Incident Reporting at South Australian Uranium Mines

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Development of Reporting Criteria

- Independent review of reporting procedures in the SA uranium mining industry commenced May 2002.
- Due to:
  - A series of unplanned spills or incidents at various uranium mines, and
  - The start of commercial ISL mining in Australia
- This review resulted in the Bachmann Reporting procedure. Key recommendations:
  - Incident reporting criteria
  - Standard reporting process
  - Public notification of serious incidents

Implementation of the Criteria

- The EPA implemented the recommendations in February 2003
- Direct reporting of spills and other incidents to government agencies
- Public notification of all reported spills and incidents
  - via PIRSA website
- Record details of minor spills and incidents

Risk to Environmental Values

- Regulation is undertaken to protect environmental values
- Environmental values are agreed between regulator and operator
- The need for reporting increases with increasing risk of environmental or occupational harm
- Regulatory effort is focussed on high risk activities and events
- The Bachmann Reporting Criteria incorporate risk by consideration of the location of a spill

Location related risk

- The requirement to report a spill is based on the level of control and containment
  - Spills into secondary containment are more amenable to control
  - Spills into tertiary containment, the plant perimeter, are in an area that will be subject to investigation and rehabilitation
- All spills beyond the plant perimeter, the undisturbed environment, are reportable
  - These have the greatest risk of harm
  - The spill area to be included in future rehabilitation

Location related risk

- The Bachmann criteria also vary the reporting requirements depending on the area of a spill within an operation.
- The process liquors and materials having varying radiological content, with varying degrees of risk
  - Uranium product represents a much greater risk compared to other process materials, such as barren solutions or ground water
  - The radiological content can be characterised by the area of the plant in which a spill occurs

Process liquors

Solution	Radioactive (>35 Bq/g)
Groundwater	No ~ 1 Bq/g
Raffinate	No ~1 Bq/g
Pregnant Solutions	No, ~ 10 Bq/g
Mining Fluids	No, ~10 Bq/g
Evap. Pond Liquor	No, ~10 Bq/g
Tailings Liquor	Yes, ~40 Bq/g
Other process liquor or fluid	Yes, ~500 Bq/g
Uranium Concentrate	Yes, 25 kBq/g

The Bachmann Criteria

- Separated into 5 key areas
  - General Requirements
  - Undisturbed Environment
  - ISL Wellfields
  - Process Plant
  - TRS, Corridors and Pipelines

General Requirements

- Report
  - Any Defect that is likely to lead to an urgent change to keep radiation dose ALARA

Any Defect due to design or malfunction, discovered in the mine, mill plant, equipment or working procedure, that is likely to lead to an urgent change in plant, equipment or work procedure in order to keep radiation doses as low as reasonably achievable

Undisturbed Environment

- Unexpected degradation or defect in ISL trunklines, TRS pipelines and structures and pond pipelines or structures that is likely to lead to a reportable release
- Any release of radioactive material to the undisturbed environment
- ISL mining fluid excursions
- Release of radioactive materials that enter or threaten to enter an ephemeral watercourse

