LANG Jennifer (Admin Review)

From: Job, Andrew <andrew.job@angloamerican.com>
Sent: Friday, 2 August 2013 11:50 AM
To: MCWILLIAM Mick; Andrews, Darren
Cc: SLEIGH John
Subject: RE: Docs forwarded to John Sleigh by Andrew Job
Attachments: AA_SSDP_11_ LFI Investigation Manual.doc

Mick,
Darren is offsite today. Attached is a copy of the requested document.
Regards,
Andrew.

From: MCWILLIAM Mick [mailto:Mick.McWilliam@dnrm.qld.gov.au]
Sent: Friday, 2 August 2013 11:21 AM
To: Andrews, Darren
Cc: Job, Andrew; SLEIGH John
Subject: Re: Docs forwarded to John Sleigh by Andrew Job

Darren

One of the documents that Andrew Job forwarded to John Sleigh earlier today is entitled Incident Reporting Standard (MetCoal_11-4_STD_Incident Reporting.doc).Version 2 - Date 22 July 2013

Within that document at Section 5.5 - LFI Investigations - The Anglo American Learning From Incidents Investigation Handbook is referenced.

May I request a copy of this document be forwarded to John and I please, as it states that:

"All incidents shall be investigated in accordance with the Anglo American Investigation Process described in The Anglo American Learning From Incidents Investigation Handbook.

This process defines the:

· Required composition of investigation teams (in accordance with the severity level of the incident).

· Key steps in the investigation process.

· Types of analysis tools that could be used.

Further information regarding this process may be obtained from Met Coal Safety personnel".

Regards
Mick McWilliam
Inspection Officer (Mechanical)
Mines Inspectorate
Mine Safety & Health
Department of Natural Resources and Mines
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http://mines.industry.qld.gov.au/safety-and-health

Vision: Our Industries Free of Safety & Health Incidents

LEARNING FROM INCIDENTS

INVESTIGATION HANDBOOK

FOR FACILITATORS AND PARTICIPANTS

Anglo American Causal Analysis Method

Safety and Sustainable Development

Contents

Guidance on Using this Document

This document contains an overview of the processes that make up incident investigation, including mandatory requirements, and guidance on using them. Mandatory requirements are indicated by the use of the word “shall”.

Introduction and Overview

In line with Anglo American’s vision of Zero Harm a global, best practice, *Learning From Incidents* process has been developed to eliminate repeat incidents by identifying their basic causes, effectively closing out all agreed actions and vigorously sharing and acting on lessons learnt. This incident investigation Manual is part of the new *Learning From Incidents* process.

Incident investigation is an important part of making sure we improve our safety performance as a company. Through applying a consistent and high quality approach to investigating all incidents, we will be able to identify repeat incidents and high risks, share learnings widely across the organisation, and take concerted action to reduce risk across the board. It is therefore critical to the organisation’s overall delivery of our ‘No Repeats’ safety principle. The fundamental purposes of incident investigation are the collection, protection, validation, analysis and organising of evidence, facts and data about an incident in compliance with local laws, in order to tell a detailed story about what happened, where and when, who was involved (the facts), followed by how and why it happened and how we stop it happening again (the analysis) all in a manner that minimises the exposure of Anglo American, its managers and employees to criminal and civil liability.

Scope & Objectives

This document specifies the recommended process for investigating incidents. It identifies the issues involved to satisfactorily address an investigation and the production of reports to satisfy both internal and external requirements.

The document provides guidance designed to help deliver systematic, repeatable and objective incident investigations anywhere in Anglo American. Its content applies to all levels of incident severity (actual and potential), from minor incidents through near hits up to fatal incidents. The level of reporting and investigation can vary depending on incident severity and complexity, but the basic approach and tools identified are applicable to all incidents.

While primarily targeted at the investigation of safety related incidents, this document provides an approach to investigation, which is applicable to a wide range of incidents, including those affecting health, environment, reputation, production and assets. Many incidents can affect several of these issues simultaneously. It covers notification and investigation of incidents, identification of preventative and corrective actions and the development of a final investigation report. It also touches on other processes such as emergency response, legal issues and communication of learnings from investigations, in order to ensure the investigation team understands how its processes interact with these other processes (but does not go into any detail on these other processes).

This document is primarily designed to guide Investigation Team Leader s through the investigation process, but will offer useful information to anyone participating in incident investigations. It aims to:

1. Ensure all incidents reported to any office within Anglo are appropriately documented and notifications actioned (Section 1);

2. Ensure that all incidents reported to any office within Anglo are accurately and consistently assessed and classified in order to determine the appropriate level of investigation and reporting (Section 2);

3. Detail the initial investigative activities undertaken by the site First Response Team and Incident Management Team immediately following an incident and clarify how they interface with actions of the Investigation Team Leader when arriving on site (Section 3);

4. Help the Investigation Team Leader be aware of how investigations interface with other activities following an incident and to prepare and plan for the investigation (Section 4);

5. Ensure the acquisition and retention of quality evidence at the scene to assist in determining the nature and cause (Section 5);

6. Ensure comprehensive analyses of the causes of an incident (Section 6);

7. Ensure appropriate conclusions and preventative measures are identified (Section 7);

8. Ensure the investigation report is clearly and concisely written to convey the results of the investigation within acceptable time frames (Section 8);

Each section of the document also aims to:

- Ensure that local laws are complied with and legal protections are introduced from the outset of an investigation;
- Ensure that the investigation is performed in a manner that minimises the potential exposure of Anglo American, its managers and employees, without compromising the need to learn from the incident and avoid repeats.

Investigation Process Overview

This document is broken down into eight sections, each covering a different component of the incident investigation process shown in Figure 1. Incident investigation is the key component of the Learning from Incidents Process and one of several business processes that interact with each other. Figure 2 illustrates how these different processes are connected.

Each process has different objectives and is generally carried out by separate parties. However the Anglo Safety Way requires these different processes to work together. For example, the Investigation Team may need to work with the Incident Management Team to ensure evidence is protected during emergency response; however, emergency response is the priority process following any incident. The site operations team need to work with both the emergency response and investigation teams to evaluate when and how to restart operations. Audit and assurance processes evaluate and feed back to all other processes.

