

# Radiological Assessment of the rehabilitated Nabarlek Uranium Mine, Northern Territory, Australia.

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The Nabarlek mine site is located in the remote Western Arnhem Land, in the wet-dry tropics of the Northern Territory of Australia. The Nabarlek ore body was a relatively compact, high-grade ore body that extended from the surface to a depth of 72 metres, and was mined out during the dry season of 1979. The ore was stockpiled, and subsequently milled and sold over an eight year period that ended in 1988. The mill tailings, together with scraped sludge from the bottom surfaces of runoff and evaporation ponds, were placed back in the mined out pit when operation ceased. These were covered by geotextile, followed by a 1-3 m thick graded rock and leached sand layer. With final decommissioning in 1995, remaining contaminated material and plant equipment were placed in the remaining pit void and covered with another layer of waste rock. Other areas rehabilitated were the plant area, the evaporation ponds, several runoff ponds, and the ore, waste rock and topsoil stockpile areas.

The Supervising Scientist Division of the Australian Government Department of the Environment, Water, Heritage and the Arts conducts regular visits to the Nabarlek site as part of an ongoing assessment of the status and radiological conditions of the land and water resources within the Nabarlek area. Extensive field surveys have been conducted to estimate the magnitude of exposure pathways, and the location, extent and seasonal variability of the sources. Work has also focussed on the analysis of groundwater monitoring data, and groundwater modelling indicates a uranium plume moving to the north east from the pit where tailings have been stored, in agreement with general groundwater movement in the area. An erosion modelling study has shown that erosion of radionuclides off-site occurs. However, the impact is likely to have existed pre mining, as indicated by a study of stable lead isotopes in sediments in a nearby Creek. The ingestion pathway was modeled, using dietary information gathered from local Aboriginal people and measurements of radionuclide in bush food items, water and soils. Concentration factors from other studies in the Top End of Australia were applied. In this paper we will present the site specific radiological dose model and major conclusions concerning the present radiological footprint of the rehabilitated Nabarlek site.