioactivity levels after 1992 the most recent comprehensive investigation is contained in the following publication:

'Stage One investigation of Radioactive Contamination Numbers 7 and 9 Nelson Parade, Hunters Hill for New South Wales Department of Health, by Egis Consulting Australia, November 1999'.

Egis Consulting found from a search of various archival materials the following as contained on page 15 and 16 of the report that.

1. "These searches revealed correspondence that showed that, at the direction of the Secretary of DOH, acting on the 22 June 1982 resolution of State Cabinet, a small amount (3-4 cubic metres) of contaminated soil was transferred from No. 5 and 11 to No. 7 and 9".

2. "…around 7 September 1992, following demolition of the houses on No 7 and No 9, …the 'hot spot' of radioactive contamination under the kitchen area of No 7 (which was the source of the radon hazard identified by Scott, 1977) was supposedly dug up, sealed in 200 L drums and relocated to the Lidcombe site of DOH Radiation Health Services Branch".

3. “Our search of State archives also showed …removed a smaller amount of extra soil from near the pool on No 5 Nelson Parade sometime between 8 February 1993 and 25 February 1993”.

4. “In so far as we have been able to determine, there seems to be no existing records documenting:

    - the relocation of contaminated soils from No 1 and 5 onto No 7 and 9 in 1982/3; and/or
    - following the SKP, 1987, investigation and subsequent demolition of the house on No 7, the relocation of soils from the ‘hot spot’ that lay under the house on No 7 or the relocation of soils from around the pool in No 5.”

The Egis report also generally confirms the distribution of contaminated soils on No 7 and No 9 as identified in a study undertaken by Sinclair Knight and Partners (SKP) in 1987. However the report makes no mention of No 5, 9 or 11.

These two reports cast very serious doubts about the quantity of material removed and the quality of remediation undertaken on these sites.

On this basis Council believes that a new benchmark, or starting point, needs to be established before any works are undertaken. The following recommendation is made in light of Councils previous request and in the interests of establishing a reliable baseline from which a remediation strategy can be prepared.

Recommendation to Committee:

That the Committee recommends to the State Government that the Council and residents request for a current risk assessment should be undertaken as a matter of urgency.

AND

This assessment should involve ANSTO being requested to:

(i) Re-test all sites from its 1987 report for SKP and provide comparative data

(ii) Undertake testing on No 5, 11 and 13 (including under each existing dwelling)

(iii) All test results to be compared against current world best practice standards and current ARPANSA standards

(iv) All information and results are to be made publicly available.

(b) The extent of contamination and radioactivity levels

It should be noted that while the land subject to the current proposal is No.7 and 9, questions have also been raised in respect of material at Nos 5, 11, 13 and 15. The status of these lands should also be clarified in any further investigations, or testing, to fully satisfy any on-going concerns of Council and the residents.

Council has been assured by staff from the Department of Environment & Climate Change (DECC), that these sites are safe and that radiation levels emanating from the site are below the levels at which it would be necessary for regular monitoring to take place.

Council understands that a risk assessment in respect of radiation levels for the site was undertaken in 2002, and while those levels were satisfactory at the time, it would certainly provide the community with a greater sense of comfort if a current risk assessment, or some other reliable information on the radiation levels was obtained and provided to Council and local residents before any work is commenced on the site.

However, Council has recently been provided with a copy of a report prepared by Australian Radiation Services Pty Ltd that raises serious concerns regarding any advice previously provided to Council

These concerns are further supported by the knowledge that ANSTO has "…*not been asked to test the soil …or measure the risk of people ingesting radioactive dust particles*." (SMH 26.06.08)

What were ANSTO asked to do? One might cynically suggest that they were simply asked to critique and as a result discredit the testing process conducted previously and referred to by the Member for the Hills, Michael Richardson MP.

In considering the extent of contamination and radioactivity levels the most recent comprehensive investigation is contained in the following publication:

'Stage One investigation of Radioactive Contamination Numbers 7 and 9 Nelson Parade, Hunters Hill for New South Wales Department of Health, by Egis Consulting Australia, November 1999'.