Figure 1 Incident Investigation Process Overview

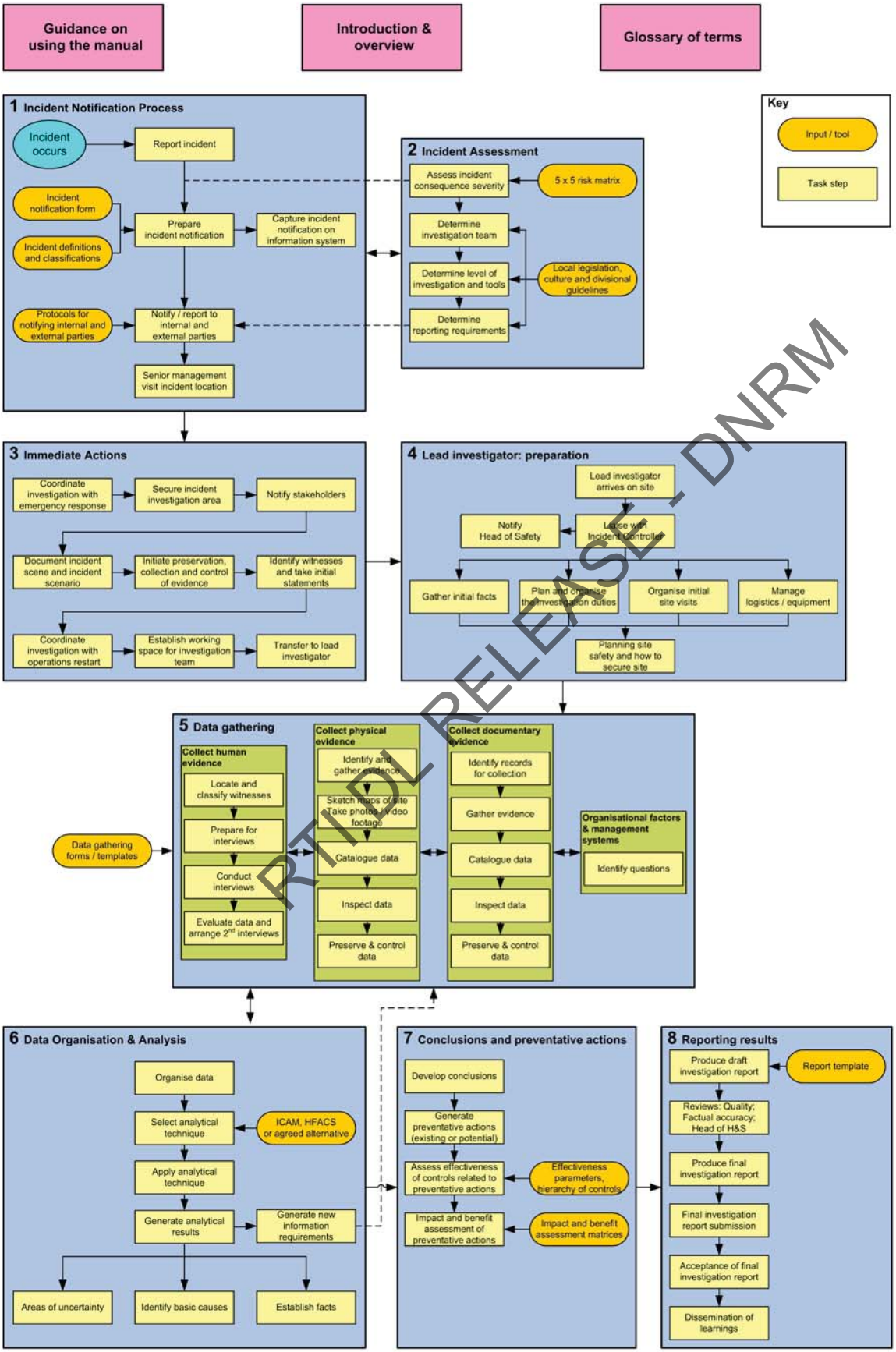
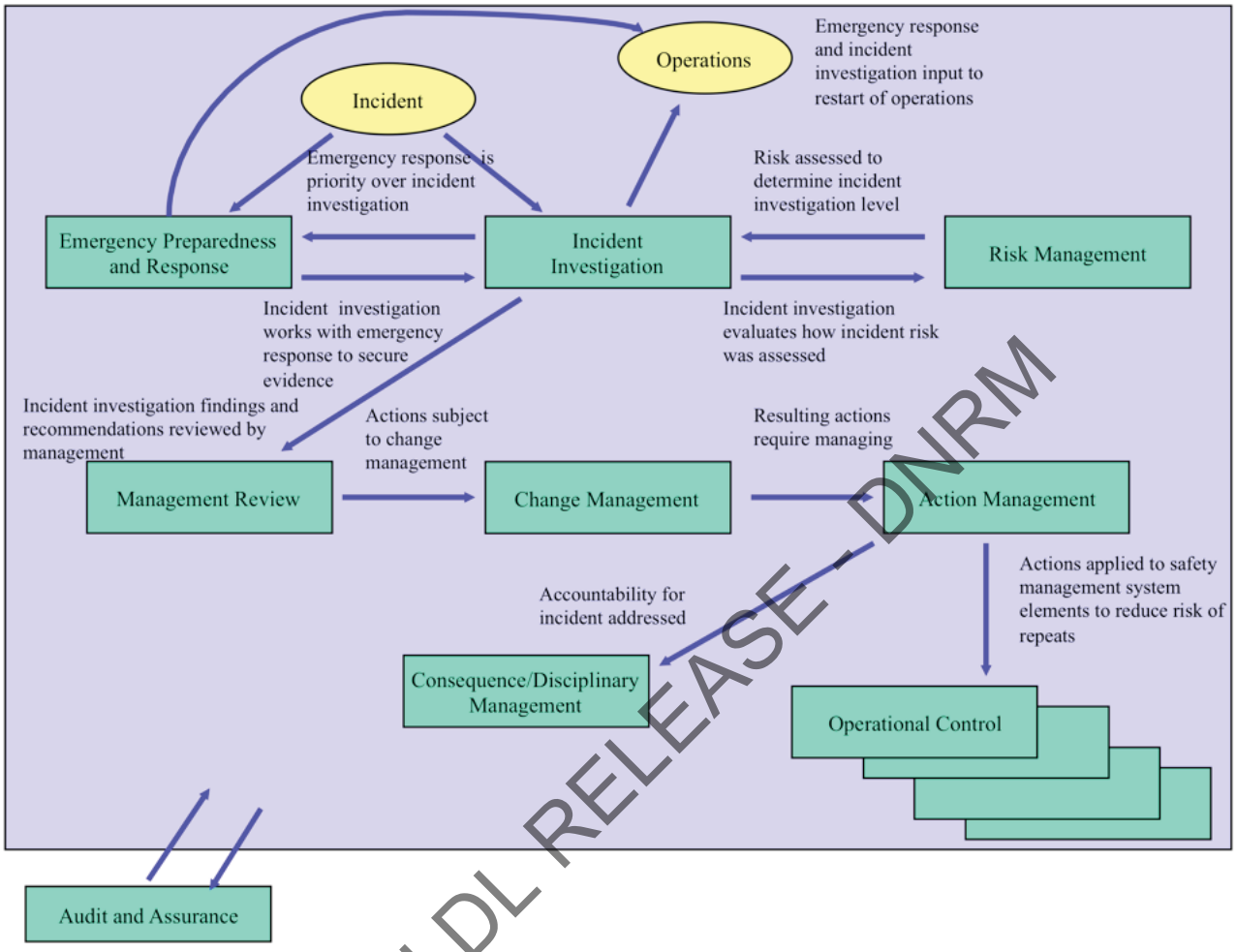
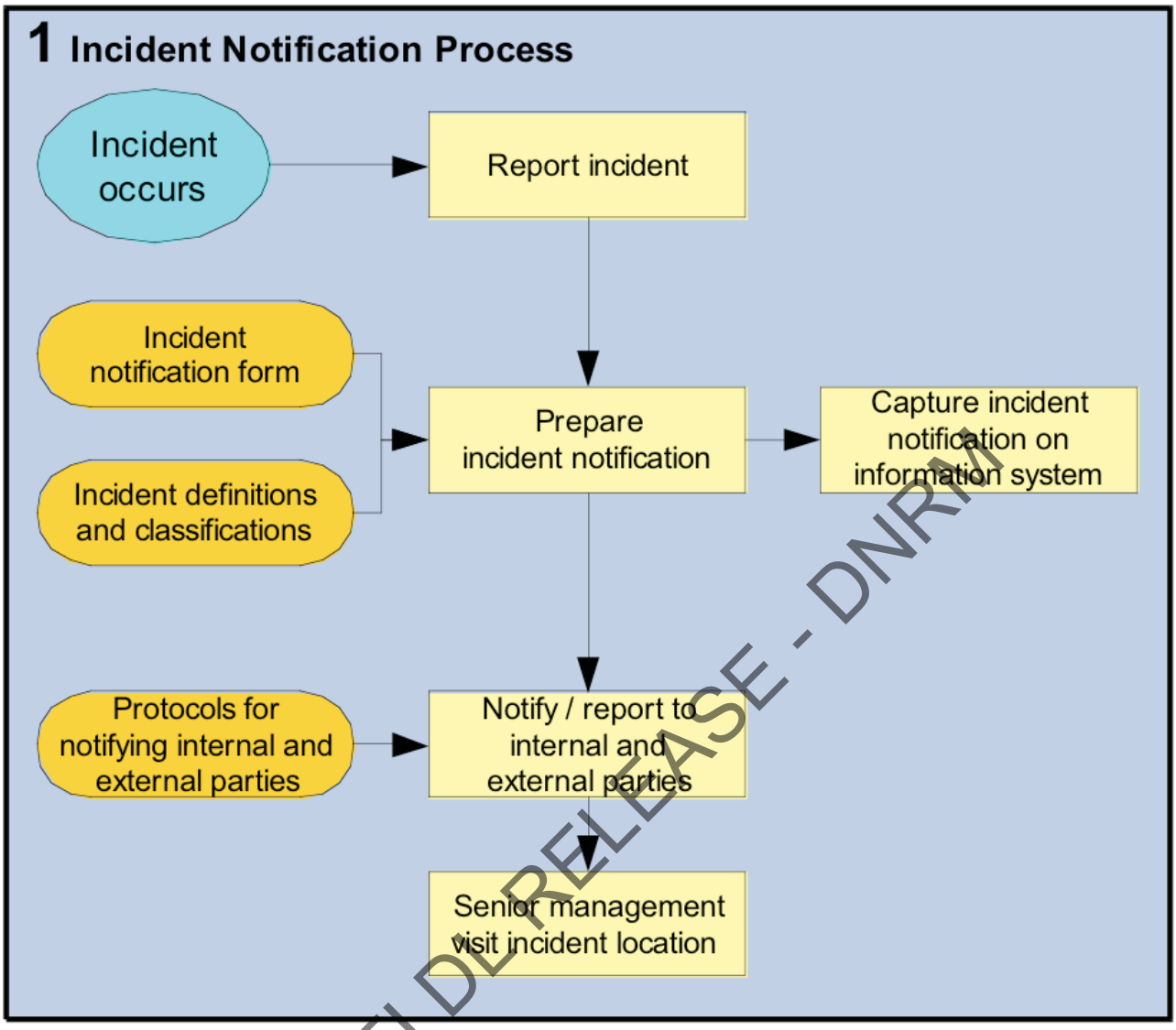


Figure 2 Relationships between the Incident Investigation Process and Other Processes



Section 1



Section 1

Incident Notification Process

1.1 Objective

To ensure that all incidents reported to any office within Anglo are appropriately documented and notifications are actioned.

1.2 Approach

A written form may be used, most notifications will be entered directly into Site Safe.

1.3 Notification Process

Any individual on site can, and indeed has a duty to, report that an incident has occurred. The details of the incident shall be recorded wherever possible and practicable, by a supervisor or equivalent. In the absence of a supervisor or equivalent the details of the incident can be recorded by the next appropriate individual on site.

Site Safe is this principal Notification system. It shall be used as the sole source of fact surrounding the incident during the Notification Process. The notification shall not be used to speculate about the cause of the incident or to assign blame or responsibility. It shall not be altered or transmitted to third parties before going through the management chain described below.

The person who completes the Incident Notification in Site Safe shall send it to the General Manager (or equivalent) and other parties depending on the severity level and following site procedures. This should happen automatically as part of the information system function.

The Incident Controller shall be responsible for carrying out any initial actions following an incident (such as notifications to external parties, securing the incident area and protecting evidence, etc); he/she may assign these to members of the Incident Management Team. Each site shall ensure these tasks and responsibilities are addressed in emergency procedures.

Notification protocols for notification to all external parties, particularly the unions and regulators shall reflect specific local legislative requirements, Business Unit practices, external communication protocols and cultural factors. Example processes for notifying the next of kin are provided in the following paragraphs.

In the Event of a Fatality (Employee)

- Refer to Division's local guidance on contacting next of kin.
- Sites must have written confirmation of next of kin details and update details as they change, or at least on an annual basis.
- Counsellors would be engaged to assist the family as soon as possible after notification.

In the Event of a Fatality (Contractor)

- Senior contracting official contacted with known details (name of contractors employee etc) to enable contracting official to source personal details.
- Police would be advised of known details and contact details of the employing contractor provide. Contracting company required to give urgent notification.
- In co-operation with the contracting official, site would organise counselling to assist the family as soon as possible after notification.
- Available management and/or contractor representatives would be dispatched to the home address as soon as possible to add support and to give known factual details of events; site reps will attend with the contractor reps, only where it is appropriate and desired to do so.
- Available management and/or contractor representatives would be dispatched to the home address as soon as possible to add support and to give known factual details of events.

In the Event of Incapacitating Injury (Employee)

- Employees would be encouraged not to release any pre-emptive details, however, if family members are onsite special consideration is to be given to their welfare and requests.
- If possible, the employee is to be placed in verbal contact with next of kin.
- If this is not possible and/or a recovery situation exists a senior site official on shift is to contact the next of kin, this should be done in consultation with the injured party, if possible.
- Support in the form of family, friends and possibly counsellors and Site Officials to be mobilised.
- Verbal contact would be maintained over whatever frequency and duration necessary to provide timely and progressive updates on the status of the injured person.
- In the event the injured party dies on the site as a result of injuries received before the next of kin can meet the employee – consideration to the existing status of the circumstances will determine who is best placed to notify the next of kin. This decision will be taken in consultation with the police, site officials and medical personnel.

In the Event of Incapacitating Injury (Contractor)

- Employees and contractors would be encouraged not to release any pre-emptive details, however, if family members are onsite, special consideration is to be given to their welfare and requests.

- The senior site official onsite is to contact the contracting company advising them of the situation and, if possible, the contractor is to be placed in verbal contact with the next of kin.

- If this is not possible, or a recovery situation exists, a site senior official in consultation with the contracting company is to contact the next of kin. This should be done in consultation with the injured party, if possible.

- Support in the form of family, friends and possibly counsellors, and contractor and site officials to be mobilised.

- Verbal contact would be maintained over whatever frequency and duration necessary to provide timely and progressive updates on the status of the injured person.

- In the event the injured party dies on the site as a result of injuries received before the next of kin can meet the employee – consideration to the existing status of the circumstances will determine who is best placed to notify the next of kin. This decision will be taken in consultation with the police, site officials, contracting company officials and medical personnel.

