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Health and Safety Conference
Coping With Growth
August 6 – 9, 2006

Risk Assessment System Utilised at the George Fisher Mine for Lateral and Vertical Development

Author: **V. Clay Wittchen**
Planning Superintendent
Xstrata Zinc / Mount Isa Mines
George Fisher Mine

Contact Information: **Tel: 07 4744 6264**
Fax: 07 4744 6451
E-mail: Cwittchen@xstratazinc.com.au

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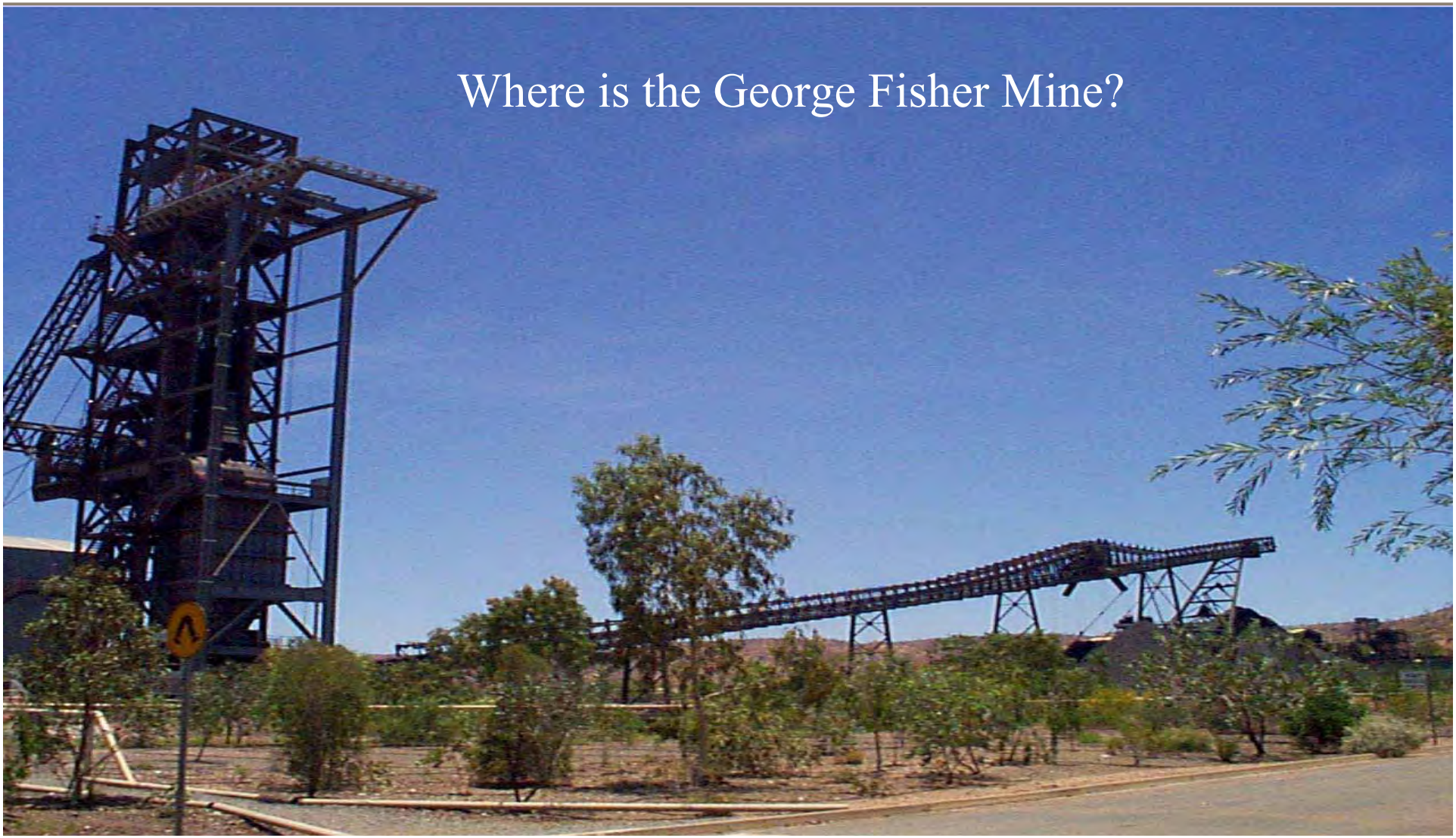