1977 Scott points out that contamination should be viewed with greater concern than previously as the extraction or radium had not been accompanied by the removal of it parent uranium. *(P 7)*

The Egis report states that: *"…As Radium has a half-life of only 1600 years, it will therefore 'grow' back into secular equilibrium with thorium-230 by about one0half every 1600 years. In other words, the net radioactivity of the soils on the site will steadily increase with time due to radiul-226 ingrowth." (P 8)*

1987 Sinclair Knight and Partners (SKP) were contracted by the Department of Health to undertake a Review of Environmental Factors (REF) for remedial option for No. 5, 7, 9, 11 and 13 Nelson Parade.

(ANSTO were subcontracted by SKP to conduct detailed soil sampling and gamma radiation analysis of surface and sub-surface soils).

At his point it should be noted that the DOH did not request this level of analysis in its most recent request to ANSTO. *(See SMH article 26.06.08)*

The extent of contamination and radioactivity levels is also directly linked to rehabilitation and remediation of these sites. The previous section (a) of this submission is also very relevant. There are very, very serious and legitimate concerns that the real extent of contamination and radiation levels has never been properly, or appropriately, assessed or addressed.

The Egis report only examines results from No7 and 9 and makes no reference to No 5, 11 or 13.

The Mudd article also raises concerns when it states the following:

1976 In light of new issues the NSW Health Commission re-investigated the site. *"It was now thought that the main reason for concern was*

possible exposure to radon and its radioactive progeny, not gamma radiation as previously thought." (P187)

Radiation exposure was found to be significantly above the then public standard of 5 mSv per annum.

Soil samples were also found to be elevated in thorium consistent with uranium processed and it was suggested that over time the decay of the thorium would lead to more radium and therefore radon.

What is very significant here is that the public standard of the day was 5 mSV.

Today that standard is 1 mSv under the 'Dose Limit' for the public contained in the national Directory for radiation Protection..

This obvious scarcity of any detailed reports and lack of information supports the Council and residents request for a current risk assessment to be undertaken.

Recommendation to Committee:
That the Committee recommends to the State Government that the Council and residents request for a current risk assessment should be undertaken as a matter of urgency.

AND

This assessment should involve ANSTO being requested to:

1. Re-test all sites from its 1987 report for SKP and provide comparative data
2. Undertake testing on No 5, 11 and 13 (including under each existing dwelling)
3. All test results to be compared against current world best practice standards and current ARPANSA standards
4. All information and results are to be made publicly available.

(c) The impact of any contamination on public health and the environment

As previoulsy resolved by State Government as far back as 1966, both Council and the local community would support the complete removal of all contaminated material from the site, provided that this could be done safely and to an appropriate site, and not simply move the same problem to someone else.

The obvious scarcity of any detailed reports and lack of information, as identified in the two previous sections, has undermined public confidence and created a climate of concern and uncertainty. It is impossible to tell from available information what impact contamination has had on public health and the environment in the past.

It is acknowledged worldwide that no level of radiation is safe and these sites were previously measured against the standard of the day of 5 mSv. This is now completely unsatisfactory given that the standard is now 1 mSv and current radiation and contamination levels need to be tested and advised in accordance with current standards.

What is absolutely essential to the future public health of residents and the environment is that all suggested sites are thoroughly and comprehensively tested and the results made publicly available at the earliest opportunity.

Recommendation to Committee:
That the Committee recommends to the State Government that the Council and residents request for a current risk assessment should be undertaken as a matter of urgency.

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This assessment should involve ANSTO being requested to:

1. Re-test all sites from its 1987 report for SKP and provide comparative data
2. Undertake testing on No 5, 11 and 13 (including under each existing dwelling)
3. All test results to be compared against current world best practice standards and current ARPANSA standards
4. All information and results are to be made publicly available.

(d) The appropriateness of the Government's planned remediation strategy

The site is known as 7 and 9 Nelson Parade, Hunters Hill, and includes adjoining foreshore land, as shown in Figure 2. *(Page 3 of GHD Report 2007and Appendix 2 attached)*

The site consists of four parcels of land (of which two are reclaimed foreshore land).

The site has a total area of 1,972.5 m2, the distribution of which is summarised in below.