- Record > $10m^3$ of groundwater

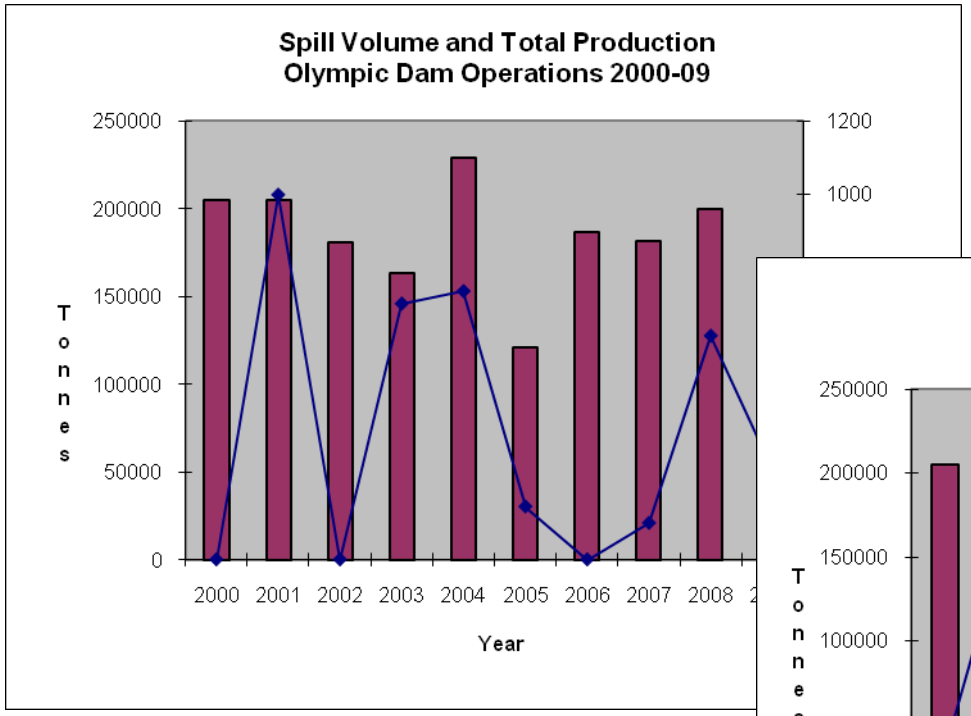
Other Areas

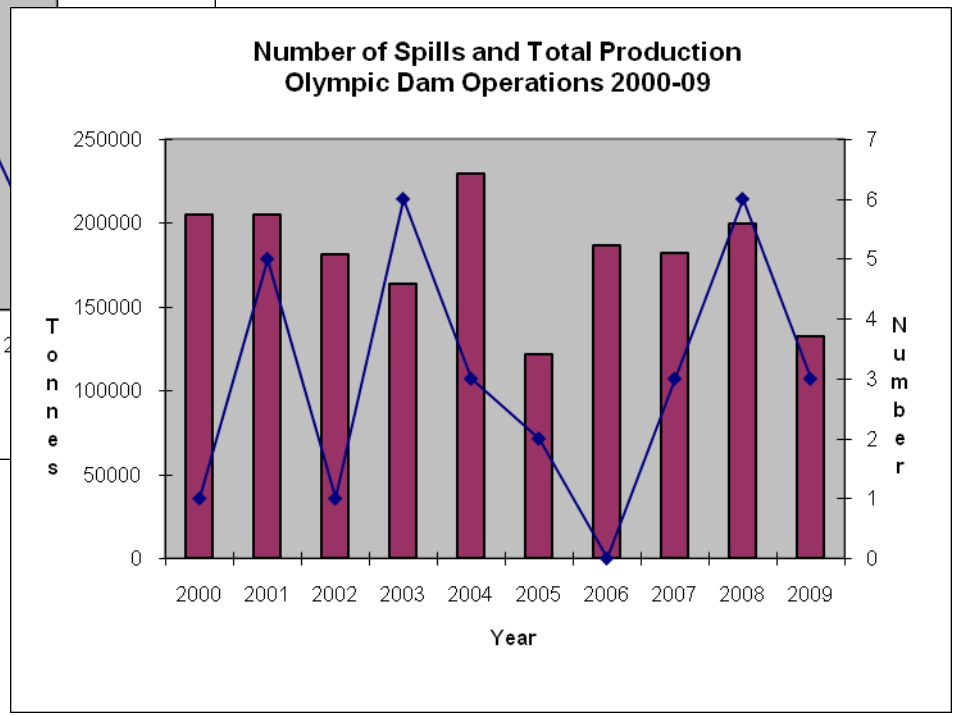
	ISL Wellfields	Process Plant	TRS corridors and pipeline
Report	> 10 m^3 radioactive liquids	Any uranium concentrate or > 50 m^3 beyond secondary containment > 2 m^3 uranium concentrate within secondary containment	> 50 m^3 with TRS bunded areas and pipeline corridors
Record	>1 m^3 radioactive liquids > 10 m^3 groundwater	> 50m^3 process material or > 0.2 m^3 uranium conc. in secondary containment > 10 m^3 process material beyond secondary containment	> 10 m^3