1.4 First Response

All sites, including Corporate Offices, shall prepare a site Emergency Preparedness and Response Plan (Anglo Safety Way Standard 9 Emergency Preparedness and Response).

All such Plans shall detail the specific requirements, contact lists and protocols for the site's immediate first response to an incident, the formation of a site Incident Management Team and the detailed circumstances requiring the formation of such an Incident Management Team.

Incident reporting therefore feeds into both the investigation and emergency response processes.

1.5 Reporting Requirements

1.5.1 Immediate Reporting Requirements

All Significant Incidents (i.e. actual L4 or L5 consequence as shown in Figure 2.1) shall be reported as soon as possible in accordance with the Incident Reporting and Investigation Procedure.

Incidents with actual consequence below L4 or 5 or High Potential Incidents shall be reported to the General Manager within 24 hours; the General Manager then determines if these require further reporting(note that all incidents will be contained in monthly/annual overall incident reports).

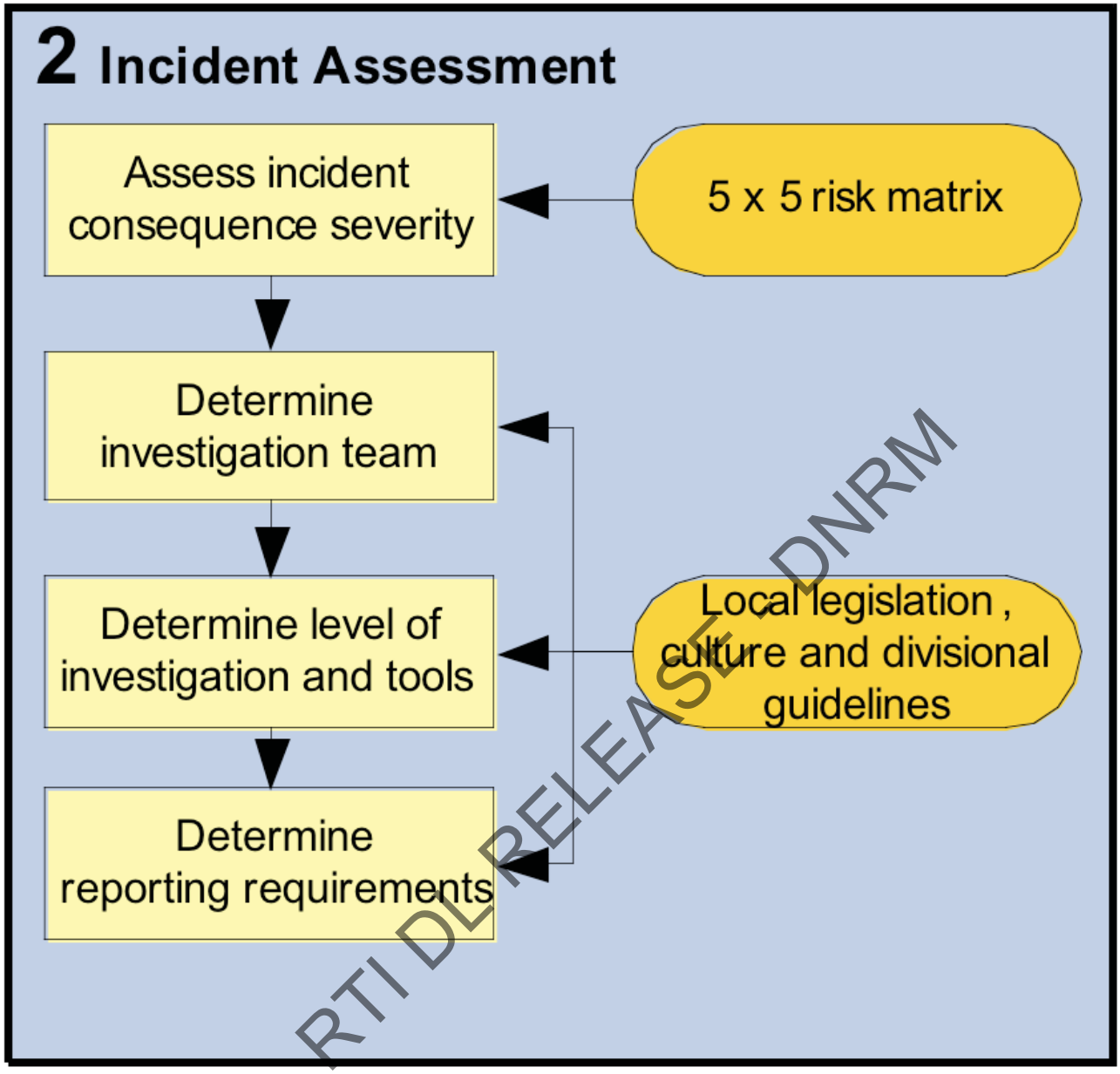
1.5.2 Further Reporting Requirements

When above-the-site management receive notification as per the Incident Reporting and Investigation Procedure, they shall ensure that:

- a reliable means of contact with the affected General Manager is established; and
- all of the key details in relation to the incident have been determined.

Subsequently, they shall ensure/confirm that the Business Unit Chief Executive Officer (CEO), the legal team in the relevant jurisdiction (or, if there is none, a local approved lawyer), the Head of External Affairs (Media) and other appropriate senior managers are aware of the occurrence of the Significant Incident.

Section 2



Section 2

Incident Assessment

2.1 Objective

To ensure that all incidents reported to any office within Anglo are accurately and consistently assessed and classified in order to determine the appropriate level of investigation and reporting.

2.2 Incident Severity Rating

All incidents shall be classified in accordance with the Consequence Rating in the Anglo SHE 5X5 Risk Matrix, as detailed in Figure 2.1. It is important to note that when assessing severity only the consequence level (actual or potential) should be used. The probability should not be considered.
This classification rating is the first step in determining:

1. The level of investigation required;
2. The number of members and the composition of the investigating team, as depicted in Table 2.2.; and
3. The reporting and notification requirements.

In order to determine the most appropriate level of response required, the person responsible for the reporting on site (i.e. the plant manager or equivalent) shall adequately assess the incident based upon the table below. This table shall also be used for high potential incidents to determine the similar level of investigation necessary even though the outcome did not have the actual severity.

Figure 2.1 Anglo 5X5 SHE Risk Matrix- Consequence Levels

Anglo American SHE Risk Matrix	Consequence Level (consider the maximum reasonable potential consequence of the event)				
Impact Type (Additional 'Impact Types' may exist for an event; identify & rate accordingly)	**1 Minor**	**2 Low**	**3 Medium**	**4 High**	**5 Major**
(S) Harm to People- Safety	First aid	Medical treatment	Lost time	Permanent disability or single fatality	Numerous permanent disabilities or multiple fatalities
(H) Harm to People- Occupational Health	Exposure to health hazard resulting in minor discomfort	Exposure to health hazard resulting in symptoms requiring medical intervention and full recovery (no lost time)	Exposure to health hazards/ agents (over the OEL) resulting in reversible impact on health (with lost time) or permanent change with no disability or loss of quality of life	Exposure to health hazards/ agents (significantly over the OEL) resulting in irreversible impact on health with loss of quality of life (permanent disability) or single fatality	Exposure to health hazards/ agents (significantly over the OEL) resulting in irreversible impact on health with loss of quality of life of a numerous group/ population or multiple fatalities
(E) Environmental Impact	Lasting days or less; limited to small area (metres); receptor of low significance/ sensitivity (industrial area)	Lasting weeks; reduced area (hundreds of metres); no environmentally sensitive species/ habitat)	Lasting months; impact on an extended area (kilometres); area with some environmental sensitivity (scarce/ valuable environment).	Lasting years; impact on sub-basin; environmentally sensitive environment/ receptor (endangerous species/ habitats).	Permanent impact; affects a whole basin or region; highly sensitive environment (endangerous species, wetlands, protected habitats)
(C) Social / Community Impact	Minor disturbance of culture/ social structures	Some impacts on local population, mostly repairable. Single stakeholder complaint in reporting period	On going social issues. Isolated complaints from community members/ stakeholders	Significant social impacts. Organized community protests threatening continuity of operations	Major widespread social impacts. Community reaction affecting business continuity. "License to operate" under jeopardy
(L&R) Legal & Regulatory	Technical non-compliance. No warning received; no regulatory reporting required	Breach of regulatory requirements; report/involvement of authority. Attracts administrative fine	Minor breach of law; report/investigation by authority. Attracts compensation/ penalties/ enforcement action	Breach of the law; may attract criminal prosecution of Operating Co. and/or of Directors/ Mgrrs. And penalties/ enforcement action. Individual licence temporarily revoked	Significant breach of the law. Individual or Class action law suits, criminal prosecution of Co., Directors/ Mgrrs. Suits against parent Co.; permit to operate substantially modified or withdrawn
(M) Material Losses/ Damage/ Business Interruption	< 0.01 % of Annual Revenue/ Total Assets	0.01 - 0.1 % of Annual Revenue/ Total Assets	0.1 – 1.0 % of Annual Revenue/ Total Assets	1 - 5 % of Annual Revenue/ Total Assets	> 5 % of Annual Revenue/ Total Assets
(R) Impact on Reputation	Minor impact; awareness/ concern from specific individuals	Limited impact; concern/ complaints from certain groups/ organizations (e.g. NGOs)	Local impact; public concern/ adverse publicity localised within neighbouring communities	Suspected reputational damage; local/ regional public concern and reactions	Noticeable reputational damage; national/ international public attention and repercussions

2.3 Investigation and Recording Requirements

Once the Incident Severity Rating (actual or potential) is determined, the required level of investigation and recording and the required characteristics of the investigation team can be identified. The following tables (2.2 and 2.3) indicate how these requirements are related to the incident severity rating.

2.3.1 Appointing the Investigation Team Leader and the Investigation Team

The appointment of Investigation Team Leader and Investigation Team for all incidents, actual or potential shall be determined using the guidance shown in Table 2.2.

Note: Wherever possible, decisions on the Investigation Team composition shall be made in conjunction with the Investigation Team Leader, once appointed.

At a minimum, a L4 or L5 Incident Investigation Team shall comprise:

- Mix of individuals from operations, maintenance, legal and safety; and
- Technical expert qualified in the equipment involved in the incident where appropriate.

Other members may include subject matter experts or appropriate individuals to handle the workload. In addition, it may be a local or legal requirement to invite the relevant union and regulatory body to nominate a representative to participate in the investigation. However, unions, police and regulators may carry out their own investigations.

Key things to consider in choosing team members include the following:

- Availability through the investigation's expected duration;
- Direct involvement in the incident;
- A personal interest in the incident which might impede objectivity or impartiality while performing their tasks; and
- Local knowledge.

When selecting a team of investigators, the level of knowledge and experience must be directly comparable to the area in which the investigation is taking place.

The following team membership make-up table (Figure 2.2) provides guidelines, and the site should also use independent experts if required, dependent upon the level of investigation. An independent “fresh pair of eyes” review of high-potential Incidents, and fatalities should be undertaken on a periodic basis.