Street Address	Approximate Area (m2)
7 Nelson Parade	765.1
9 Nelson Parade	689.0
Rear 11 Nelson Parade (Foreshore Land)	164.4
Remaining Foreshore land	354.0

The proposal involves the remediation of the site in order to render the site suitable (from an environmental and health perspective) for 'standard' low density residential use. The GHD report does not mention the level to which the site would be suitable but Council would contend that this should be no more than 1 mSv.

The subject lots are currently zoned for residential purposes and the proposal suggests that the sites will be redeveloped in accordance with the provisions of the relevant Council zoning.

This would suggest the construction of separate residential dwellings on each of Nos. 7 and 9 Nelson Parade. However, this does not form part of the current proposal.

The GHD report estimates the volume of contaminated soil requiring excavation and off-site disposal is (approximately):

- Upper (terraced) area: 700m3
- Lower (foreshore) area: 550m3

GHD also advises that these estimates are subject to a number of assumptions, and should be viewed as indicative only.

A review of the preliminary environmental assessment prepared by GHD, advises that the anticipated volume of soil requiring excavation and off-site disposal is 1,250 cubic metres and that:

"...the current contamination status of the subject site may be summarised as follows:

- *The upper areas of the site (i.e. Lots 7 and 9) contain elevated levels of radium.*

  The upper areas are, however, seemingly not subject to any chemical contamination at concentrations above the relevant (residential) land use criteria.

- *The lower (foreshore) areas have been filled, using crushed sandstone with some ash and black gravel (coal, charcoal and/or slag) inclusions. Levels of radium in parts of the foreshore area have also been demonstrated to be marginally above the relevant site validation criteria.*

Thus for the purpose of assessment of contamination on the site, remediation is required to a standard compatible with a 'standard' residential land use before development can be permitted".

The proposal is silent on detailed information regarding material on 5, 11 and 13 Nelson Parade.

Previous attempts at remediation are described in earlier sections of this submission and it is not unreasonable to say that there are serious doubts about the outcomes of those efforts and as a result the proposed remediation strategy.

Based on the unreliability and paucity of historical information available and the recent independent tests undertaken by Australian Radiation Services Pty Ltd Council cannot support the proposed remediation strategy.

Any proposed remediation strategy must be based on sound, proper and current data. This can be achieved by agreeing with the request made by Council for the re-testing of the sites and preparation of a current risk assessment.

Recommendation to Committee:

That the Committee recommends to the State Government that following completion of a current risk assessment and the provision of current test results, NSW Health in conjunction with NSW DECC should prepare a revised remediation strategy based on world best practice and current ARPANSA standards, including a comprehensive community consultation process.

(e) Disposal of waste from the site.

Council has concerns about three aspects of disposal of waste from the site.

These are:

1. How will the material be processed on the site?

2. How will the material be transported from the site?

3. How and where will the material be disposed?

In considering this matter it is worth revisiting the historical picture provided by Gavin Mudd in respect of the remediation efforts of the 1980's as contained under the heading of – 'The Legacy: Urban Radioactive'. *(p. 186-189).*

1913 Liquid wastes probably discharged into harbour, solid wastes stored or dumped nearby.

1966 Proposed changes to residential development saw several walls and terraces constructed and solid wastes and contaminated liquids used as fill *(please refer to evidence from Graeme Camp)*

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decay of the thorium would lead to more radium and therefore radon.

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1979 NSW State Government announces proposal to remove 3000 tonnes of radioactive waste from six blocks of land.

Project stalls as no permanent disposal site can be found.

1982 Government directive sees NSW Department of Health purchase three blocks of land. One of these was "…remediated and 'made safe', with the contaminated soil removed and transferred to the adjacent block s for storage." *(P188)*

It is presumed that this reference is to No. 11 being made safe and the contaminated material transferred to No. 7 & 9.

No. 7 and 9 were fenced off, re-vegetated and warning signs erected.

1993 Houses remaining on No. 7 and 9 were demolished.

1995 In response to a Council inquiry monitoring of the site ceases when EPA declares that material is of a nature that will not change in the short term and monitoring is unnecessary.

The Egis report found from a search of various archival materials the following as contained on page 15 and 16.