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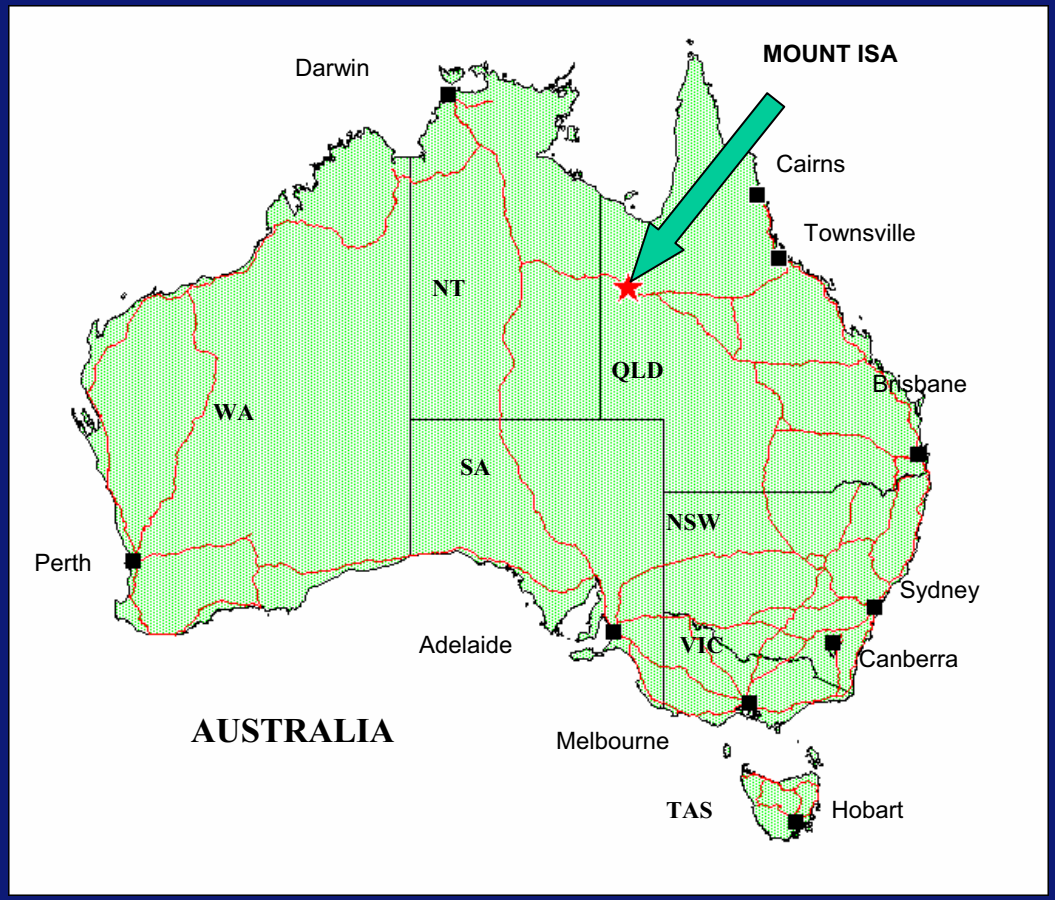
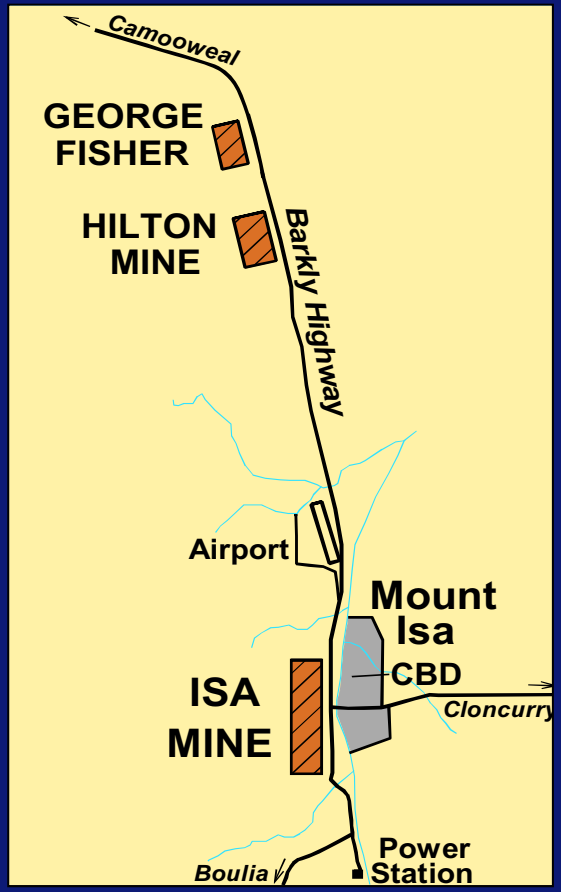
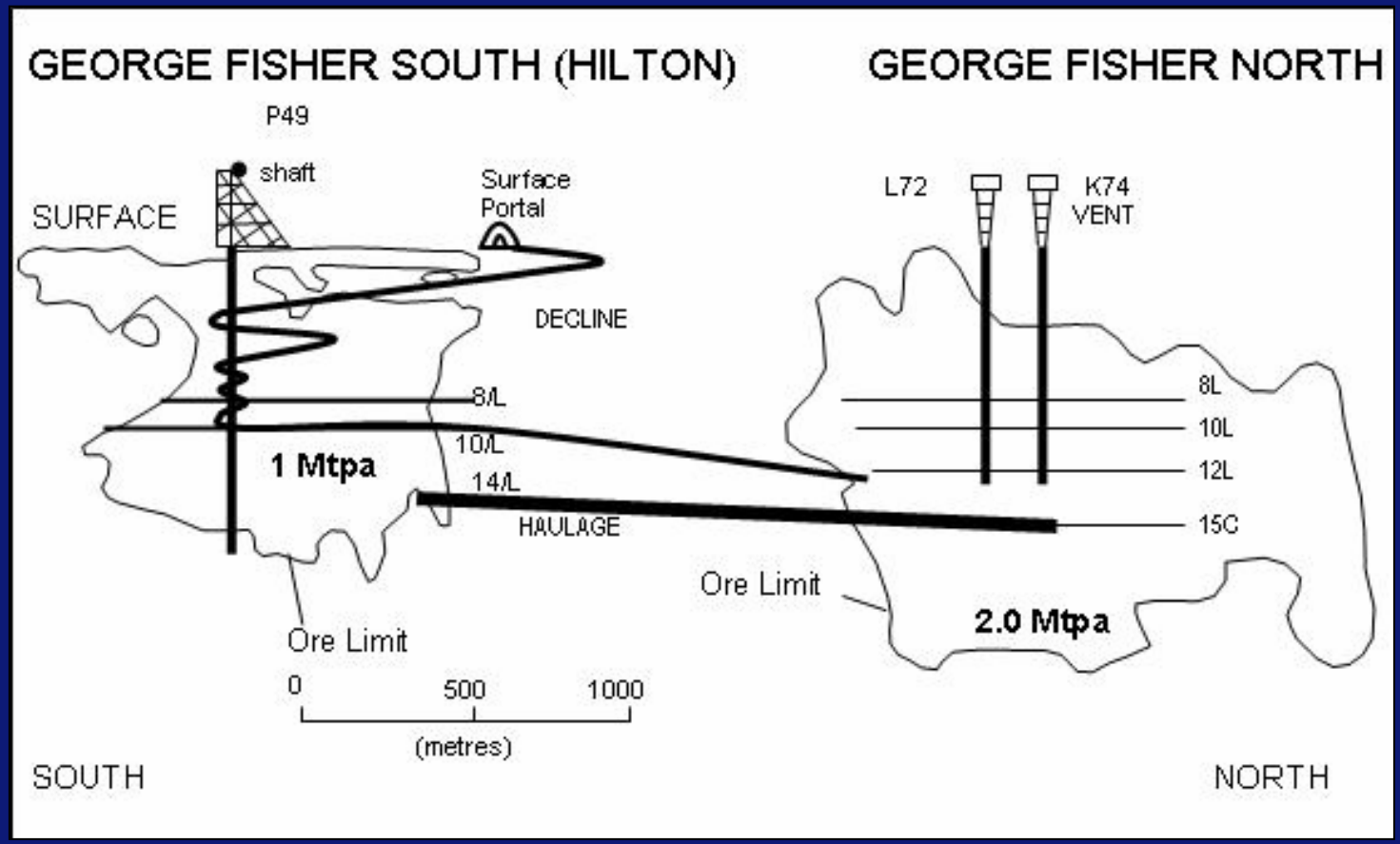
Location of George Fisher Mine