Table 2.2 Investigation Team Numbers and Members – (Guide only)

Level	Recommended Team Members	Team Leader*	Who appoints lead and team
5 Major	• Senior Site Manager • Senior Supervisor • Senior SHE person from site • External lawyer	Trained and experienced Investigation Team Leader and Facilitator independent of the Business Unit	Group S&SD function in co-ordination with Business Unit
4 High	• Senior Site Manager • Senior Supervisor • Senior SHE person from site • Union representatives • External lawyer	Trained and experienced Investigation Team Leader and Facilitator independent of the Business Unit	Group S&SD function in co-ordination with Business Unit
3 Medium	• Senior Site Manager • Senior Supervisor • Senior SHE person from site • Supervisor from area concerned • Union representatives • If appropriate, an external lawyer or assistance from the legal team	Senior SHE person	Site Manager
2 Low	• Senior Site Manager • Senior Supervisor • Senior SHE person from site • If appropriate, remote assistance from the legal team	Senior SHE person	Site Manager
1 Minor	• Responsible Supervisor • Safety Officer • SHE representatives	Responsible Supervisor	Site Manager

* The suggested composition is based on the assumption that all Investigation Team Leaders are (at a minimum internal to Anglo American) trained in the incident investigation process, as well as data analysis and data collection tools contained within it.

2.3.2 Recording

Table 2.3 Recording Requirements

ISR Rating, Actual or Potential	Actions by	Input to SHE Database	Documentation* completion
5 Major	Site Manager	24 hours	Within 2 months
4 High	Site Manager	24 hours	Within 2 months
3 Medium	Senior Manager	24 hours	Within 1 month
2 Low	Senior Supervisor	24 hours	Within 2 weeks
1 Minor	Senior Supervisor	24 hours	Within 1 week

The initial details of all incidents shall be entered on to the Anglo American incident database within 24hrs of the incident occurring. In instances where this is not practically possible (e.g. remote sites with limited internet connectivity), the time frame may be extended, but all reasonable efforts should be made to communicate the information to someone capable of entering it into the Anglo American incident database.

External reporting requirements to country regulators shall be undertaken by site SHE Management under direction from Site Manager and in consultation with the legal team. The relevant country regulator will advise when the incident scene can be released for examination and analysis and whether other authorities such as the Police need to be involved. It is important to inform the regulators as soon as is practical where the actual or potential severity of the incident requires this in accordance with local statutory requirements.

* If the period is exceeded a valid reason shall be provided as to why to:
- Business Unit and Corporate Management in the case of incidents L3-5, or
- Site Management, in the case of incidents L1&2.

Note: Additional reports may be required for 3rd parties such as regulators. This will vary across jurisdictions. Consult the legal team for local requirements.

2.3.3 Investigation Tools

There are many established tools for investigating incidents and identifying basic causes. Anglo American recognises that the appropriate tool(s) for conducting the investigation will be determined by the context of the incident and the competence of the investigation team. It is the responsibility of the Investigation Team Leader to select the appropriate investigation tools. In general, however, Anglo American specifies that at least one member of the team needs to be trained in the tool(s) selected for use.

2.3.4 Analysis and Classification Tool

Anglo American specifies that Incident Cause Analysis Method (ICAM) shall be used as the core analysis and classification tool for incidents L4 and L5 (actual or potential).

While ICAM is the default tool for general analysis and classification of incidents L4 and L5, (actual or potential), this does not preclude the selective use of other tools or incorporation of concepts from other tools (see Appendix 1 for other analysis techniques), where this is justified based on the circumstances of the incident.
Where the incident circumstances dictate an alternative tool is more appropriate, the Investigation Team Leader may substitute ICAM with an alternative analysis tool, but this shall be agreed with the Group Head of Safety.

For L1- 3 incidents, the analysis and classification tool is left to the Investigation Team Leader discretion.

2.4 Legal Considerations

The incident investigation team should coordinate with the legal team to seek advice immediately after the occurrence of a Significant Incident and during the investigation process. This is important to ensure the incident is investigated in a manner that complies with the specific legal requirements of the jurisdiction where the incident occurred and best protects the interests of the company and its employees from unnecessary legal attack in the form of civil or criminal actions. Legal advice is particularly important when there is a possibility for escalation) where the incident investigation team shall notify the country and or/ Business Unit legal and S&SD Department Heads within 24 hours of an incident and shall continue to seek advice throughout the investigation process.

One reason to liaise with the legal team immediately after an incident is to try to establish from the outset, legal privilege to the investigation process. Legal privilege rules vary from country to country (and privilege is not available in some jurisdictions) and the legal team will be able to advise on the application of local rules in each incident scenario. Where it applies, broadly it enables a company to communicate with and obtain advice from its legal advisors and get to the bottom of exactly what happened in an incident in the confidence that these communications are less likely to be disclosed to outside parties or to be used by the courts or regulators against the company, its managers or employees. As such it can be a critical tool in establishing the facts and properly analysing them. Even once legal privilege is established, unless the investigation and communications resulting from it are managed properly, such protection can easily be lost, hence the need for ongoing involvement of the legal team.

Key stages in the investigation process where the legal department may need to be included:

- Dealing with regulatory and police investigations.
- Controlling information, documents and reports.
- Dealing with compensation claims.
- Reviewing requests from and responses to external stakeholders (e.g. police, regulatory authorities and media).
- Workforce briefings.
- Reporting to joint venture partners, customers, Anglo American divisional and corporate officers.
- Incident reporting required under legislated requirements, e.g. health and safety legislation, environmental protection legislation.
- Preparation of evidence, collation of exhibits and statements.
- Reviewing any required statutory investigation reports and internal reports prior to release.
- Reviewing how information on “key learnings” is disseminated without prejudicing future potential court proceedings.
- Briefing managers or staff members prior to being interviewed by regulatory inspectors and attending interviews.
- Complying with any regulatory Notices issued relating to the incident investigation.
- Initiating a separate investigation into the incident for the dominant purpose of obtaining legal advice.

When it comes to safety, like any organisation it is essential that we learn from incidents to improve the may we manage health and safety across our business. At the same time we need to make sure that we appropriately protect Anglo’s legal position and that of its employees, managers and executive officers.

Ref: Managing a Major Safety Incident Workshop, 15 January 2008, Leppan Beech Attorneys

Example Guidance on Legal Advice

ANGLO. PLATINUM
FROG NO. A33
EFFECTIVE DATE: 1 April 2006
SUBJECT: OBTAINING LEGAL REPRESENTATION DURING MAJOR INCIDENT and HPI INVESTIGATIONS

SCOPE: This Franchise Rule of Governance ("FROG") is Applicable to all Mining, Processing and Projects Operations, which are Owned, Controlled or Managed by any one of Anglo Platinum Limited, its Subsidiaries and Joint Ventures (Subject to Approval by the Applicable Joint Venture Management Committee).

This Franchise Rule is aimed at ensuring that legal representation is obtained immediately after any major incident and/or high potential incident ("HPI"), that legal privilege applies to all investigation documentation information (where appropriate) and that appropriate action plans are implemented and adopted.

DEFINITIONS: For the Purposes of this Franchise Rule, a Major Incident is Classified as an Incident where a Person Loses His/Her Life or a Limb.

A high potential incident (HPI) includes business interruption, damage to assets, environmental damage (including potential damage), damage to business relationships, reputational damage and impact on security.

PURPOSE: To Ensure that all Operations and Projects Identify and Categorise Major Incidents and HPIs in a Consistent Manner and Obtain Legal Representation Immediately after a Major Incident and/or HPI.

To provide assistance at the earliest opportunity thereby ensuring that all persons involved in the major incident and/or HPI are able to understand the circumstances, obligations and entitlements.

FRANCHISE RULE:

1. Immediately after a major injury has occurred or an HPI is identified, the Operations Manager (Mines and Processing), Project Manager or a person nominated by him/her must make telephonic contact with one of the Anglo Platinum Legal Advisors listed below, advising the Anglo Platinum on Mine Health and Safety Issues and such Anglo Platinum Legal Advisor will notify the Head of Legal Services of the occurrence of the major incident or HPI:

    - Alistair Collier
    - Robert Botha

The Anglo Platinum Legal Advisor is required to make contact with the external legal representatives identified by the Head of Legal Services.

The external legal representative must be requested to confirm, in writing, that all information, documents and data obtained during the inspection in loco and preliminary analysis is collected and collated on the instructions of the Anglo Platinum.

The external legal representative is to keep the relevant Anglo Platinum Legal Advisor fully informed of all matters pertaining to the instruction.

2. The external legal representative must be requested to provide further instructions in accordance with the Guideline: Legal Representation.

3. All information, data and documentation must be annotated, "This document is legally privileged and confidential and is directed to (and prepared to assist in the provision of legal advice from) attorneys and legal counsel in anticipation of legal proceedings and contemplated litigation. It must not be circulated to third parties and must be kept confidential.

4. Consultations must be arranged with the external legal representative as soon as practically possible. In the case of a major incident, the external legal representative should be requested, where practicable to attend the inspection in loco under the auspices of either the Department of Minerals and Energy ("DME") or the Department of Labour ("DOL"), whichever is applicable.

5. In respect of HPIs, the external legal representative should be requested to attend all and any internal and external meetings in respect of the HPI.

6. No documentation must be distributed to any external persons, including representatives of the DME and/or DOL until such time as the applicable Anglo Platinum Legal Advisor or the external legal representative has authorised the release of the information, data or documentation.