1. "These searches revealed correspondence that showed that, at the direction of the Secretary of DOH, acting on the 22 June 1982 resolution of State Cabinet, a small amount (3-4 cubic metres) of contaminated soil was transferred from No. 5 and 11 to No. 7 and 9".

2. "…around 7 September 1992, following demolition of the houses on No 7 and No 9, …the 'hot spot' of radioactive contamination under the kitchen area of No 7 (which was the source of the radon hazard identified by Scott, 1977) was supposedly dug up, sealed in 200 L drums and relocated to the Lidcombe site of DOH Radiation Health Services Branch".

3. “Our search of State archives also showed …removed a smaller amount of extra soil from near the pool on No 5 Nelson Parade sometime between 8 February 1993 and 25 February 1993”.

4. “In so far as we have been able to determine, there seems to no existing records documenting:

    - the relocation of contaminated soils from No 1 and 5 onto No 7 and 9 in 1982/3; and/or
    - following the SKP, 1987, investigation and subsequent demolition of the house on No 7, the relocation of soils from the ‘hot spot’ that lay under the house on No 7 or the relocation of soils from around the pool in No 5.”

The above statement (No.4) is a very real concern, as this effectively means that all previous actions on the site cannot be verified. On this point alone it is imperative that all sites are re-tested and compared to current standards.

Martin Kelly (BSc (1st class) Theoretical Physics, PhD Theoretical Physics) is an expert in this area and he has worked at Serco Assurance for 13 years working on problems of radioactive waste management, contamination and disposal. His particular areas of expertise are radiation dose assessment and health effects, repository performance assessment, decision analysis and mathematical modelling of radionuclide transport in the geosphere and biosphere (where we live).

The following are some of his comments on disposal of radioactive material. These comments create some independent perspective about the need to prudent and diligent in managing the disposal of radioactive waste.

How do we dispose of nuclear waste?

The disposal of radioactive wastes, such as those produced during nuclear power production, depends on the nature of the wastes. Wastes are usually classified according to the danger they pose, and the classifications include Low Level, Intermediate Level and High Level radioactive waste. These are usually abbreviated as LLW, ILW and HLW, respectively. Some LLW is sufficiently inert that it can be disposed in ordinary household land-fill sites. Most LLW and some ILW can be disposed in "shallow" waste repositories, built a few metres or more under the ground surface. At the present time, it is believed that the remaining ILW and HLW is best

disposed of in deep waste repositories, built many hundreds of metres under the ground

How do we know the disposal method is safe?

One can never say with 100% certainty that any radioactive waste disposal is completely safe, in much the same way that no other activity (e.g. crossing the road) can be considered totally safe. However, before a disposal facility is built and operated, it undergoes extremely rigorous safety analyses to ensure that it will perform to the required safety levels (I do this type of work for a living). In the UK and most other countries, this analysis is subject to public enquiry and can only be authorised by the government. Perhaps because of this, very few deep disposal facilities have been authorised around the world.

Can you prove that?

As noted above, one cannot demonstrate that a disposal facility is totally safe, in the sense that no radioactive wastes will ever return to the environment accessible by humans (and animals and plants). Most safety assessments attempt to predict the quantities that will return and what the radiological consequences will be. In the UK and most other countries (except the USA ...) it must be demonstrated that the radiological effects are negligible over a time period of at least 1,000,000 years. The safety assessments consider the various mechanisms that will return radionuclides to the accessible environment, the most important of which is usually the dissolving of wastes in groundwater and their subsequent migration through rocks back to the ground surface

Why is deep disposal the best way?

Deep disposal is considered by many people to be the most effective means for disposing of ILW and HLW. The reason is that deep disposal provides the greatest degree of isolation of the wastes, and hence would require the greatest length of time before the wastes could migrate back to the accessible environment (and hence give the radioactive materials the greatest amount of time to decay). Although deep disposal might not completely prevent some wastes from re-appearing (especially those with long radioactive half lives), the time required for this to happen would result in considerable dilution of the wastes, with a consequent reduction in radiological consequences.

But how can you be so sure?