Longitudinal Schematic of George Fisher Mine



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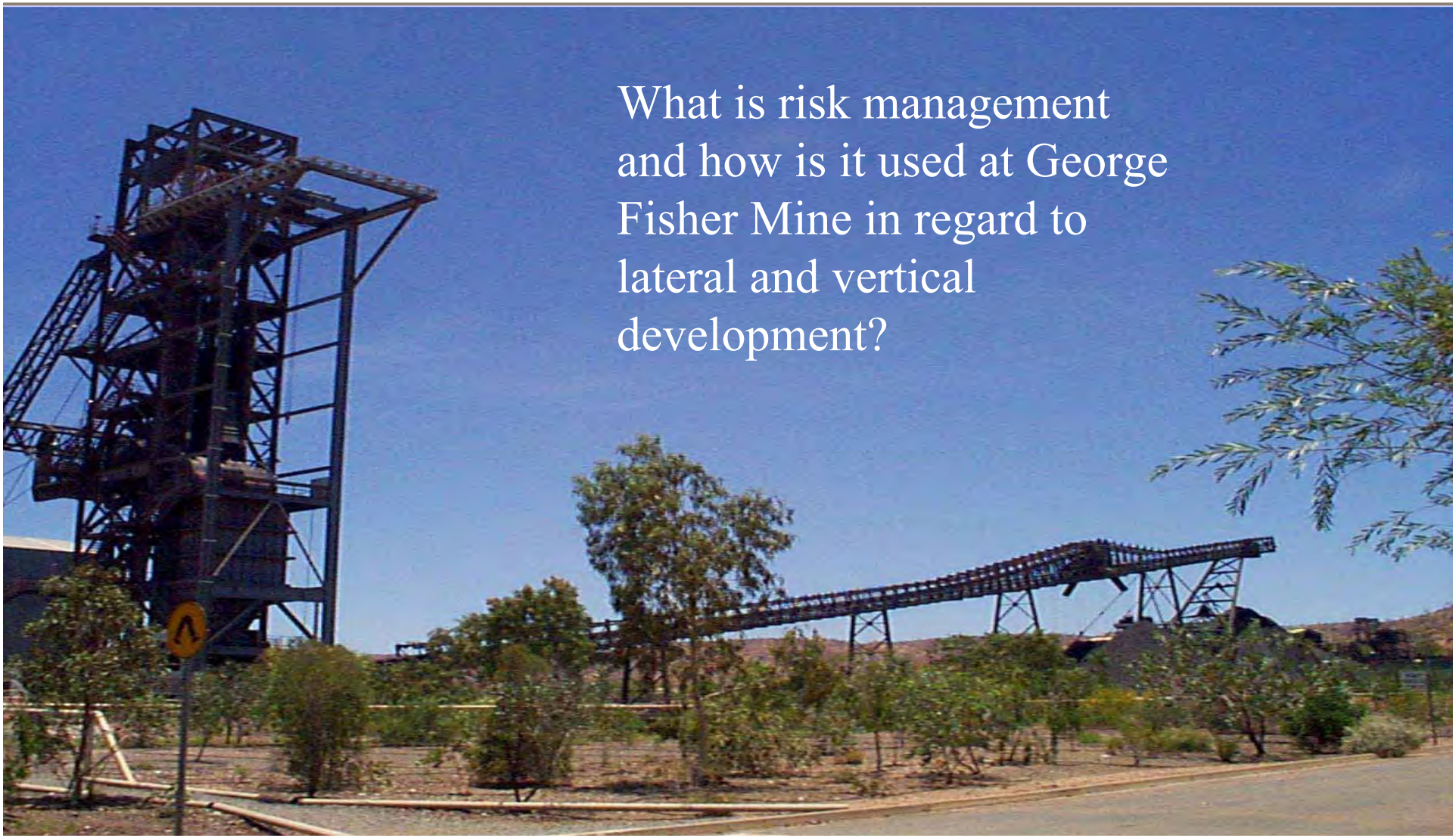

