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Update on the National Low Level Radioactive Waste Repository Study

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SUMMARY Activity to establish a national repository for low-level and short-lived intermediate-level radioactive waste began in the early 1980's. From the early 1990's computer-based geographic information systems had developed sufficiently so that all of Australia could be quickly reviewed using digital data relevant to site selection criteria. A three-phased approach to site selection was commenced which included an iterative process of data collection, interpretation, and public involvement through discussion papers. All of Australia was reviewed using national-scale data, and eight broad regions were identified and reviewed using regional-scale data. A third phase report will be released shortly which includes details on the process for identifying the preferred region of the eight. This region will be the focus for public involvement and for detailed study to identify a site for the national repository.

1. INTRODUCTION

Active interest and activity in siting a national repository for Australia's low- and short-lived intermediate-level radioactive waste began in the early 1980's. A joint Commonwealth/State Consultative Committee (C/SCC) was formed (1) and the Australian Atomic Energy Commission (AAEC) undertook a study (2) demonstrating that existing information could be used for an initial suitability assessment using the guidelines published by the International Atomic Energy Agency (IAEA) (3). Each State and Territory, with the exception of Victoria, then undertook initial screening studies indicating that potentially suitable sites were widespread in Australia. The Northern Territory Government subsequently commissioned the Australian Nuclear Science and Technology Organisation (ANSTO) to undertake a feasibility study (4) but later withdrew its support for further work.

In 1992, the Minister for Primary Industries and Energy announced that the National Resource Information Centre (NRIC) would conduct a new Australia-wide siting study for a repository. The new study would use national databases with a geographic information system (GIS) to review site criteria defined by the National Medical Health and Research Council (NHMRC) (5). A feature of the new study was that it would simultaneously review the whole country to provide a nationally objective approach.

By using a GIS, the assessments of suitability made against the selection criteria could be varied to show alternative interpretations revealing areas that remained suitable despite changes.

2. SITE SELECTION METHOD

The new site selection method and the initial results of its assessments were presented to the Australian Public in a Phase 1 Discussion Paper (6). The method and its GIS interface became known as *ASSESS – A System for Selecting Suitable Sites* (7, 8, 9). The essential components of ASSESS were:

- a clearly defined purpose (ie. to select a suitable repository site);
- access to an established set of selection criteria (NHMRC, 1993);
- a collection of appropriate geographical data to address the issues raised by the selection criteria and conversion of these data to a digital (GIS) format;
- access to expert, multi-disciplinary teams who interpreted the characteristics of the data and assigned ratings of suitability;
- the assembly of the rated data in a GIS with a graphical display window, point-and-click menus and on-line information for help and explanation;

- use of the system to interactively compare, *combine or rate differently, all or some of the data*, to show areas that were consistently suitable;
- re-use of the system by including new or more detailed information for all of Australia or for smaller regions.

Of key importance was that a user of ASSESS could see the result of interpreting of up to twenty databases in less than a minute. Results were shown with familiar geographical features such as towns, roads, coastline, state boundaries and areas of interest could be magnified to fill the computer screen. All the data and information about where it came from, how it was interpreted and its importance for the

selection criteria were immediately available in pop-up text windows. These features supported the assertion that the method was open and transparent in its presentation and operation.

The Phase 1 Discussion Paper outlined the application of this method in a three-phased site selection process in which a progressively finer selection 'sieve' was applied to progressively smaller areas, ultimately identify a site for the repository. The emphasis of Phase 1 was the national overview, Phase 2 the review of several broad regions (10), and Phase 3, the specification of a preferred region to select a site. Public comment was sought on this process (11, 12) and the method was applied Australia-wide and to the eight broad regions (Figure 1).