Because the other options simply don't provide the same advantages of deep disposal. For example, shallow disposal (for LLW and some ILW) provides a greater opportunity for future human activities to disturb the repository contents. Indefinite storage at the ground surface (another often-cited alternative) is susceptible to terrorist and other deliberate attacks, for example 9/11 style sabotage.

Are there any "rules" for radioactive waste disposal?

Yes, and in most countries the rules are very strict. In the UK, the performance of any waste disposal facility is subject to radiological risk limits and targets. Radiological risk is a measure of the probability of cancer induction from repository derived wastes, and in the UK, the risk limit is this: in one year, there should be nor more than one fatal cancer induction per million people from repository derived wastes. To provide some context, this risk limit is about 100 times smaller than the radiological risk that results from natural background radiation.

What other options are there?

Apart from burial underground, the (serious) options include burial under the sea bed and firing the wastes off into space. However, burial under the sea bed is banned by international law, and firing into space can easily be shown to be a hopeless option. The problem is this. While putting the wastes into space would provide the ultimate isolation of wastes from humans on earth, the consequences of a rocket crash during lift-off are unimaginable - imagine all that HLW being falling fro the sky and being scattered over the ground surface. The safety record of rockets is not good enough to rule out the possibility of a crash, and it would be very easy to show that the radiological risks from this option are unacceptably high.

What are the issues facing waste disposal?

There are many issues facing radioactive waste disposal at the present time. One of the principal concerns at the moment is that there are large quantities of waste around the world currently in storage, waiting for someone to take a decision about what to do with them. This is certainly true in the UK, where the refusal of planning permission for an underground laboratory at Sellafield in Cumbria threw the UK's deep disposal plans into chaos. From a personal perspective, I think that a big issue is the communication of the issues to the general public. To non-experts, the issues must seem very confusing, and unfortunately the safety analyses of disposal facilities and the results of those analyses are technically complex and challenging to understand - even for experts! Many people, perhaps understandably, equate all talk of radioactivity with what happened at Chernobyl and atom bombs. Convincing folk that this is not the case is a major challenge

What happens to the waste before being disposed of?

Most HLW and some ILW is extremely radioactive, and when it is removed from the nuclear power reactor where it is generated, is extremely hot (because of the high levels of radioactivity) and will remain so for many years. Such wastes are stored in cooling ponds until the excess heat and radioactivity has been dissipated. Once this has happened, the wastes go into surface storage until a satisfactory and permanent means of disposal can be found

There are also Australian Standards that should be applied to any site to which material may be disposed.

No 7 and 9 are effectively acting as storage sites and they should meet the same criteria as any other site selected to become the repository of any contaminated material removed from these or other sites identified in a current risk assessment.

"The Surface Disposal of Radioactive Waste (the "NHMRC Near Surface Disposal Code provides the following site selection criteria:

- the facility site should be located in an area of low rainfall, should be free from flooding and have good surface drainage features, and generally be stable with respect to its geomorphology
- the water table in the area should be at a sufficient depth below the planned disposal structures to ensure that groundwater is unlikely to rise to within five metres of the waste, and the hydrogeological setting should be such that large fluctuations in the water table are unlikely
- the geological structure and hydrogeological conditions should permit modelling of groundwater gradients and movement, and enable prediction of radionuclide migration times and patterns
- the disposal site should be located away from any known or anticipated seismic, tectonic or volcanic activity which could compromise the stability of the disposal structures and the integrity of the waste
- the site should be in an area of low population density and in which the projected population growth or the prospects for future development are also very low
- the groundwater in the region of the site which may be affected by the presence of a facility should ideally not be suitable for human consumption, pastoral or agricultural use
- the site should have suitable geochemical and geotechnical properties to inhibit migration of radionuclides and to facilitate repository operations.

The Code goes on to say that other factors, which shall also be considered, are:

- the site for the facility should be located in a region which has no known significant natural resources, including potentially valuable mineral deposits, and which has little or no potential for agriculture or outdoor recreational use
- the site should have reasonable access for the transport of materials and equipment during construction and operation, and for the transport of waste into the site

- the site should not be in an area which has special environmental attraction or appeal, which is of notable ecological significance, or which is the known habitat of rare fauna or flora
- the site should not be located in an area which is of special cultural or historical significance
- the site should not be located in reserves containing regional services such as electricity, gas, oil or water mains
- the site should not be located in an area where land ownership rights or control could compromise retention of long-term control over the facility.