Reporting results

Solution	Radioactive (>35 Bq/g)	Number of spills 2001 - 2009
Groundwater	No ~ 1 Bq/g	7
Raffinate	No ~1 Bq/g	
Pregnant Solutions	No, ~10 Bq/g	29
Mining Fluids		
Evap. Pond Liquor		
Tailings Liquor	Yes, ~40 Bq/g	11
Other process liquor or fluid	Yes, 500 Bq/g	6
Uranium Concentrate	Yes, 25 kBq/g	7

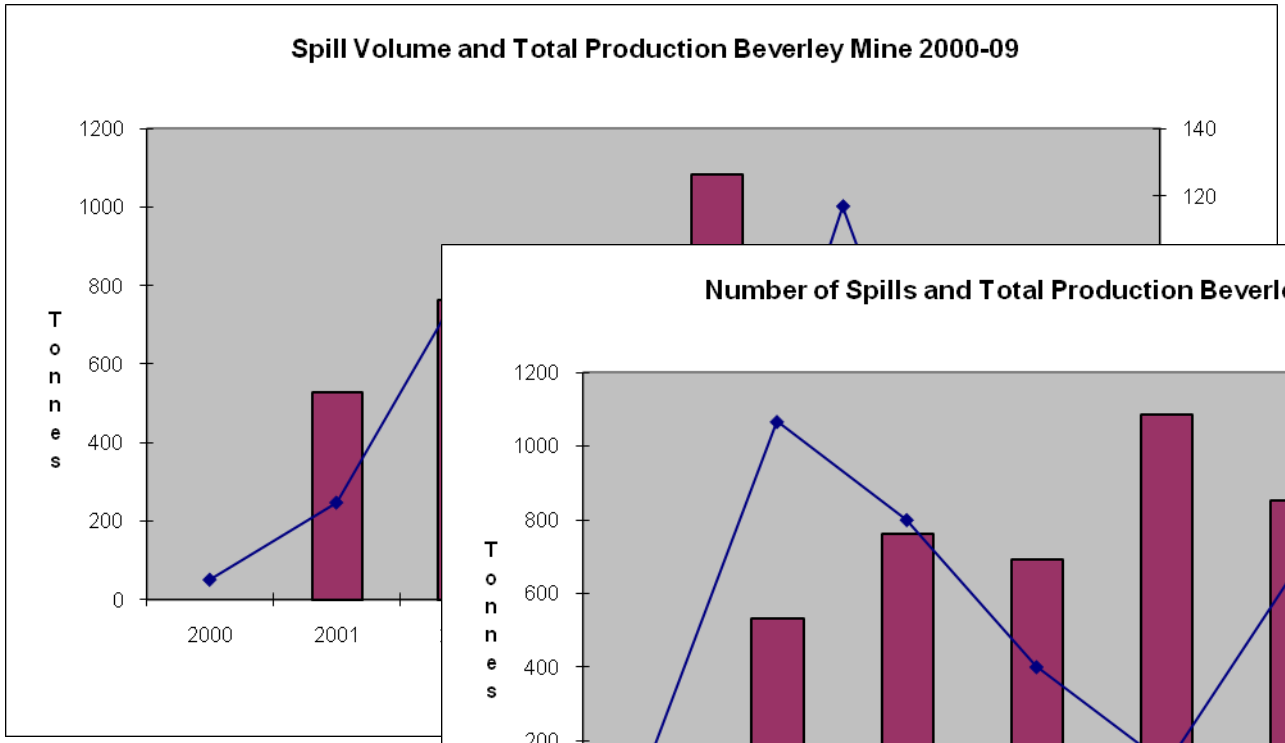
Olympic Dam*

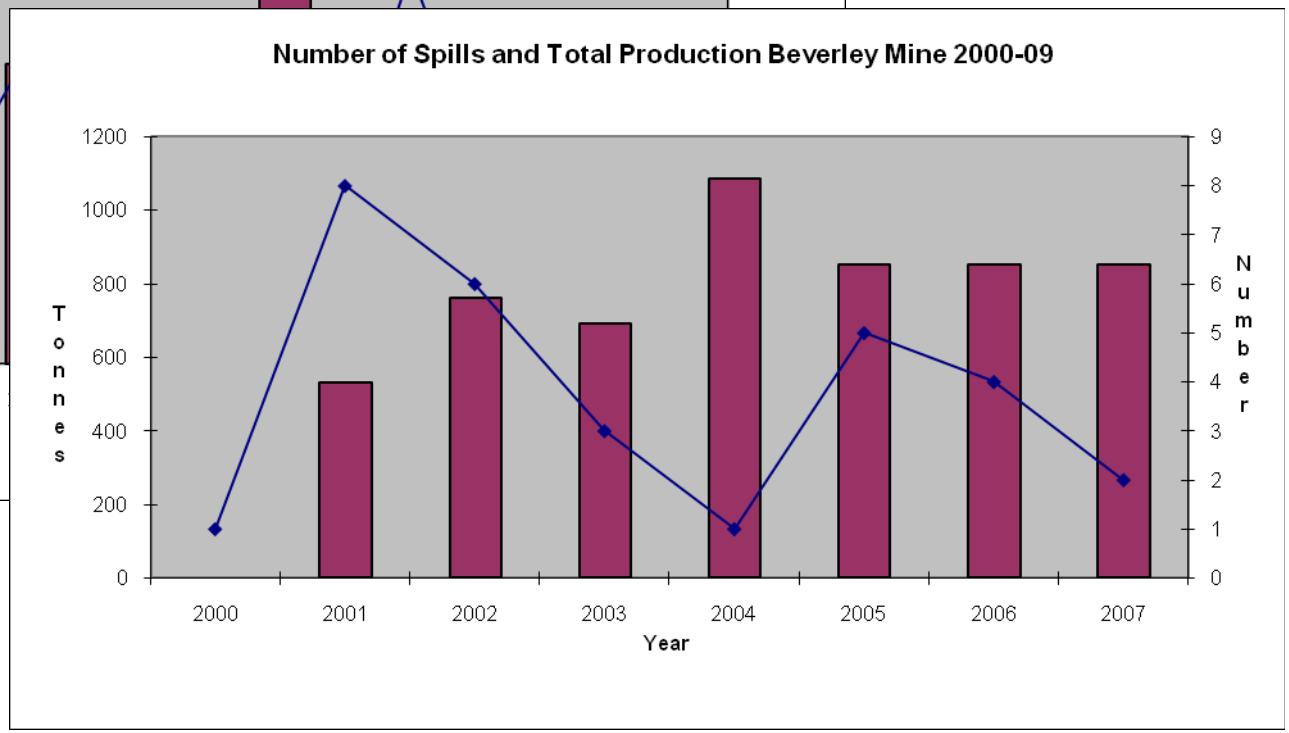




* Production taken from public reports it may not be correct

Beverley*





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Experience with the criteria

- Reporting across multiple areas
  - Complex and some duplication
- Attempts to identify potential failures or spills
  - Defects that are likely to lead to failure.....
- The “Undisturbed Environment”
  - Clearly defined

The areas outside the approved engineering controls (eg pipes, stormwater drains and ponds, bunding of the plant or wellfield or pipeline corridors, airborne emission control equipment or the wellfield mining zone

Undisturbed environment

- There has been a spill outside the TRS/pipeline bund, but it is all on a track/laydown pad/vehicle hardstand etc.
- There has been a spill from a pipeline into an area bounded and enclosed by a pond bund and the bunds of 2 pipelines.
- Clearly the there is room to improve the language used in the criteria
- Perhaps the undisturbed environment can be defined according to land classification under native vegetation legislation

Experience with the Criteria

- Public reporting appears to have addressed public concerns
- The criteria can be simplified
- There may be a need for site specific reporting criteria
- There has been no environmental harm

- EPA is currently reviewing the reporting criteria, for example could be based on environmental values

All suggestions and feedback are welcome

Additional Information

- Bachmann Criteria
  www.pir.sa.gov.au/__data/assets/pdf_file/0019/20548/incident_reporting.pdf
- Bachmann Report
- PIRSA –Licensing and Regulation:
  www.pir.sa.gov.au/minerals/licensing_and_regulation
- Operations
  www.pir.sa.gov.au/minerals/sa_mines/approved_mines/beverley
  www.pir.sa.gov.au/minerals/sa_mines/approved_mines/olympic_dam
  www.pir.sa.gov.au/minerals/sa_mines/approved_mines/honeymoon