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- **Foundation of the Queensland *Mining and Quarrying Safety and Health Regulation 2001***
- **Allows the mining industry to take a proactive approach to safety and heath issues**
- **Cyclic in nature:**
  - **identify hazards**
  - **rate risk (likelihood & consequences)**
  - **controls**
  - **evaluate residual risk**
  - **additional controls (if required)**
  - **monitoring / follow-up / re-assessment**

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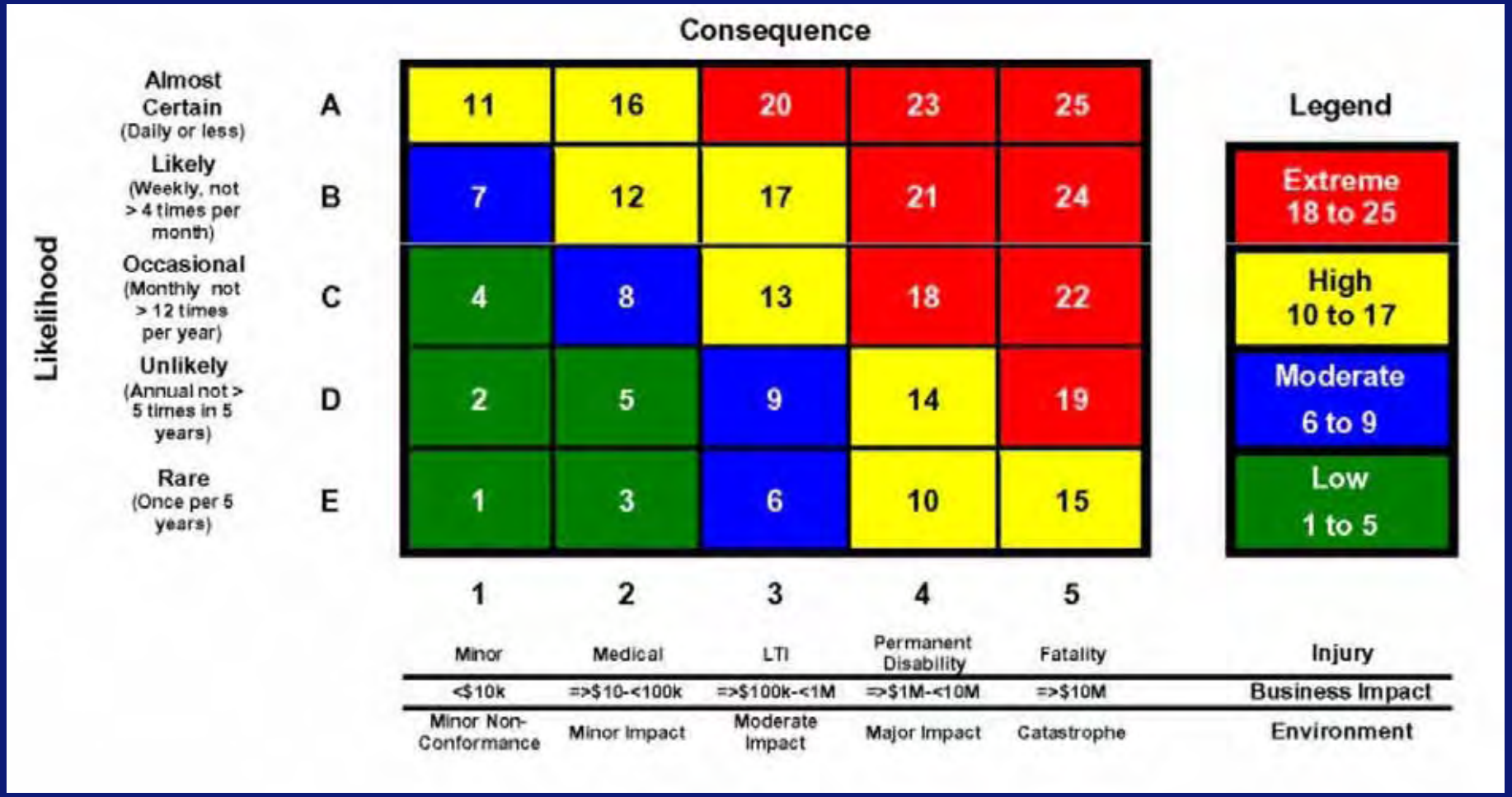
Risk Assessment Matrix