Consistent with the position that the site selection criteria are one part of an overall safety assessment, the NHMRC Code notes that:
*A potential site may not necessarily comply with all of these criteria. However, there should be compensating factors in the design of the facility to overcome any deficiency in the physical characteristics of the site***".**

There are very real concerns from the community, both in Hunters Hill and the broader community as to how and where material removed from the site will be disposed.

Recommendation to Committee:
That the Committee recommends to the State Government that:

1. Material removed from the site is transported in accordance with the ARPANSA code of practice for 'Safe Transport of Radioactive Material, 2008 Edition.'
2. Material is disposed of in accordance with the ARPANSA 'Regulatory Guidance for Radioactive Waste Management Facilities: Near Surface Disposal Facilities: and Storage Facilities, December 2006'.

Conclusion

There are five major issues that Council submits to the inquiry must be resolved and a number of actions required to resolve those issues.

- **Issues**

1. Uncertainty about the locations and volumes of contaminated material on No 5, 7 9 11 & 13 Nelson Parade, Hunters Hill.
2. The validity of the Section 55 Certificates issued for No 5, 11 & 13 Nelson Parade, Hunter's Hill, given that no documentation can be located that confirms what, if any, remediation occurred on these sites. *(Egis Report Page 16)*
3. The issuing of Section 55 Certificates for No 5 and 11 has meant that since that time all focus has been on No 7 & 9, without considering the validity of those clearances, as identified in the SKP study in 1987.
4. Given that no level of radiation is considered safe, what levels of radiation currently exist on No 5, 7 9 11 & 13 Nelson Parade, Hunters Hill, compared to the dose limit for the public of 1 mSv in a year, as contained in the National Directory for Radiation Protection - Schedule 1.
5. Based on the results of 4 above what is the current level of risk to the residents of specifically of No 5, 11 & 13 Nelson Parade, Hunter's Hill and to all other residents of Nelson Parade and adjoining streets in the neighbourhood, of exposure to unsafe levels of radiation.

- **Actions**

These issues can only be resolved by:

1. Requiring the NSW Department of Health to engage ANSTO to properly identify and test all five sites, and a number of adjoining benchmark sites, and to make these findings publicly available at the earliest opportunity.

   This assessment should involve ANSTO being requested to:

   (i) Re-test all sites from its 1987 report for SKP and provide comparative data

   (ii) Undertake testing on No 5, 11 and 13 (including under each existing dwelling)

(iii) All test results to be compared against current world best practice standards and current ARPANSA standards

2. Following the completion of the testing a revised risk assessment and risk management strategy being prepared and implemented as a matter of urgency.

3. NSW Health in conjunction with NSW DECC preparing a revised remediation strategy based on world best practice and current ARPANSA standards, including a comprehensive community consultation process.

4. Material removed from the site is transported in accordance with the ARPANSA code of practice for 'Safe Transport of Radioactive Material, 2008 Edition.'

5. Material is disposed of in accordance with the ARPANSA 'Regulatory Guidance for Radioactive Waste Management Facilities: Near Surface Disposal Facilities: and Storage Facilities, December 2006'.

These actions are encapsulated in a series of Recommendations to the Committee at the conclusion of the discussion on each area of the terms of reference.

Council appreciates the opportunity to provide a submission to the inquiry and we look forward to appearing in person to discuss Council and community concerns.

Should you require any further information, or wish to discuss the matter please do not hesitate to contact me on 9879 9431 or email genmanager@huntershill.nsw.gov.au

Yours sincerely

Barry Smith
General Manager

Bibliography

1. *'The Legacy of Early Uranium Efforts in Australia, 1906-1945: From Radium Hill to the Atomic Bomb and Today'*, Gavin Mudd. Historical Records of Australian Science, 2005, 16, 169-198, CSIRO Publishing.

2. *'Stage One Investigation of Radioactive Contamination Numbers 7 and 9 Nelson Parade, Hunters Hill for NSW Department of Health'*, Egis Consulting Australia, 1999.