7. Appendix A of this document provides requirements for internal investigations after an incident has taken place.

8. Appendix B of this document provides guidance on the legal requirements for the disclosure of information.

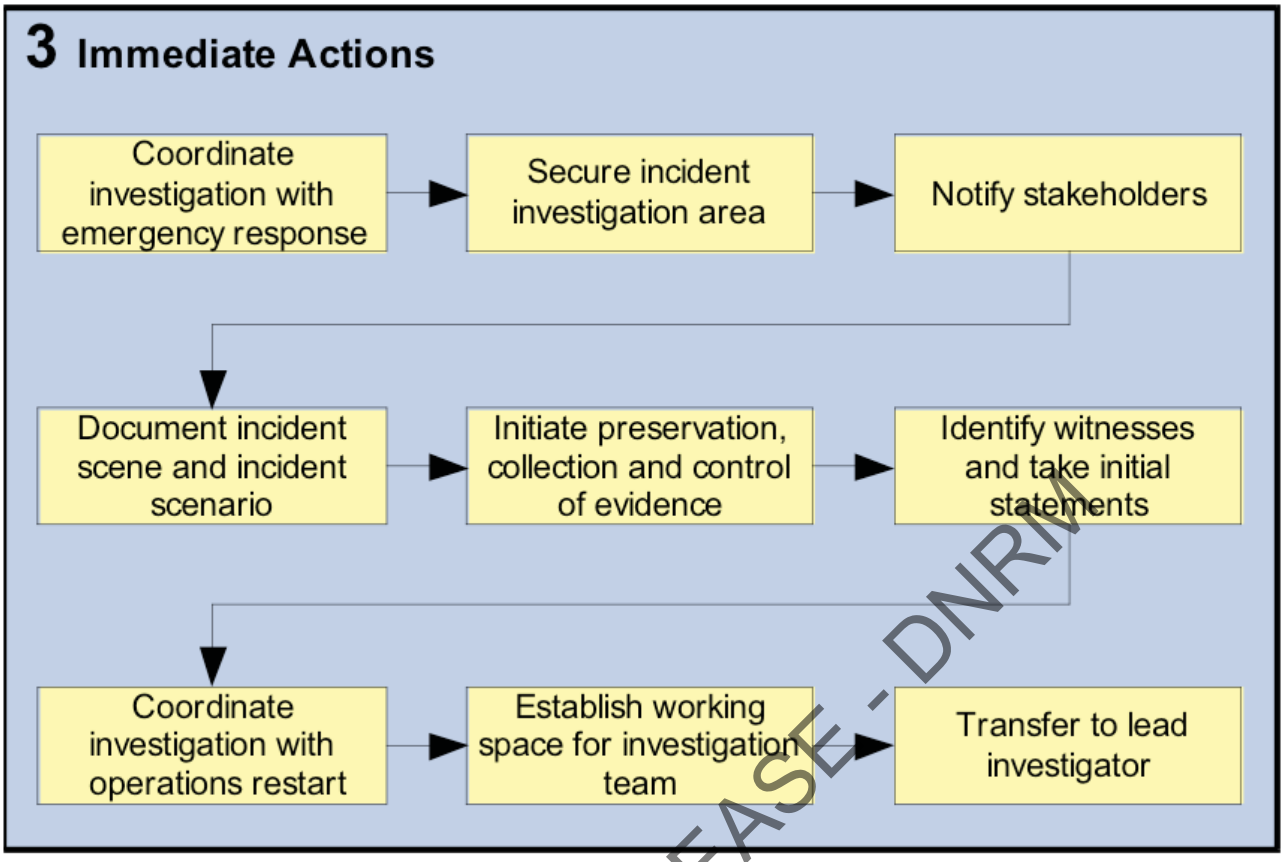
REFERENCES:

This Franchise Rule must be read together with:

- FROG No. A13 : High Potential Incidents
- FROG No. A2: Anglo Platinum Incident Causation Analysis Technique ("AICAT")
- Guideline: Legal Presentation
- Emergency Response Plan
- Corporate Communications Policy

Approved by: A*l I 1,+
ROELAND VAN KERCKHOVEN DUNCAN WAN BLAD
DIRECTOR OF FINANCE & DIRE - , ' OF PROJECTS & CORPORATE DEVELOPMENT ENG
I(E`HALHEAD
ROBIN MILLS
DIRECTOR OF PROCESSING DIRECTOR OF MINING

Section 3



Note: Wherever “Lead Investigator” is stated, substitute the words “Investigation Team Leader”.

Section 3

Immediate Actions

3.1 Objective

To detail the initial investigative activities undertaken by the site First Response Team and Incident Management Team immediately following an incident and clarify how they interface with actions of the Investigation Team Leader when arriving on site.

3.2 Immediate Post-incident Actions

Emergency response actions take precedence over initial investigative actions. To minimise the loss of evidence, advance planning and coordination with emergency response personnel are necessary.

Immediately after an incident occurs, the site Incident Controller, supported by the Incident Management Team, shall be responsible for ensuring that the preliminary work is undertaken for the investigation team prior to their arrival as it may take several days to convene the full team:

- Establishing legal privilege (where applicable) for collection of evidence and formation/communication of information and conclusions;
- Initial securing of the incident investigation site/area (to be handed over in part or in full to the Investigation Team Leader as appropriate);
- Notifying and providing critical information to the relevant stakeholders, in accordance with legal and external communications protocols;
- Coordinating with the emergency response team to preserve the incident scene;
- Beginning legal negotiations (using the legal team) for temporary control of the area if the incident occurs on public property or on property owned by a private party;
- Establishing a working space for the investigation team to work in that is secure and quiet;
- Initiating collection and control of evidence and documentation of the incident scene and scenario;
- Managing identification of witnesses and collection of witness statements;
- Determining which contractor and line organisations are affected by the incident;
- Providing input into decisions made by line managers regarding mitigation actions and the restoration of operations, as appropriate prior to the arrival of the Investigation Team Leader who will then assume control;
- Ensuring a smooth transition of initial investigative activities to the Investigation Team Leader including transferring evidence and other information relevant to the incident, see Section 3.6).

3.3 Preserving and Documenting the Incident Scene

The effectiveness of an incident investigation depends on immediate preservation of the incident scene and the evidence related to the incident.

In L4 and L5 incidents, and other cases where the Investigation Team Leader is unlikely to be on site immediately, the First Response Team and Incident Management Team shall preserve and document the condition and status of the incident scene.

Preserving and documenting the incident scene encompasses:

- Assessing the medical condition and fitness-for-duty status of the injured or others involved in the incident; and
- Preserving and recording the incident scene by means of written documentation, sketches, video, and photographs (including the location of equipment, parts, materials, debris, spills and stains, injured parties and witnesses, and other pertinent items).

This will involve a designated member of the First Response Team and Incident Management Team performing a walkthrough to:

- Characterise the incident scene;
- Identify key human, physical, and documentary evidence;
- Identify changes made to the scene because of incident mitigation activities; and
- Define the physical characteristics of the incident scene (e.g. "injured person is four metres from equipment, lying face down").

The incident scene should be secured immediately following an incident. This can be achieved in several ways, including:

- Removing and excluding all persons from the incident scene except essential emergency responders;
- Cordoning the area with rope, tape, or barricades;
- Locking doors and gates;
- Posting warning signs;
- Posting security personnel to control access;
- Taking photographs and narrated videotape recordings of the incident scene, especially of any evidence that easily can be destroyed (e.g., tyre tracks and fluids on the ground); and
- As necessary, dependent upon the location of the incident, which may be on a public highway, assistance may be required from authorities such as Police and Fire, Ambulance, Safety Regulators, Environmental Regulators.

Securing a frequently used or public area may require additional efforts. Security personnel can be posted around the area to help secure the incident scene long enough for the First Response Team and Incident Management Team to complete a thorough walkthrough and document the scene, if long-term access controls are not feasible.

If the incident occurs in an area that makes securing the incident scene difficult, the walkthrough may be the sole opportunity to collect and preserve important evidence.

Designated First Response Team and Incident Management Team members are responsible for recording the incident scene as it exists after the Incident. Effective documentation methods include:

- Photographs
- Videotapes
- Initial position maps
- Sketches

Because a professional photographer or videographer may not be available, it is important that designated First Response Team and Incident Management Team members be familiar with these techniques so that they can capture the initial state of the incident scene. If necessary, initial photographs and videotapes can be supplemented later with professional photographs and videotapes.

Sketches and position maps can be used to note items removed from the scene prior to distances and directions from reference objects that will remain at the scene. The original location of evidence

should be marked at the incident scene (using paint, tape, chalk, or other appropriate media) before evidence is removed.

3.4 Collecting, Preserving and Controlling Evidence

Most physical evidence can safely be left intact at a protected incident scene to await examination by the investigation team. However, some evidence may be too perishable to remain safely at the scene, and some may have been removed during emergency response or casualty evacuation.

Procedures shall be in place for the personnel at the scene of an incident to preserve that scene for investigators once the emergency response activities are complete (see Section 5.7 for guidance). Perishable evidence includes artefacts that may provide information about the incident and are located at the scene, but that may be corrupted, moved, or lost if left at the scene. For example, fluids emanating from equipment or vehicles involved in an incident may quickly evaporate or be absorbed by surrounding materials. Therefore, fluid samples should be taken quickly.

Do not be too conservative in determining whether items are evidence. It is easy to discard items that are not needed later on, but it may be difficult or impossible to recover discarded items intact.

Section 4.2.2 Early Access to Information
Early access to information allows the Corporate Office and the Investigation Team Leader to start:

- Identifying information about similar types of incidents;
- Identifying and contacting appropriate team members;
- Identifying and contacting consultants and advisors; and
- Scoping and planning the incident investigation before the team arrives onsite.

3.5 Obtaining Initial Witness Statements

One responsibility of the site First Response Team and Incident Management Team is to identify witnesses and record initial statements (see Section 5.3 for guidance).

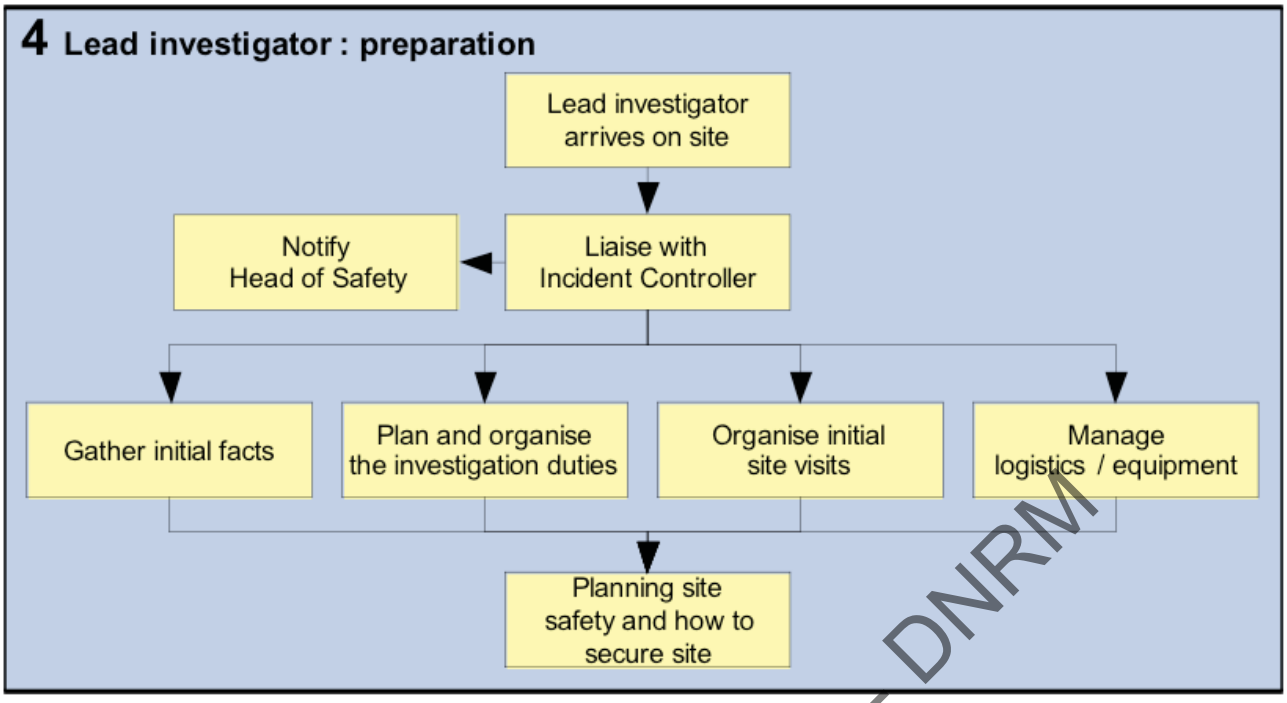
3.6 Transferring Information to the Team

The investigation team expands and builds on results from the site First Response Team and Incident Management Team initial activities. Therefore, the Investigation Team Leader shall obtain a timely assessment of what has been done and determine the team's immediate actions.