Consequences Categories

CONSEQUENCES

Level	Descriptor	Example Detail Description		
		People	Business Impact	Environment
5	Catastrophe	Fatality/Fatalities	=>$10M	Catastrophe – long term, significant legal implications and potential to effect community
4	Major	Permanent Disability	=>$1M-<10M	Major Impact – harm or breach of license conditions or obligations, discharges off site
3	Moderate	Disability/Lost Time Incident (LTI)	=>$100k-<1M	Moderate Impact – external to local area, generally contained on site
2	Minor	Medical	=>$10-<100k	Minor Impact – minimal impact outside the local area
1	Insignificant	Minor	<$10k	Minor Non-Conformance – no impact, minor breach in procedure

Likelihood Categories

LIKELIHOOD

Level	Descriptor	Description	Quantification
A	Almost Certain	The event is expected to occur in most circumstances	Employees are exposed to the event occurring to its final outcome daily
B	Likely	The event will probably occur in most circumstances	Employees are exposed to the event occurring to its final outcome greater than once per week but no more than 4 times a month
C	Occasional	The event should occur at some time	Employees are exposed to the event occurring to its final outcome greater than once per month but no more than 12 times per year
D	Unlikely	The event could occur at some time	Employees are exposed to the event occurring to its final outcome greater than once per year but no more than 5 times in 5 years
E	Rare	The event may only occur in exceptional circumstances	Employees are exposed to the event occurring to its final outcome greater than once in 5 years

