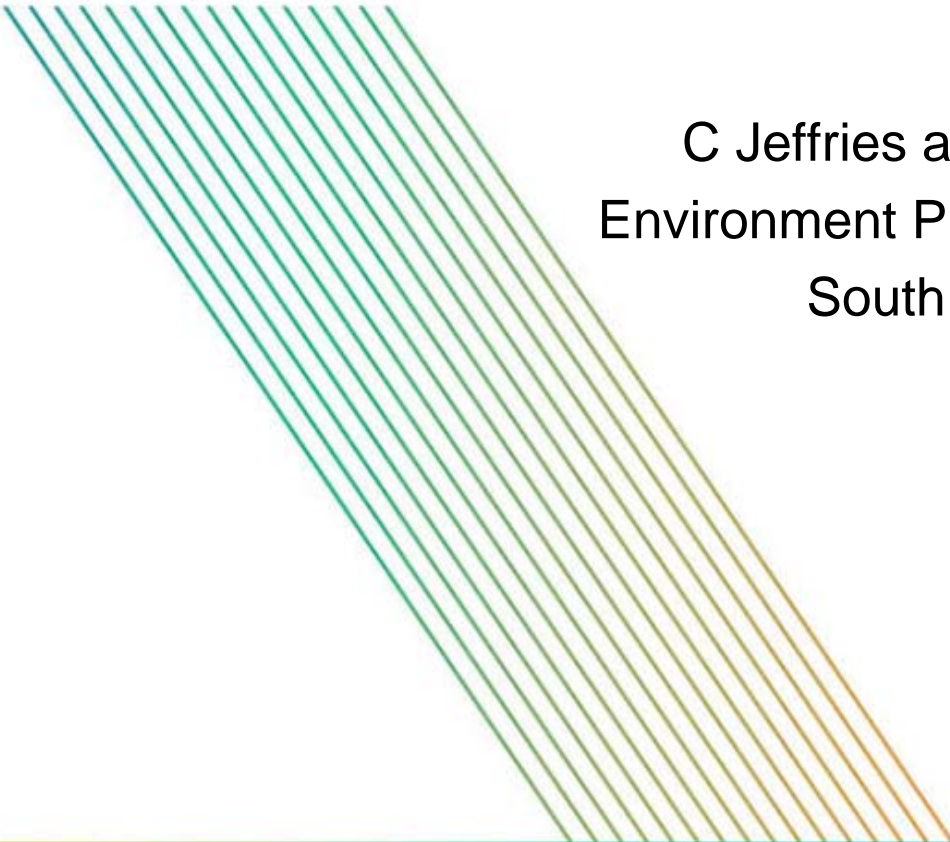




# Incident Reporting at South Australian Uranium Mines



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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

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- 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 focused 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

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# Location related risk

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- 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

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# The Bachmann Criteria

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- 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
  - Release or loss of control of radioactive materials leading to accidental exposure of a worker or significant contact
  - Unplanned atmospheric dispersal of radioactive material through failure or abnormal event
- Record
  - The results of investigation that reveals defects likely to cause increased radiation exposure, and actions taken

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# Undisturbed Environment

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- 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  $> 10\text{m}^3$  of groundwater