Procedures shall be in place detailing how information collected by the Incident Controller will be transferred to the Investigation Team Leader and cover:

- Identification and reporting of the incident;
- Continued communication with Corporate Officers;
- Providing a detailed, well-structured briefing to Investigation Team Leader and helping to brief the investigation team pre and on site; and
- Transferring documentary evidence, along with the secured incident scene and other evidence, to the incident investigation team.

Section 4



Note: Wherever “Lead Investigator” is stated, substitute the words “Investigation Team Leader”.

Section 4

Investigation Team Leader: Preparation

4.1 Objective

To help the Investigation Team Leader be aware of how investigations interface with other activities following an incident and to prepare and plan for the investigation.

4.2 Organisational Structure, Roles and Responsibilities

The Investigation Team Leader is in charge of the investigation process. They shall direct the Incident Investigation Team until replaced by another Investigation Team Leader, if this is required.

The Incident Controller shall control the site during the emergency response (see Section 3). As the emergency is brought under control, the Incident Controller shall hand over control of part of, or the entire site to the Investigation Team Leader depending on the investigation requirements and the status of the emergency.

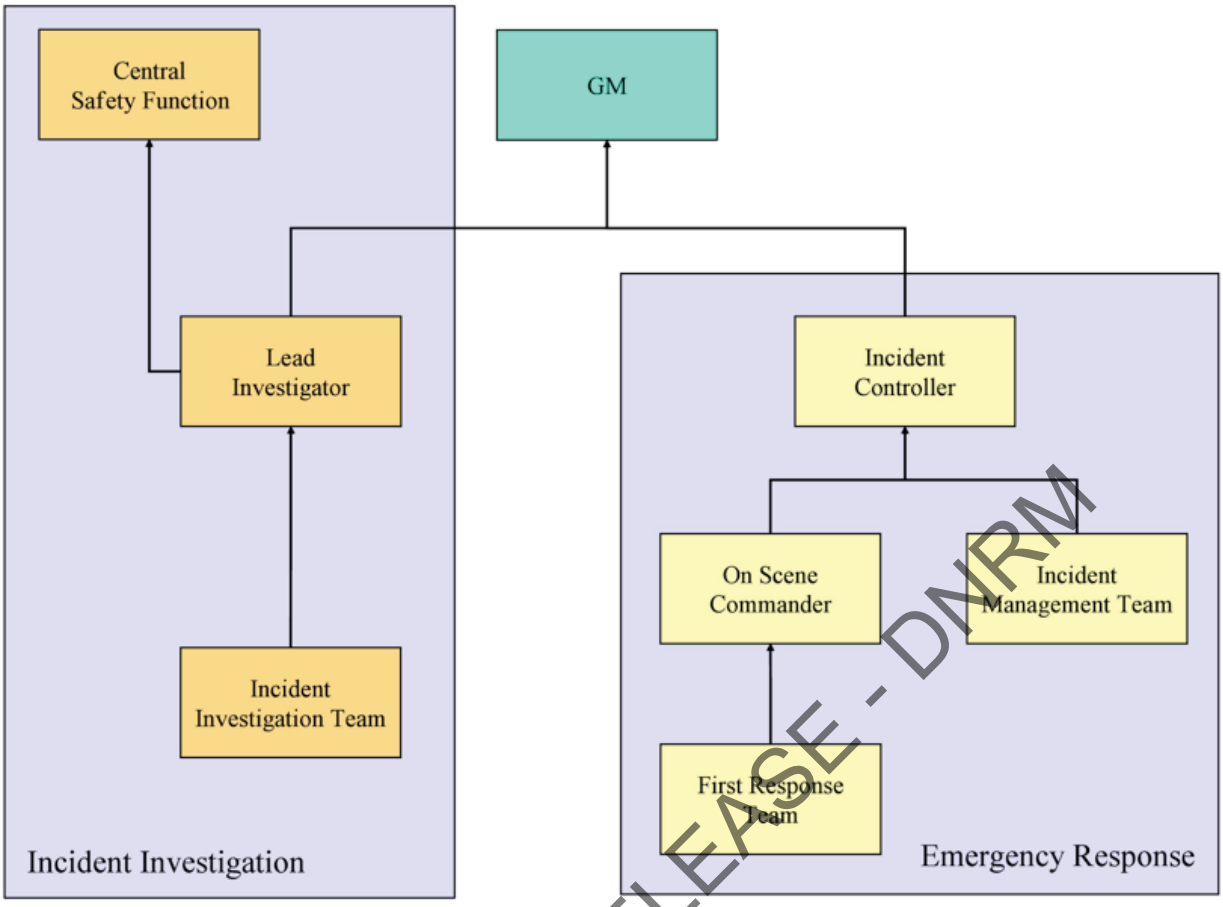
Once determination has been reached in consultation with the Site General Manager and the site is secured, the Incident Controller may hand over the site to the Investigation Team Leader to commence the investigation process. However, close collaboration will be required during the investigation process as the Incident Controller will have a high level of information relating to the initial scenario identified. For L1-3 incidents (i.e. non-significant incidents with limited emergency response requirements), the Incident Controller may assume the role of Investigation Team Leader, if appropriate.

The overall command structure during emergency response and incident investigation is shown in Figure 4.1 below. There is a transition phase prior to the arrival of the Investigation Team Leader during which the Incident Controller is responsible for initial investigation activities as well as emergency response.

Dependent upon the nature of the incident, the country regulator may be the authority which determines when the equipment may be released or the operations restarted. The General Manager may also be the decision-maker on these issues, taking input from the Incident Controller regarding the status of the emergency, from the Investigation Team Leader regarding the needs of the investigation and from the legal team regarding regulatory requirements. However, where the regulatory authorities are involved, regulatory requirements shall always have precedence over this issue.

When carrying out post mortems, and where there are concerns about infrastructure and/or competence, the General Manager should take steps, where the local legislation allows, arranging to have the post mortem carried out by an independent specialist medical practitioner.

Figure 4.1 Emergency Response and Incident Investigation Command Structure



Note: Wherever "Lead Investigator" is stated, substitute the words "Investigation Team Leader".

After handover from the Incident Controller, the Investigation Team Leader and Incident Controller shall be (jointly and wholly) responsible for controlling people's movement around the incident site and preserving evidence, which would involve:

- Reviewing and addressing the adequacy of roadblocks, gate guards and a marked perimeter;
- Providing guidance and support to site guards and briefing security personnel;
- Keeping a list of named security personnel to be admitted to the site;
- Declining requests from press (refer press to the corporate media liaison officer);
- Managing government officials;
- Declaring the site safe for access and work re-start;
- Co-coordinating/Liaising with any parallel investigations;
- Identifying any outstanding pieces of evidence that need to be preserved and reviewing the adequacy of storage of these; and
- Secure appropriate working space and equipment (considering necessary security, communications and storage).

4.3 Liaising with the Incident Management Team

The initial phase of an incident response involves emergency response personnel and agencies executing their planned emergency responses to the incident. The on-site First Response Team and Incident Management Team have duties to attend to immediately, which take precedence over Incident Investigation including:

- Responding to the incident to limit further injury and damage, search and rescue of casualties, evacuation of non-essential personnel, etc;
- Notifying and keeping informed the operational chain of command; and
- Informing key parties including next-of-kin, regulatory authorities, etc.

The investigation team shall stand clear of personnel performing these essential duties.

4.4 Planning and Organising the Initial Investigation Activities

The Investigation Team Leader shall:

1. Gather initial facts about the incident (via telephone calls or face-to-face conversations with shift supervisor or the Incident Controller) in relation to the:

   - Incident context (task being performed, equipment, stores, route, location, weather); and
   - Damage to equipment / machinery and surroundings; survivors and casualties.

   At this stage, the Investigation Team Leader should maintain an intellectual detachment (the information will be incomplete and potentially inaccurate) and avoid early causal statements.

   Investigation Team Leader should record both accurate factual information and views/statements which may be currently unsubstantiated for testing later – clearly differentiating between the two. This information is used to brief the investigation team in the initial kick off meeting.

2. Plan and prioritise investigative duties (and divide the work among the team). These activities should be prioritised according to the perishability of the evidence (see Section 5 for guidance).

   The Investigation Team Leader will also need to plan on-going investigation duties (e.g. the next/ongoing steps in the field investigation/ evidence collection) through:

   - Organising interviews with witnesses (based on initial statements);
   - Surveying/Plotting site and equipment as appropriate;
   - Reviewing records, tapes, data in descending order of their likely potential (varies with incident context);
   - Outlining equipment examination onsite (items and sequence). List tools/people required;
   - Reviewing initial plans of the work schedules of the team and ensure tasks are assigned to individual team members based on their areas of expertise; and
   - Reviewing the need for additional team members.

3. Organise and design site visits (including managing site safety and securing as discussed below).

   Post a site visit – it will be useful for the Investigation Team Leader to organise a debriefing session with the team to share the information (observations and facts) gathered during the day. Box 4.1 below provides guidance for the initial visit.

Box 4.1 Guidance for the Initial Visit

- Treat the first visit as reconnaissance: do not make hasty judgements.
- Walk around the whole site to see it from every angle.
- Avoid touching things and take care not to spoil evidence which others will also need to view. Disorganised/Undisciplined handling of the equipment disturbs evidence and leaves no record of condition as found. When initially visiting the site, focus on the information that can be gleaned from the site will yield as it lays information which may be lost when you begin to disturb it. When that course has been exhausted, concerns will turn to removing the plant to accomplish what could not be done in the field or what is better done under controlled conditions.
- Do not work an incident site without light. Doing so poses high risk to personnel and evidence, with low prospect for reward.

4. Manage logistics/equipment. The Investigation Team Leader will need to ensure that Transportation to and from the incident site is organised by someone in the team.