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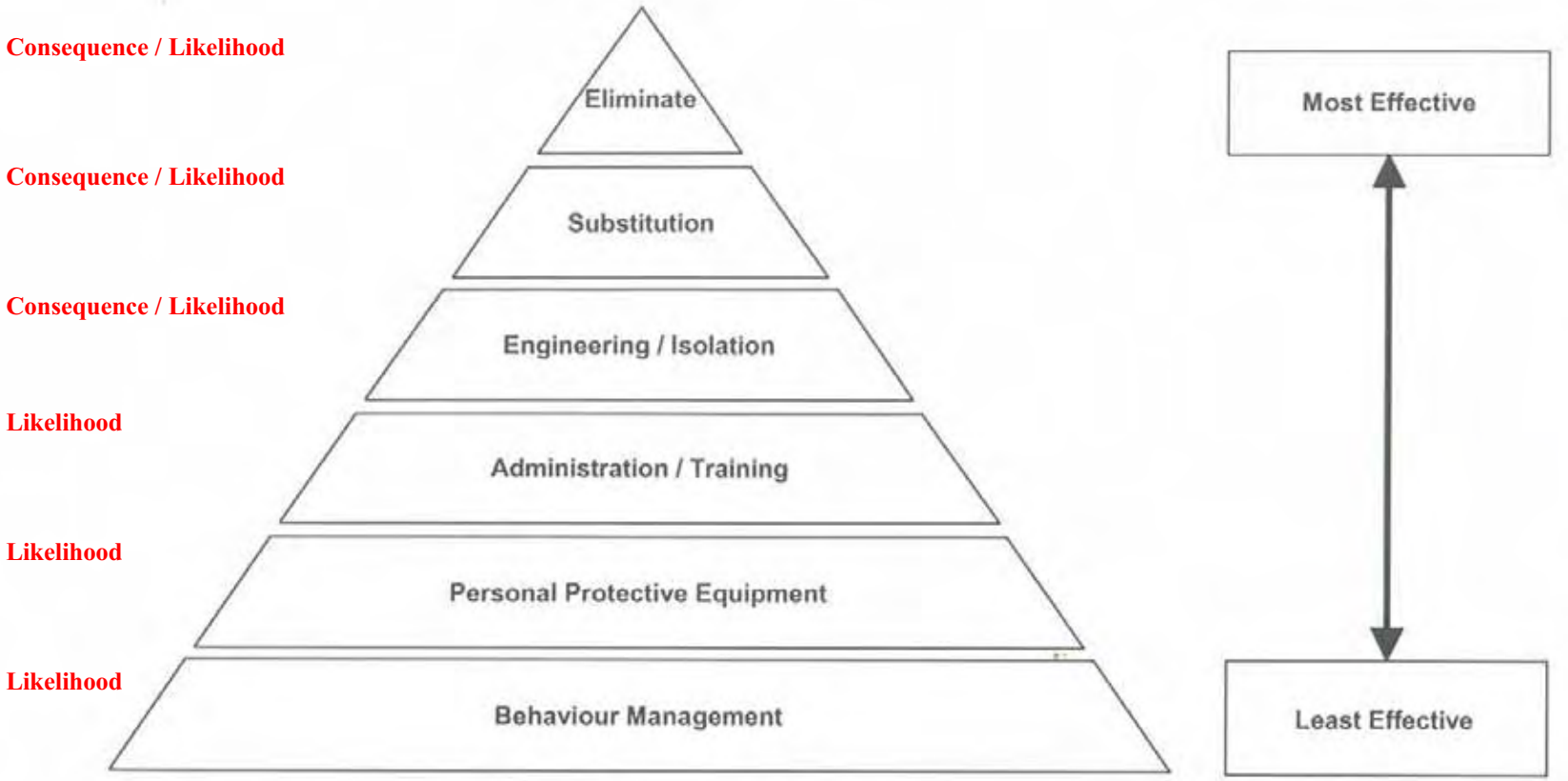
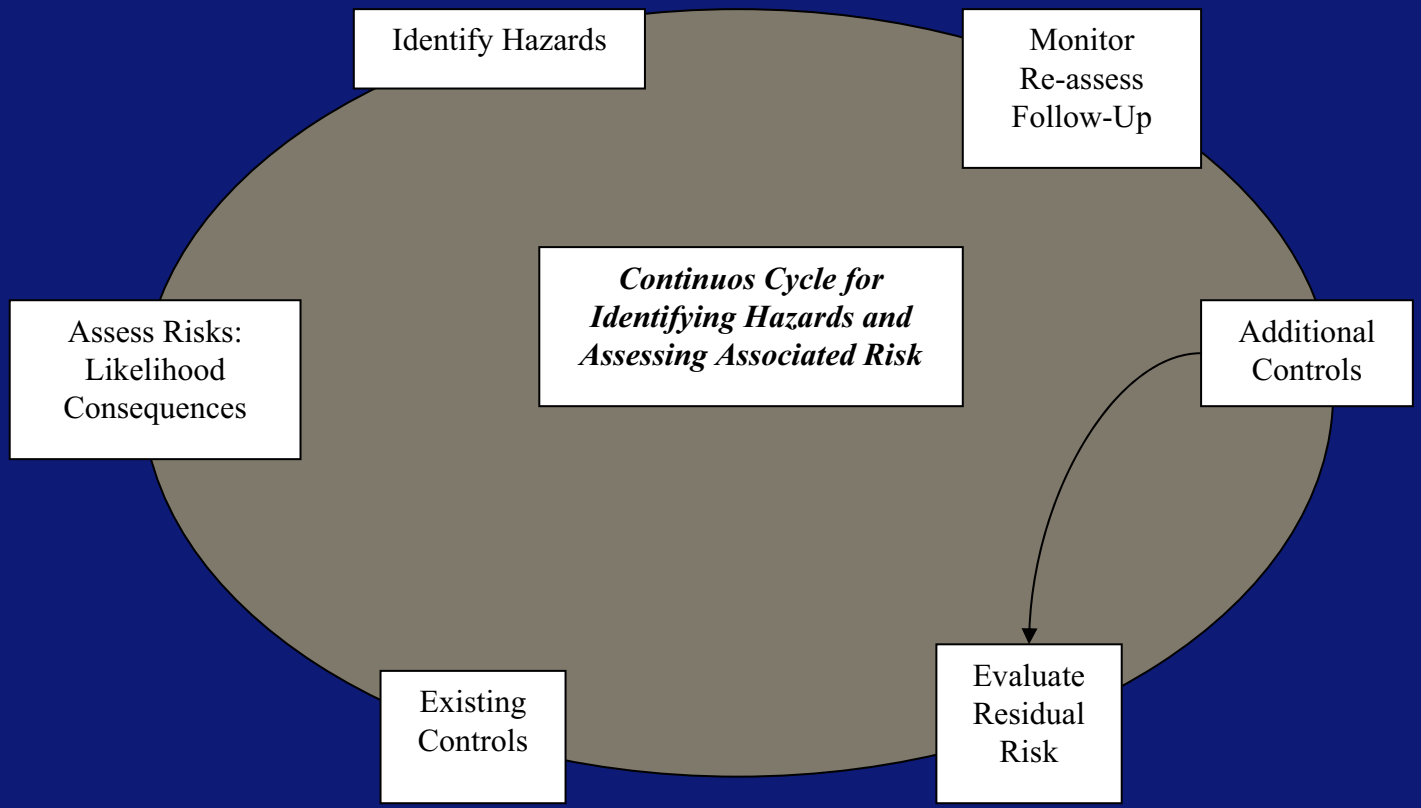
Hazard Controls Hierarchy



Risk Assessment Cycle



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Designing and Planning of Vertical and Lateral Development

- dynamics of development interfacing with day-to-day production activities
- continual inflow of new personnel - Mine Planning and Operations Dept.
- consistent risk assessment system
- hazards / risks (likelihood & consequences) / required controls highlighted

Risk Assessment Procedure

- Relevant geological and geotechnical data (location of faults, orebodies, etc)
- Existing access and travelways (location in 3D space in relation to the planned development)
- Fixed emergency facilities (nearest location / what will be required)
- Contaminants in the ventilation system (interaction with current ventilation system)
- Ground control (as dictated by the geological / geotechnical data)
- Stockpiling (where mullock / ore is to be transported / stored)
- Underground water treatment (current drainage / pumping system and future requirements)
- Vehicular interaction

Personnel Involved with Risk Assessment

- Relevant personnel
  - Planning
  - Rock Mechanics
  - Geology
  - Ventilation
  - relevant personnel that will be doing the work

- ***Rule of Thumb => if standard does NOT exist require additional relevant personnel***

Personnel perspective => risk rating must be ALARA

Financial risk => considered on a case-by-case basis

=> lowest attainable risk being the goal

=> no compromise to safety to personnel

What is considered as acceptable risk is rarely clear-cut.