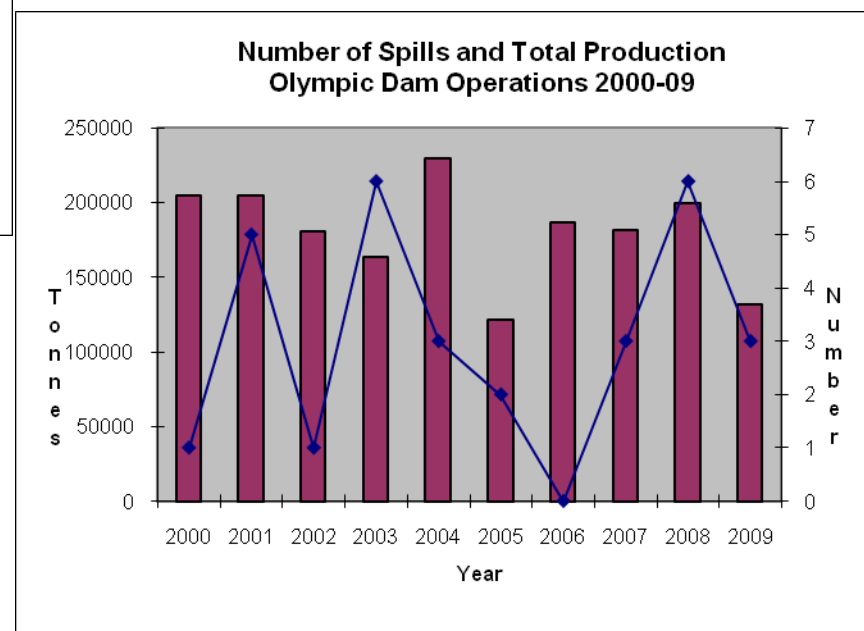
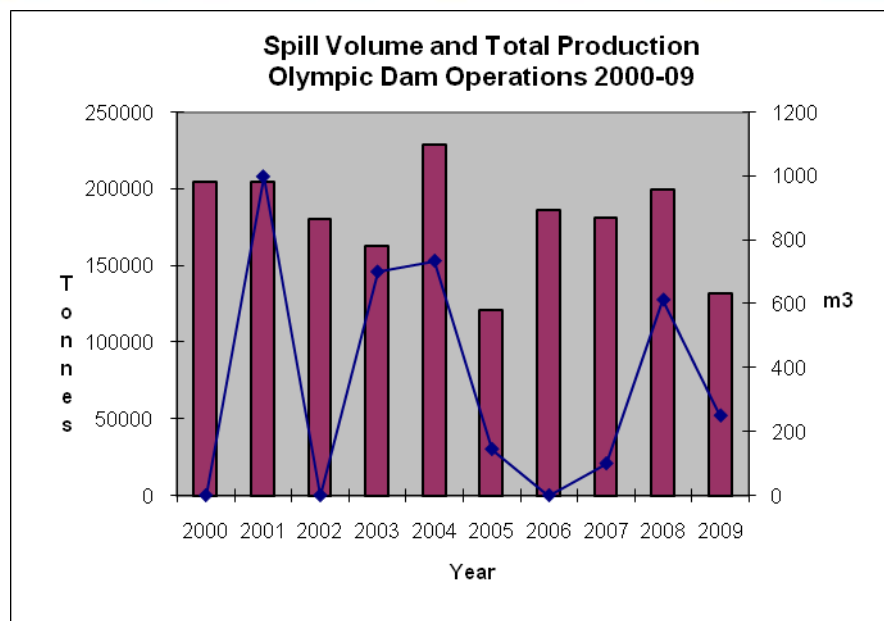
# Other Areas

