Appendix 1

Issue	Likelihood of occurrence	Community concern	Summed score
1. Water Management System			
1.1 Release of mine site water	3	4	7
Retention Ponds (stop RP4 releases)	1	3	4
RRZ	2	2	4
1.2 Tailings Dam	1	4	5
Pipeline corridor	2	2	4
Seepage	2	2	4
Seepage collection system	1	1	2
1.3 Impacts on surface waters	2	4	6
2 Air Quality			
SO_2	1	1	2
Yellowcake dust	1	1	2
Subaerial vs subaqueous tailings	2	2	4
3 Radiation	1	3	4
Employee	1	2	2
Members of the public	1	3	4
Off-site exposure	1	3	4
4 Accidents			
4.1 Explosive magazine blows up	1	2	3
4.2 Tailings dam collapse	1	4	5
4.3 Human injury due to road transport	1	1	2
4.4 Fuel/U carrying road trains crash	1	1	2
4.5 Ammonia tanks crack	1	1	2
4.6 4.1 and 4.5 together	1	4 (ondamage)	5
4.7 Green terrorists	1	1	2
4.8 Trucks collide (OH&S)	1	1	2
4.9 Accidental chemical release into waterways	2	2	4
5 Determine BPT	3	2	5
Rehabilitation	3	4	7
tailings in pit	2	1	3
tailings in dam	2	3	5
6 Water management	4	2	6
Enhanced evaporation			
Filtration			
Boiling off			
Irrigate in bush	2	2	4
16 other options			
RUEI ok'd release strategy versus subsequent veto by traditional owners			
Robustness of water management plan	2	2	4

Determine beneficial uses	2	2	4
7 Radiology			
Hazard analysis assumptions incorrect	2	1	3
Radiation level at high exposure	1	3	4
8.Societal concerns			
Unacceptability of uranium	3	3	6
Linkage of non-causal events (eg. a death and an RP4 release)	2	2	4
Western Arnhem Land open to exploration	3	2	5
Sacred sites preservation	3	2	5
Health preservation (human and ecosystem)	2	3	5
Ecosystems preservation How to measure Biodiversity, productivity, sustainability, resilience	2	3	5
9 Terrestrial ecosystem			
White crust	2	1	3
Measures of ecological health	2	1	3
Alien weed introduction	2	2	4
Impacts on fish communities due to vegetation change	2	1	3
10 Extreme events			
Earthquake	1	2	3
Tropical cyclones	1	3	4
Inadequate design criteria	1	2	3
climatic variability	1	1	2
11 Form of the EPR			
Needs joint development with Company	2	2	4
Questions must focus on performance guidelines	2	2	4
Assess preparedness in absence of a problem	2	2	4

12 Rehabilitation (after decommisioned)	**4**	**2**	**6**
Response of encapsulated tailings (protect groundwater from contamination)	2	2	4
Company will want rapid release	3	3	6
Water releases from abandoned mine site	2	2	4
Stop erosion of waste-rock	2	2	4
surface run-off	2	2	4
maintain Kakadu ecosystem	3	3	6
13 Monitoring System			
Adequacy of sampling	2	2	4
Correct variables being measured	2	2	4
14 Legislative and consultative framework			
Are key groups involved	2	3	5
Does this set decommissioning procedure	2	2	4

Appendix 2

Scoring Risk

The summed score of Appendix 1 adds together the likelihood of occurrence and the community concern. The definitions of risk given in Chapter 2 imply that risk involves a multiplication of factors rather than an addition. Yet the Asian Development Bank framework given in Figure 3.5 sets boundaries that correspond to linear combinations of the axes. Which should it be?

The answer depends on whether the scoring system being used is linear or logarithmic. Notice in Figure 3.5 that the monetary damage scale increases by a factor of ten between each of the four boxes. Now, one of the characteristics of logarithms is that the addition of logarithms corresponds to the multiplication of the numbers represented by logarithms. For example:

$$(1/10) \times 1000 = 10^{-1} \times 10^{3} = 10^{-1+3} = 10^{2} = 100$$

where the logarithm of 1/10 is -1 and the logarithm of 1000 is 3.

We may thus infer that the frequency of occurrence scale in Figure 3.5 must also represent a logarithmic scale of probabilities. We may thus infer probabilities and likely numbers of concerned people represented in the rows of Table 5.1 as given in Table A.2:.1.

Table A.2.1 Quantified probabilities and concerned population implied in rankings of Table 5.1

Likelihood of occurrence	Inferred probability	Community concern	Inferred numbers
Remote, but possible	0.0005	negligible	5
Occasional, sometime occurs	0.005	marginal	50
Reasonably probable, several times	0.05	critical	500
Frequent, repeatable	0.5	unanimous	5000

This method of taking descriptive terms, and assigning quantitative values to them, forms one of the bases of quantitative risk assessment.

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