3. *'National Directory for Radiation Protection – Edition 1'*. ARPANSA, August 2004.

4. *'Code of Practice for Safe Transport of Radioactive Material'*, ARPANSA, 2008 Edition.

5. *'Regulatory Guidance for Radioactive Waste Management Facilities: Near Surface Disposal Facilities: and Storage Facilities'*, ARPANSA, December 2006.

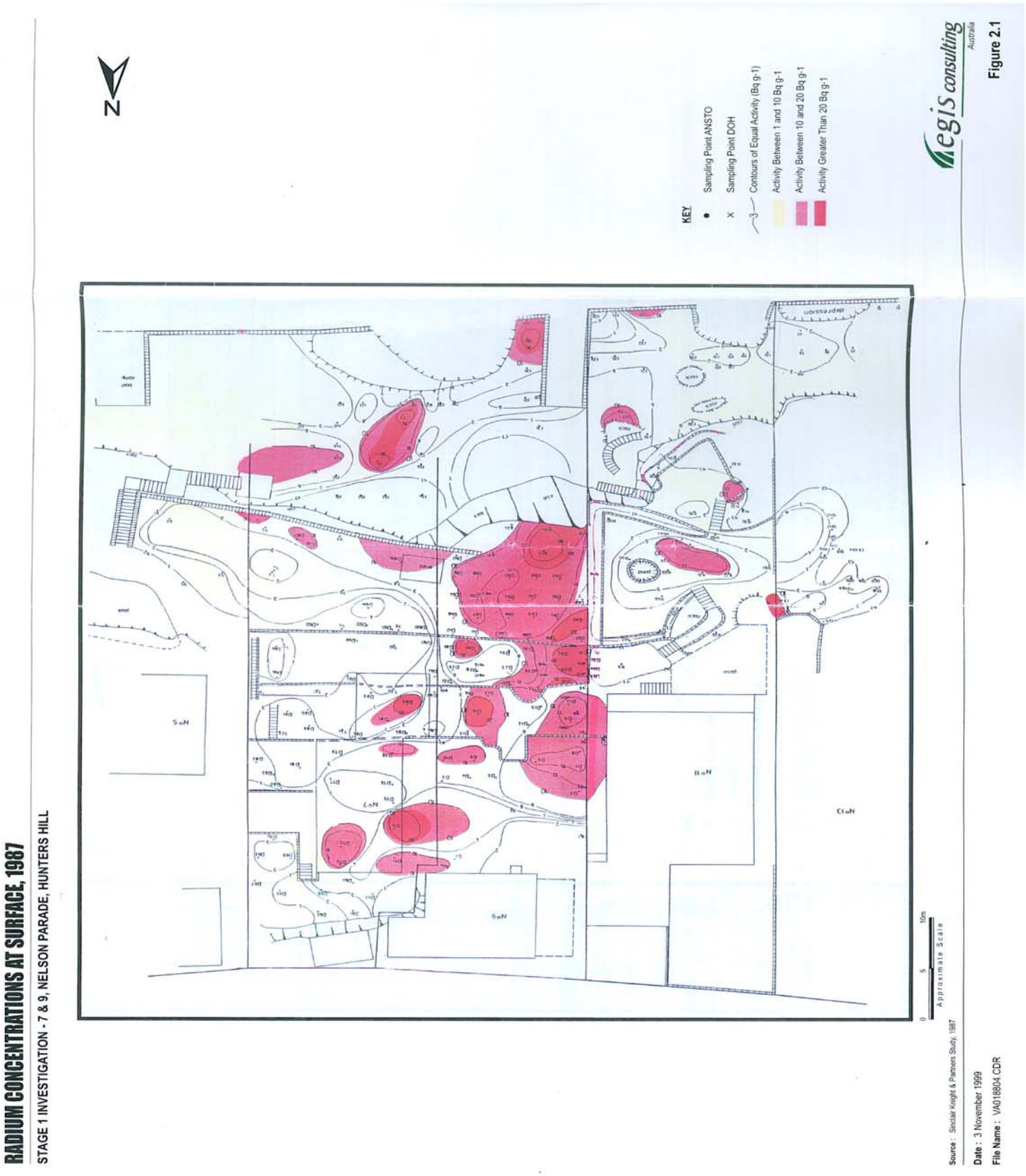
6. *www.* Martin Kelly (BSc (1st class) Theoretical Physics, PhD Theoretical Physics)

