Radiological Considerations for the BHP Billiton Olympic Dam Expansion

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1. Introduction

BHP Billiton has recently received approval for the expansion of its Olympic Dam copper and uranium mining and production operation in South Australia. This follows an approval process of over 6 years duration which included an environmental impact statement (EIS), an extensive public consultation phase, a supplementary EIS followed by a bilateral state and federal government approval with conditions.

The expansion will make Olympic Dam the leading international producer of uranium oxide concentrate and will include the construction of one of the world's largest open pit mines, the construction of waste rock and tailings storage facilities, expansion of the metallurgical processing facilities and additional infrastructure.

This presentation provides an overview of the radiation considerations in the early stages of the development of the world's largest uranium mine and production facility.

Figure 1: Location Map

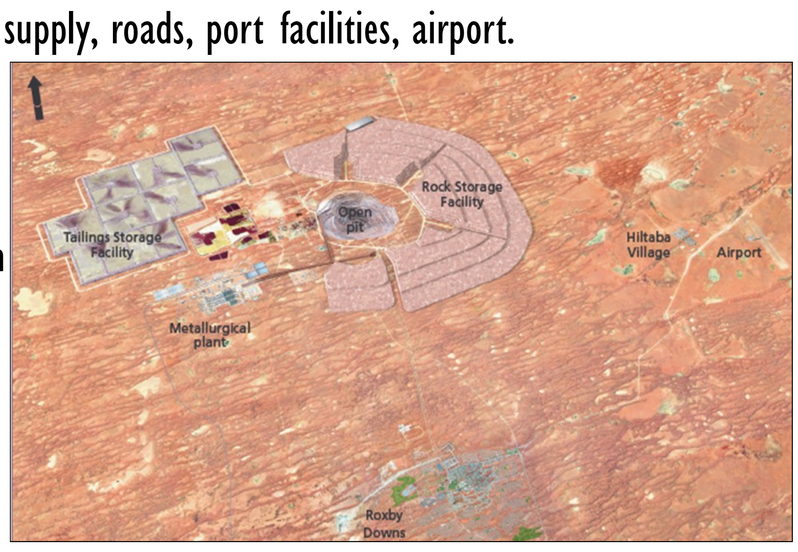
Figure 2: Aerial view of current Operation

2. Expansion Components

Currently Australia's largest underground mine
Expansion includes;

- Open pit mine with 72Mtpa ore production
- Expanded metallurgical processing plant
- 280ML/d seawater desalination plant and 320km pipeline
- Construction camp - up to 10,000 workers
- Doubling of Roxby Downs township ~ up to 10,000 residents
- Additional power supply, roads, port facilities, airport.

Figure 3: Artists impression of expanded Operation



3. EIS - The Journey

Terms of reference for impact assessment (January 2006)
Impact assessment work undertaken (2006 to 2011)
5,000 page Draft Environmental Impact Statement published (May 2009)
Public display for 14 weeks
Submissions from public/government/interested parties

- 4,197 public submissions received
- 391 unique submissions (3,806 form submissions)
- 753 unique issues addressed

5,000 page response document published (May 2011)
Government approval (October 2011)

Developed by 500 scientists, engineers from over 100 companies, >250,000 hours work
Executive Summary, information sheets, DVDs with full documentation, webpage, films and animations

4. Radiation

Considerations
Radon behavior in large open pit mine
Dose assessment for workers in mine
Public doses
Non human biota dose assessment (NHB)
Systems and controls
ALARA/optimisation study in design
Radiation risk assessment of open pit and storage facility designs
Establishment of detailed radiation design criteria
Training of design personnel

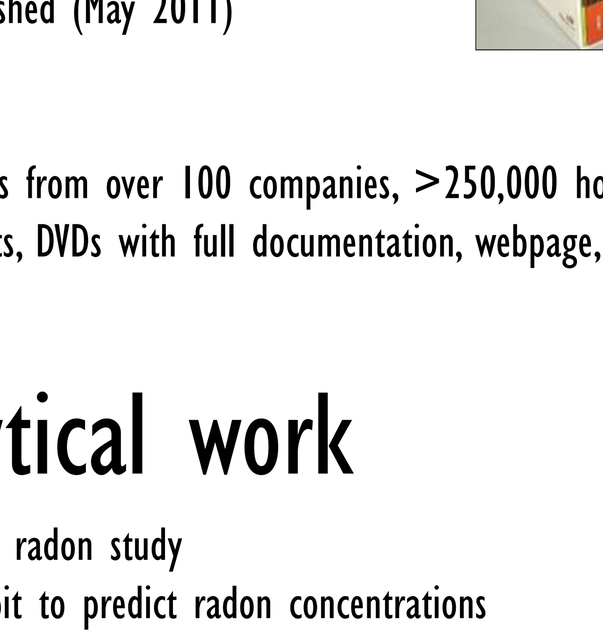
5. Key analytical work

Extensive environmental passive radon study
Modelling of micro climate in pit to predict radon concentrations
Air quality modeling for radon and dust
Further analysis of radionuclides in soil and flora
Radon emanation rates from ore, tailings and waste rock
NHB Assessment

Table 1: Doses to Miners (mSv/y)

Miner	Total Dose	Gamma	RnDP	Dust
Current Underground	3.8	1.8	1.8	0.2
Estimated Open Pit	3.8	1.4	2.3	0.1

Figure 4: Contour plot of modelled radon concentrations (above natural background levels)



6. Observations/Conclusions

The overall approach was to provide sufficient information for decision making.
Major body of work – size can be a problem.
Need to balance;

- Factual information,
- Explaining difficult concepts
- Maintaining perspective

Continue to answer the questions and provide the facts

References/Acknowledgements:
BHP Billiton