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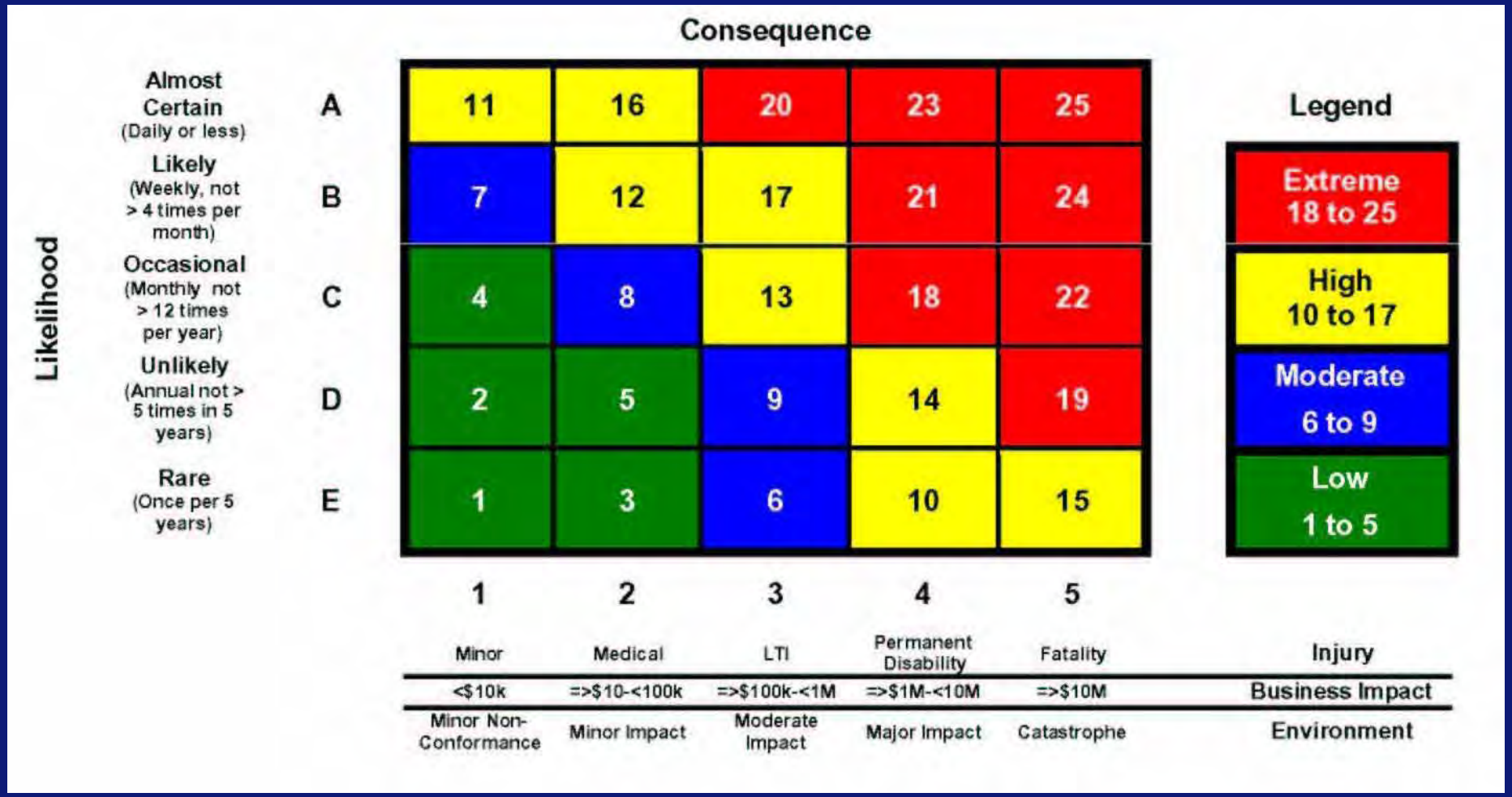
Is it Acceptable Risk to Drive an Automobile?



Issuing of Risk Assessment Information

⇒ recorded on the *PRIMARY DEVELOPMENT RISK ASSESSMENT* form

⇒ Auditable documented system

- Section #1 => general information
- Section #2 => risk assessment matrix
- Section #3 => actual risk assessment (hazards / controls / risk rating)
- Section #4 => actions required

Primary Development Risk Assessment Form

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GEORGE FISHER PRIMARY DEVELOPMENT DESIGN

PRIMARY DEVELOPMENT RISK ASSESSMENT

Development Location:	
Sub-Level:	
Date of Assessment:	
Assessors:	