   The Investigation Team Leader will need to ensure that (at a minimum) the following list of equipment is available to the team:

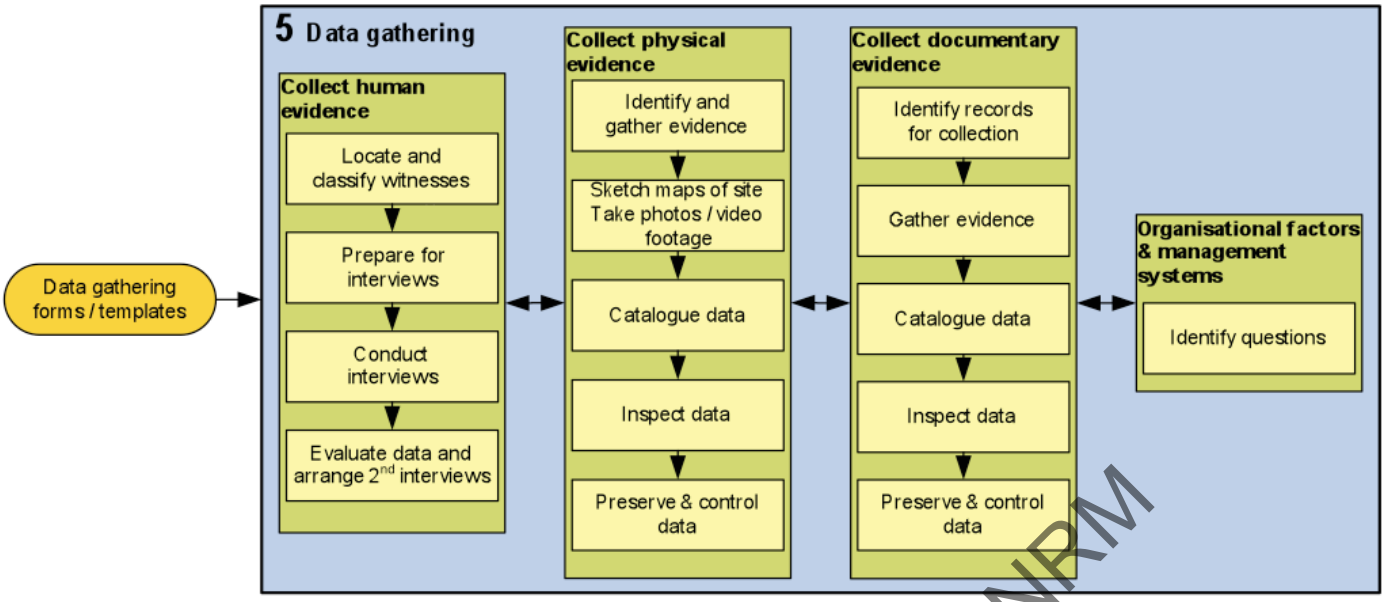
   - An appropriate camera or a professional photographer (Adequate camera: 35mm, single-lens reflex, 35-80 zoom or better, flash; or the ultimate - digital).
   - Supplies for the team (clothing, water and food).
   - A fully stocked investigation kit including:
     - Investigation Guide
     - Clipboard, lined paper and pencils
     - Digital camera
     - Incident report form
     - PPE, sunscreen, sunglasses
     - Industrial or medical gloves
     - High visibility barrier tapes
     - Cassette recorder and tapes
     - Tape measure and compass
     - Identification tags or labels
     - Zip-lock bags
     - “Out of Use” or “Danger” tags
     - Lockout padlock
     - Magnifying glass
     - Crayons, fluorescent spray paint
     - Torch and batteries
     - Paper towelling.

4.5 Planning Site Safety and Securing of Site

The site will have hazards unfamiliar to some visitors, and visitors are inherently a risk to evidence. Following handover from the Incident Controller the Investigation Team Leader shall plan for:

- site securing (including controlling people’s movement around site);
- gathering and quarantining evidence; and people’s safety on site. The Investigation Team Leader shall plan for the Investigation Team to be briefed on the site’s operating and safety rules (e.g. the required personal protective equipment, permits, etc), and incorporate these in the investigation process activities to manage the team’s safety on site.

Section 5



Section 5

Data Gathering

5.1 Objective

To ensure the acquisition and retention of quality evidence at the scene to assist in determining the nature and cause whilst:

- Limiting access to the defined scene only to those persons authorised for – photographic evidence, investigation purposes and surveys;
- Minimising the risks of exposure to the hazards;
- Releasing the scene for further activities e.g. retrieval of equipment for testing or repair, resumption of normal operational activities; and
- Using legal privilege where available and ensuring compliance with applicable law.

5.2 The Data Gathering Process

Collecting data is a critical part of the investigation. It is important to ensure that all relevant information is collected and that the information is accurate.

As noted in Section 4, the initial information is collected by the site First Response Team and the Incident Management Team. Upon arrival of the Incident Investigation Team, the point of contact (Incident Controller) briefs the team members on all actions taken by the site First Response Team and the Incident Management Team and other emergency response personnel. At this time, all the evidence collected, including lists of witnesses, witness statements, and other important documents, are also turned over to the Incident Investigation Team. The investigation team then conducts detailed evidence collection.

Collecting data is an iterative process that takes place in the first half of the investigation cycle. As preliminary analysis is conducted on the initial evidence, gaps will become apparent, requiring the team to collect additional evidence. Generally, many data collection and analysis iterations occur before the team can be certain that all pertinent evidence has been gathered and analyses are finalised.

It is advisable to gather as much evidence as quickly as possible. It is easier to discount an item than to capture or reconstruct it later.

There are five major steps that shall be followed in gathering evidence:

- Collecting human testamentary evidence – locating and interviewing witnesses;
- Collecting physical evidence – identifying, documenting, inspecting, and preserving relevant matter (e.g. equipment, parts, debris, hardware, and other physical items);
- Collecting documentary evidence (e.g. paper and electronic information, such as records, reports, procedures, and documentation);
- Examining organisational factors, management systems and management factors; and
- Preserving and controlling evidence.

Human evidence is often the most insightful and also the most fragile. Witness recollection declines rapidly in the first 24 hours following an incident or traumatic event. Therefore, witnesses should be located and interviewed with high priority. Initial interviews are likely to be built upon, as new information is gathered throughout the investigation; prompt additional lines of questioning and interviews with persons previously not interviewed.

Documentary evidence does not need to be processed immediately and can be gathered to be reviewed at a later date.

When collecting evidence – particularly, liaising with witnesses – the team should beware of and sensitive to local cultures, customs and the background of local working communities. These issues are likely to have a major impact on the way individuals perceive investigative duties and their behaviours throughout the investigative process – right from requesting/arranging interviews, the way individuals are greeted, made at ease and especially the way non-verbal messages is interpreted (eg in European culture, not looking the investigator in the eye while answering might indicate lying, where as in other cultures it could be an ingrained show of respect.)

One of the better ways to ensure the correct cultural sensitivity is to include a member of the local culture on the investigation team with three specific objectives – briefing the whole investigation team, interacting with witnesses to put them at ease and also to assist in correct interpretation of verbal and non-verbal messages.

Note: In general, it is preferable to focus efforts initially on preserving perishable physical evidence (e.g. fluids emanating from equipment), contacting witnesses and, if appropriate, taking initial witness statements to record key facts. Be aware of the legal issues surrounding the interviewing of witnesses and taking of statements.
See Forms 2-12 in Section 9.

5.3 Collecting Human Evidence: Interviewing

The First Response Team and Incident Management Team shall attempt to identify and locate witnesses to take or request initial statements.

Some witnesses may leave the incident scene before they are identified. To ensure that all witnesses are identified:

- Ask witnesses to list or recall others at the scene; and
- Make a public request for information via local media and site notification and communication systems if appropriate.

If incident circumstances prevent the First Response Team and Incident Management Team from taking witness statements at the scene, names and contact information for all witnesses should be recorded. The Incident Investigation Preliminary Interview List (Form 2) can be used to record this information.

A standardised witness statement form, such as the incident Investigation Witness Statement Form (Form 3) should be used for gathering initial witness statements. A model opening statement is provided in Section 5.3.5.

Only those with appropriate training shall interview witnesses. Their training should cover:

- How to plan the interview;
- How to categorise different types of witnesses and the influence of this on the evidence collected;
- How to decide the order in which to approach witnesses;
- Interview techniques and approaches and how to adapt the interview approach accordingly;
- How to make behavioural observations of witnesses (considering trauma, nervousness, etc); and
- Advising witnesses of their rights and obligations.

In line with Anglo American's Value of 'Care and Respect', it is the responsibility of the individual who takes the initial statement from a witness to refer witnesses to the 'Employee Assistance Programme'.

Please also refer to Business Unit or site guidance on how and when to involve counsellors with witnesses.

5.3.1 Witness Classification

Table 5.1 provides a typical categorisation of witnesses. Where possible, initial statements should be taken in the order in which the categories are listed.

Table 5.1 Types of Witnesses Who Should Provide Statements

Type of Witness	Relationship to the Incident
Principal Witnesses	Those directly involved in or who sustained injury from the incident.
Eyewitnesses	Participants. Observers of the incident or events immediately preceding, during, or following the incident.
Emergency Response Personnel and FRT and IMT Members	Those arriving at the scene shortly after the incident.
Other Potential Witnesses	Those in the vicinity of the incident. Those with knowledge of preceding events or conditions, such as shift workers on duty prior to the shift during which the incident occurred; the shift change-over team leader; or security personnel who may have conducted a recent walkthrough. Those with knowledge about activities after the incident. Persons with work tasks related to the process, equipment, or facility involved. Equipment and facility designers, operators, procurement specialists, and safety and quality personnel.

Sources of Witnesses. Table 5.2 lists sources that investigators can use to locate witnesses.

Table 5.2 Sources Used to Locate Witnesses

Site FRT and IMT members and emergency response personnel can name the person who provided notification of the incident and those present on their arrival, as well as the most complete list available of witnesses and all involved parties.
Principal witnesses and eyewitnesses are the most intimately involved in the incident and may be able to help develop a list of others directly or indirectly involved in the incident.
First-line supervisors are often the first to arrive at an incident scene and may be able to recall precisely who was present at that time or immediately before the incident. Supervisors can also provide the names and phone numbers of safety representatives, facility designers, and others who may have pertinent information.
Local or state police, fire-fighters, or paramedics, if applicable.
Nurses or doctors at the site, first aid centre or medical care facility (if applicable).
News media may have access to witness information and photographs or videos of the post-incident scene.

Maintenance and security personnel may have passed through the facility soon before or just after the incident.
Site Management will be able to describe the culture and philosophies onsite and also to be able to talk about investment programmes, which may be relevant.
Procurement personnel can describe the process and also how an evaluation of safety issues is factored in to the process. Also potentially talk about contractual issues with contractors.
Maintenance can describe the process and also how safety critical items are treated and if there are any backlogs and preventative programmes.
H&S Management will describe how safety is managed onsite, senior management commitment and any specific risk assessments relating to the incident.
HR personnel will describe processes such as employment, training, development and also discipline processes.
Contractor Management will describe the types of work they undertake and the relationship with site.