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

# Reporting results

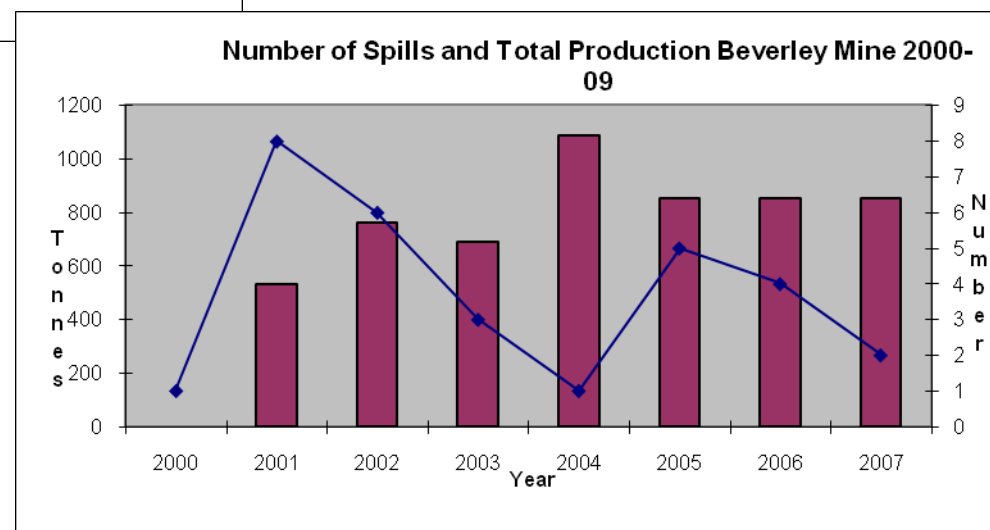
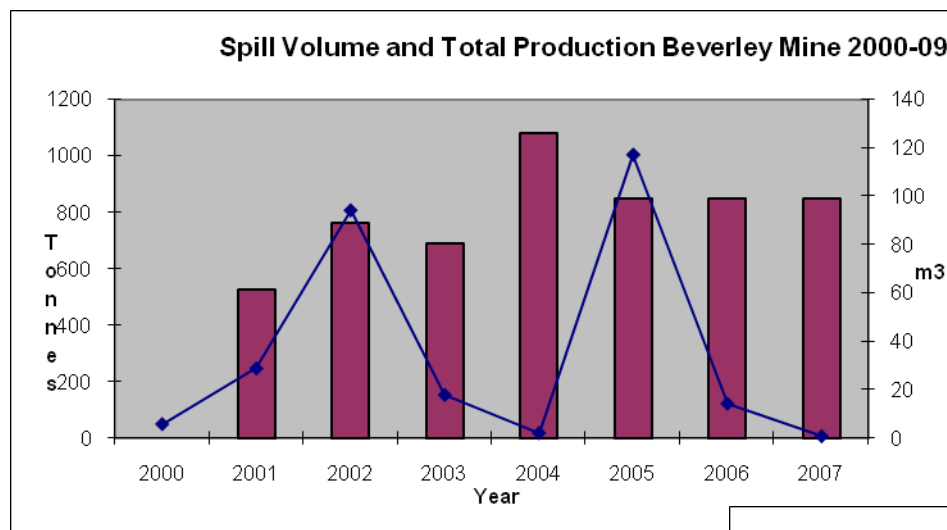
Solution	Radioactive (>35 Bq/g)	Number of spills 2001 - 2009
Groundwater	No ~ 1 Bq/g	7
Raffinate	No ~1 Bq/g	
Pregnant Solutions	No, ~10 Bq/g	29
Mining Fluids		
Evap. Pond Liquor		
Tailings Liquor	Yes, ~40 Bq/g	11
Other process liquor or fluid	Yes, 500 Bq/g	6
Uranium Concentrate	Yes, 25 kBq/g	7

# Olympic Dam\*



\* Production taken from public reports it may not be correct

# Beverley\*



\* Production taken from public reports it may not be correct

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# Experience with the criteria

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- 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
  - However, it is common to assume a plain english definition of undisturbed environment



# Undisturbed environment

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- 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 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](http://www.pir.sa.gov.au/__data/assets/pdf_file/0019/20548/incident_reporting.pdf)
- Bachmann Report  
[www.heathgateresources.com.au/public/download.jsp?id=319](http://www.heathgateresources.com.au/public/download.jsp?id=319)
- PIRSA –Licensing and Regulation:  
[www.pir.sa.gov.au/minerals/licensing\\_and\\_regulation](http://www.pir.sa.gov.au/minerals/licensing_and_regulation)
- Operations  
[www.pir.sa.gov.au/minerals/sa\\_mines/approved\\_mines/beverley](http://www.pir.sa.gov.au/minerals/sa_mines/approved_mines/beverley)  
[www.pir.sa.gov.au/minerals/sa\\_mines/approved\\_mines/olympic\\_dam](http://www.pir.sa.gov.au/minerals/sa_mines/approved_mines/olympic_dam)  
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