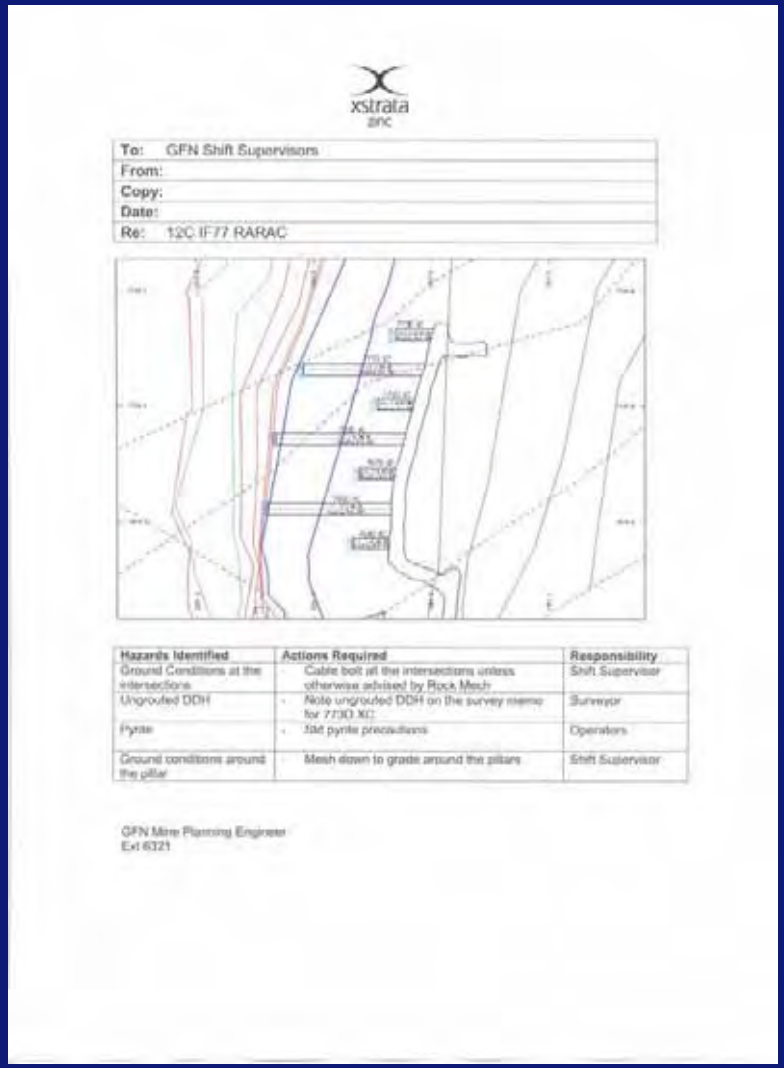
Consequence

Likelihood		1	2	3	4	5
	A	11	16	20	23	25
	B	7	12	17	21	24
	C	4	8	13	18	22
	D	2	5	9	14	19
	E	1	3	6	10	15

Legend: Extreme 18 to 25; High 10 to 17; Moderate 6 to 9; Low 1 to 5

	Existing Scenario					Controlled Scenario			
No.	Hazard Identified	Existing Controls	Conseq.	L/Hood	Risk	Additional Controls Identified	Conseq.	L/Hood	Risk
1									
2									
3									
4									
5									

No.	Action Required	Responsibility	Due Date	Completion Date
1				
2				
3				
4				
5				



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To:	GFN Shift Supervisors
From:	
Copy:	
Date:	
Re:	12C IF77 RARAC

Hazards Identified	Actions Required	Responsibility
Ground Conditions at the intersections	Cable bolt all the intersections unless otherwise advised by Rock Mech	Shift Supervisor
Ungrouted DDH	Note ungrouted DDH on the survey memo for 773O XC	Surveyor
Pyrite	SME pyrite precautions	Operators
Ground conditions around the pillar	Mesh down to grade around the pillars	Shift Supervisor

GFN Mine Planning Engineer
Ext 6321

Example of PDD memo

Lateral Development =>

Primary Development Design (PDD) memo issued with the survey memo

Vertical Development =>

Primary Development Risk Assessment Form

For communications purposes

Follow-Up

- site inspections by => Operations supervisors
  Planning
  Rock Mechanics
  Geology

- notification from workers that controls are not in place

If at any time it is noted that the required controls are not in place, the work is to be stopped until the controls are (re) instituted

JOB SAFETY ANALYSIS (JSA)

- Done by the workers with supervisor(s) acting as the facilitator(s)
- Allows immediate action on implementing any additional controls
- If control cannot be immediately implemented work is to stop until control in place
- Communication between interested parties is the key / major failure where JSA's can assist

JSA Form

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MINING SINCE 1924

Job Safety Analysis FRM-119007

Task				JSA No.		Version	
Department		Location		Operator Title		Risk Reg No.	
Supervisor		Developed By		Reviewed By		Date	
Related Risk Assessment/Procedures							
Personal Protective Equipment (PPE)	Hard Hat ☐ Safety Spectacles ☐ Goggles ☐ Face Shield ☐ Safety Boots ☐ P3 ½ Face Respirator ☐ P3 Full Face Respirator ☐ Air Line Respirator ☐ SCBA ☐ Height Safety Harness ☐ Fall Arrest Block ☐ Lanyard ☐ Lifeline ☐ Other *(Specify)* ☐: _____						
Permits	Confined Space ☐ Excavation ☐ HV Switching ☐ Cutting & Burning ☐ Authority to Work ☐ Other *(Specify)* ☐: _____						

Job / Task Step *(what are we about to do)*	Existing / Potential Hazards *(what can go wrong)*	Controls *(what can we do to prevent it from going wrong)*	Responsible	Complete
Example: Move boxes	*Manual handling injury as a result of lifting heavy boxes*	*Training, reduce box size*	*J Bloggs*	☐
1.				☐
2.				☐
3.				☐
4.				☐
5.				☐
6.				☐
7.				☐
8.				☐
9.				☐
10.				☐
11.				☐
12.				☐

Unless stamped in RED, this is an 'Uncontrolled Document'

REMEMBER:
NO JOB IS SO IMPORTANT THAT WE CANNOT TAKE THE TIME TO DO IT SAFELY

Questions???