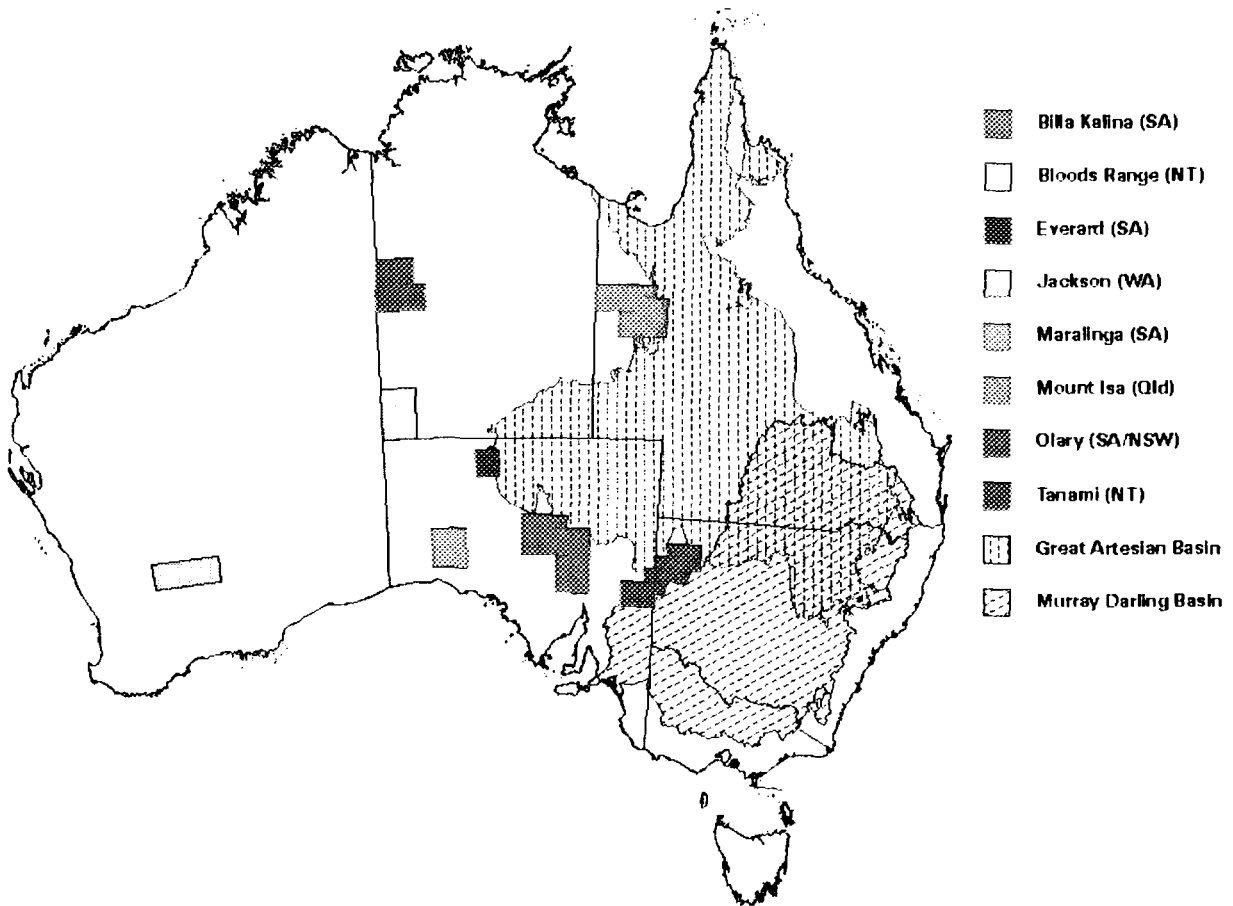


Figure 1. The eight regions reviewed during Phase 2 of the study. No areas in the Murray-Darling Basin or the Great Artesian Basin were considered because of their important water resources and agriculture.

Five of the regions were selected based entirely on the GIS assessment whereas the others were chosen because of: public suggestion (Maralinga and Mount Isa), and an existing State-based repository (Jackson - Mount Walton East). Detailed information was compiled for each region and the GIS method was

reapplied. The results were reported to the public (10) and several responses commented on the suitability of specific regions (12). The third phase was begun but was then deferred when a Senate Select Committee was established to report on the dangers of radioactive waste. The Senate

Committee's report (13) was tabled in April 1996. The Commonwealth Government replied and stated its intention to continue with the repository siting study.

A third phase report is now being prepared that describes the method used to identify a preferred region and the process for identifying a suitable site within that region. The report will include a request for public comment and on this basis work will commence to identify a site for the national repository.

3. REGIONAL COMPARISON

The Phase 2 report outlined the regional data collected for each of the eight regions and how it was assessed to show areas of relative suitability. The Phase 1 continental assessment established the context that all the regions could contain relatively suitable areas and the Phase 2 report demonstrated that the more detailed regional scale data confirmed and refined this assessment. All of the regions displayed potentially suitable areas but at that stage there was no attempt made to distinguish between the regions regarding their suitability.

In selecting a single preferred region for more detailed assessment, it is necessary to compare the regions with each other. Two techniques are used: a descriptive comparison where each region is compared in qualitative terms against the selection criteria; and an analysis, where the size, shape and specific location of suitable areas derived from ASSESS is compared. Together these styles of comparison provide a reliable description and a supporting analysis which is capable of discriminating between the regions to highlight a preferred region.

4. PUBLIC INVOLVEMENT

An important part of the selection study was, and will continue to be, the provision of status reports presented as 'public discussion papers' (6, 10). These reports have allowed the public and the scientific community to comment on the progress of the study and to recommend changes. These comments have been collated and published as a synthesis of public views (11, 12) so that everyone with an interest in the study has been informed of the others' opinions.

Phase 3 of the study will encourage local involvement and will provide a regional information service. The process and the information systems will continue to be open and accessible to the public through reports and presentations.

5. PREFERRED REGION ASSESSMENT

It is expected that the assessment of a preferred region will include a review of existing detailed survey and exploration data. Surveys may exist for subject areas such as water resources, geology and mineral potential, biology, anthropology, climate and land use. Where there is insufficient information, specific field surveys will be required. These will use accepted techniques and will apply any appropriate codes of practice. Any landowner, individual or group with a direct interest will be encouraged to contribute to the decisions about a proposed site and its surroundings.

6. CONCLUSION

The national low level radioactive waste repository study has encouraged public scrutiny and its methodology applied successfully to other land use and site selection issues. Key elements of the study were its use of geographic information systems with a graphical user interface, inclusion of a wide range of expertise and the inclusion of public comment in the process. The system assembled and used very large amounts of data for which access was provided in an interactive and versatile manner. The system enabled the detailed interrogation of all its datasets, on-line documentation of the rationale of interpretations and the ability to provide maps showing the geographical distribution of suitability. The time responsiveness, ease of access and broad acceptance has shown its appropriateness to the site selection task. Public comment has indicated significant support for the site selection approach and its method.

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