7. ARPANSA – Australian Radiation protection and Nuclear Safety Agency

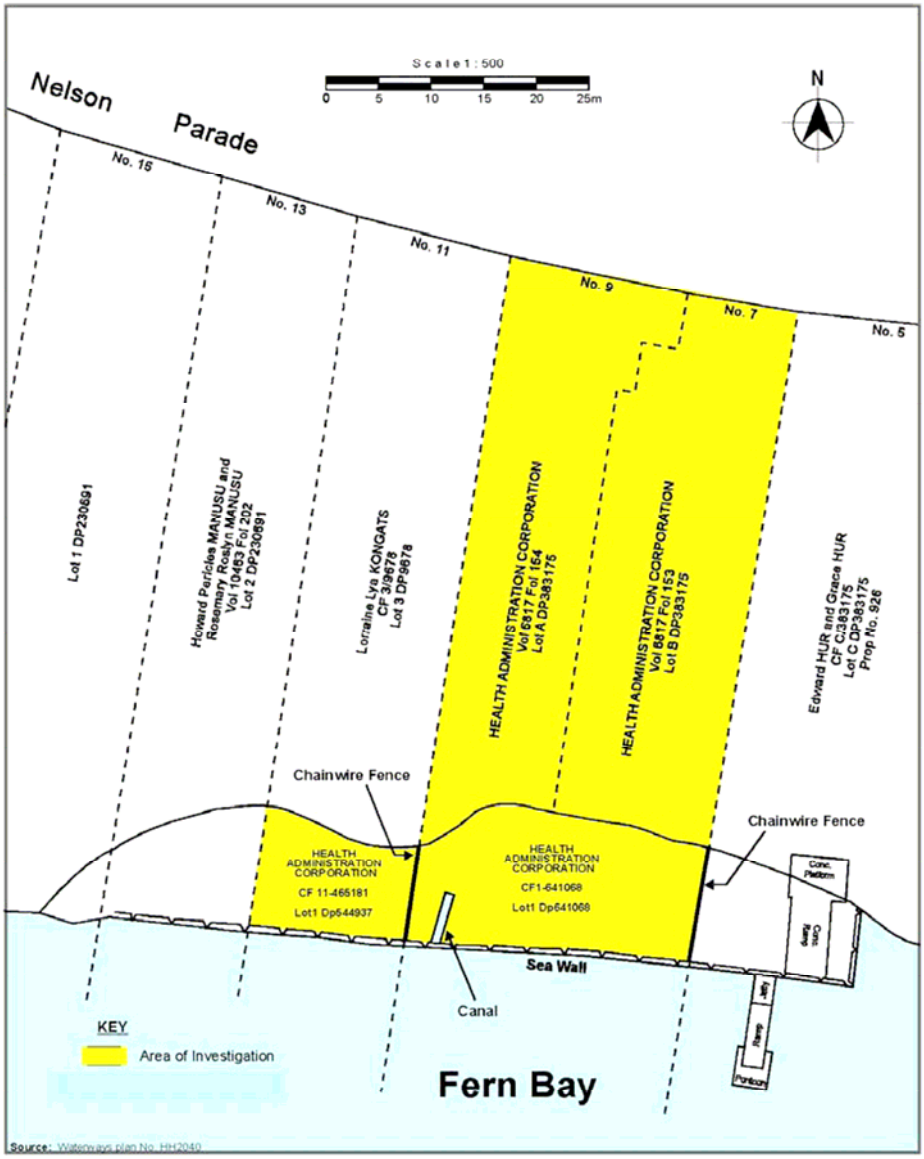
8. ANSTO – Australian Nuclear Science Testing Organisation

Appendices

1. Radium Concentrations at Surface, 1987, Sinclair Knight & Partners



2. Site Locations, 1999, Egis Consulting Australia



3. Site Plan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