Classification of Witnesses. Table 5.3 provides a summary of the different categories of witness and provides some suggested guidance on how to vary interview approach. Note: do not get hung up on these guidelines if it is not evident which category a witness falls into.

Table 5.3 Witness Categorisation

Witness Category	Important Information	Suggested Approach
Impartial	Individuals with no vested interest in the outcome of the investigation.	Open, honest. Appeal to civic responsibility to encourage participation.
Biased (e.g. unfriendly, untruthful)	Individuals with some vested interest in the outcome of an investigation that is likely to shape their accounts of events accordingly. Examples include: • Unfriendly witnesses who are hostile towards the investigator or the investigation (e.g. typically relatives, friends or associates of a person who may be the subject of the investigation). These individuals may try deliberately to mislead the investigation. • Untruthful witnesses who either: - try to help so much that they invent facts which they think will please the investigator - may be motivated by bias, hostility or unwillingness to become involved.	Try to identify any indication of bias. Triangulate the witness's account with the known facts and other witnesses' accounts. Do not reveal the facts of the inquiry. Display complete impartiality during the interview. Avoid direct challenge. Wait for the untruths to emerge clearly in their account. Use the clarity to try to establish the true position. Try to find out why the individual is not telling the truth as this may reveal something key to the investigation. If the witness in fact knows nothing, obtain a statement to that effect, thus

		clearly establishing the "value" of the witness.
Unwilling	Individuals who do not want to participate in the investigation. This may result from: • a dislike of authority or the establishment; • previous experience with investigations; • desire to avoid inconvenience/embarrassment; and • an aversion to publicity. In some instances this individual will fall into the category of 'saw nothing, heard nothing' and will say nothing despite the fact that it is obvious something of consequence was observed by the witness	Try to establish the reason for the witness's reluctance and try to remove the cause. Appeal to civic responsibility. If all else fails, obtain a statement to the effect that they saw nothing, heard nothing and will say nothing. This is known as a negative statement. Revisit the unwilling witness on a later occasion after he has had time to reflect on the situation. Should this witness offer a positive statement he/she can be cross-examined on the basis of the negative statement and may run the risk of being totally discredited.
Nervous	These individuals may be difficult to encourage to talk. They may be frightened of implication in the event or afraid of the situation they have seen or the impact this may have on them if they give a statement.	Be encouraging and considerate. Gain the individual's confidence. Allow witnesses to tell their story in their own way. Probe accounts gently and conversationally.
Child	These individuals typically observe accurately and recall faithfully what they have observed, but are inclined to be suggestible and easily influenced.	In some instances take the same approach as that adopted for nervous witnesses. Always interview in the presence of a parent/guardian.
Spouses	It may be necessary to interview the spouse of a person subject to an inquiry. These individuals may change statements over the course of the investigation (e.g. condemning their spouse initially, but having a change of heart later).	Document statements.
Experts including: Doctors; engineers (electrical, mechanical, rock, hydraulics, structural); psychologists; geologists; mechanical /machinery expert; IT; Security; Fire; Scientists (chemists, physicists, toxicologists, noise, air quality, thermal, ecologists, environmental).	Individuals qualified or skilled in a particular field but likely to be unaware of the facts of a particular case.	Identify relevant experts. Plan when to seek expert assistance, where such assistance can be obtained, and how that assistance can be of value to the investigation. Provide expert witnesses with sufficient facts and details of the inquiry to enable them to apply their experience to the problem. Obtain experts in writing, together with a record of the qualifications to support that opinion. Use simple, non-technical language as far as practicable.

[Reference: Dept of Minerals and Energy, Western Australia. Incident and Incident Investigation Manual. 5th Edition.

5.3.2 Interviewing Techniques

Individual vs. Group Interviews

Generally, principal witnesses and eyewitnesses are interviewed individually to gain independent accounts of the event. However, a group interview may be beneficial when:

- a work crew was either involved in or witness to the incident; or
- time may not permit interviewing every witness individually, and the potential for gaining new information from every witness may be small.

The team should use their collective judgment to determine which technique is appropriate. Advantages and disadvantages of both techniques are listed in Table 5.4.

Table 5.4 Group and Individual Interviews have Different Advantages

	Individual Interviews	Group Interviews
Advantages	Obtain independent accounts. Establish one-to-one rapport.	More time-efficient. May get a more complete picture. Other people serve as "memory joggers".
Disadvantages	More time-consuming. May be more difficult to schedule all witnesses.	Interviewees may influence each other's perceptions. More vocal members of the group will say more and thus may influence those who are quieter. "Group think" may develop; some individual details may get lost. Contradictions in accounts may not be revealed.

Interviewing: Do's and Don'ts
Table 5.5 lists actions that promote effective interviews, and Table 5.6 lists actions to avoid while conducting interviews.

Table 5.5 Interviewing Do's

Create a Relaxed Atmosphere
Conduct the interview in a neutral location that was not associated with the incident.
Introduce yourself and shake hands.
Be polite, patient, and friendly.
Treat witnesses with respect.
Prepare the Witness
Describe the investigation's purpose: to prevent incidents, not to assign blame.
Explain that witnesses may be interviewed more than once.
Use the Model Opening Statement.
Stress how important the facts given during interviews are to the overall investigative process.
Record Information
Note crucial information immediately in order to ask meaningful follow-up questions.
Ask Questions
Establish a line of questioning and stay on track during the interview.
Ask the witness to describe the incident in full before asking a structured set of questions.
Let witnesses tell things in their own way; start the interview with a statement such as "Would you please tell me about...?"
Create a Relaxed Atmosphere
Ask several witnesses similar questions to build a complete picture and corroborate facts.
Aid the interviewee with reference points, e.g., "How did the lighting compare to the lighting in this room?"
Keep an open mind; ask questions that explore what has already been stated by others in addition to probing for missing information.
Use visual aids, such as photos, drawings, maps, and graphs to assist witnesses.
Be an active listener, and give the witness feedback; restate and rephrase key points.
Ask open-ended questions that generally require more than a "yes" or "no" answer.
Observe and note how replies are conveyed (voice inflections, gestures, expressions, etc.).
Close the Interview
End on a positive note; thank the witness for his/her time and effort.
Allow the witness to read the interview transcript and comment if necessary.
Encourage the witness to contact the team with additional information or concerns.
Remind the witness that a follow-up interview may be conducted.

Table 5.6 Interviewing Don'ts

DO NOT rush the witness while he/she is describing the incident or answering questions.
DO NOT judge, display anger, refute, threaten, intimidate, or blame the witness.
DO NOT suggest answers.
DO NOT make promises that cannot be kept (for example, unrestricted confidentiality).
DO NOT use inflammatory words ("violate," "kill," "lie," "stupid," etc.).
DO NOT omit questions during the interview because you think you already know the answer.
DO NOT ask questions that suggest an answer, such as "Was the odour like rotten eggs?"

5.3.3 Preparing for Interviews

Good interviews depend on interviewers being well prepared and having clear objectives for each interview. Table 5.7 provides guidelines for interview preparation.

Table 5.7 Preparing for Interviews

Identify all interviewees using the Incident Investigation Preliminary Interview List (provided in Appendix 5.1). Record each witness's name, job title, reason for interview, phone, work schedule, and company affiliation; take a brief statement of his or her involvement in the incident.
Schedule an interview with each witness using the Incident Investigation Interview Schedule Form (provided in Appendix 5.6). Designate one person to oversee this process. Previous teams have found it useful to make the administrative coordinator responsible for scheduling initial and follow-up interviews and written statement verifications.
Assign a Lead Interviewer from the team for each interviewee. Having a Lead Interviewer can help establish consistency in depth and focus of interviews.
Develop sketches and diagrams to pinpoint locations of witnesses, equipment, etc., based on the initial walkthrough and site FRT and IMT input.
Develop a standardised set of interview questions. Charts may be used to assist in developing questions. The Incident Investigation Interview Form (provided in Appendix 5.6) can aid in recording pertinent data.
Discuss interviewing objectives and plan strategies to ensure that all team members use consistent interviewing methods. To enhance the quality of information obtained, everyone should have some training on correct interviewing techniques.
Determine the appropriate means of documenting interviews (handwritten notes, court reporter, etc.) in light of the circumstances.

Points to Consider when Preparing to Take a Statement
[Reference: Dept of Minerals and Energy, Western Australia. Incident and Incident Investigation Manual. 5th Edition]

Perseverance is often the key when interviewing witnesses, particularly those who “don’t want to get involved”. However, care should be taken to avoid making promises you cannot keep for example, that the matter will go no further, or the witness will not have to give evidence.

The following points should be kept in mind when preparing to take a written statement from a witness:

1. Prepare a list of questions or critical points that will need to be covered. It may not always be possible or desirable to return or re-interview the witness.

2. Discuss the matter fully with the witness or other witnesses, if appropriate.

3. Try to identify the salient points or facts which have come to light during the course of the witness's verbal account of the subject matter.

4. Ensure that both the investigator and the witness are on the same 'wave-length' and are both talking about and understanding the same thing.

5. Visit the scene of the occurrence with the witness, if appropriate and practical, and re-enact the events.

6. Put all facts and circumstances into a logical sequence (see funnelling technique).

7. Keep in mind the words – How, When, Where, Why, Who and What.

8. Refrain (in matters where criminal prosecution may result) from including 'hearsay' evidence, which is not normally admissible.

9. Remember, the statement is by the witness, not by the investigator. Use exact words and terms.

10. Do not edit any language of the witness (but if the witness statement is ambiguously worded or contradictory, the investigator should question the witness further in order to resolve this and then modify the statement).

11. Have the witness quote exactly what was said and place the quote between inverted commas. If the witness is uncertain of the exact words used, but is aware of their meaning, then clearly express that distinction. For example: 'I cannot recall the exact words but they were to the effect that .....'.

12. Read the statement over personally and then have the witness read it aloud and then ask if it is true and correct in all details.

13. Have the witness sign the statement on each page, initial all corrections and then sign at the end of the statement.

14. Witness all signatures and initials of the person making the statement immediately.

5.3.4 Conducting Interviews

[Reference: Dept of Minerals and Energy, Western Australia. Incident Investigation Manual. 5th Edition]

The power of memory varies from person to person and in accordance with the circumstances under which the observation is made. When interviewing witnesses therefore:

- Expect minor discrepancies to occur in the reports of witnesses who have observed the same event.
- Do not expect too much from a witness. A witness may have limited ability to recall the event in accurate detail will depend on a number of factors, including the state of mind of the observer at the time.

One important influence on people's memories, as well as their willingness to assist an investigative team, will be the way they are questioned (i.e. the interview approach). The lead interviewer must determine what interviewing techniques to employ (e.g. by altering style and information disclosure using Table 5.3).

Wherever possible, however, an engaging (empathetic, but professional) interviewing technique should be employed. An interview is not an interrogation. Witnesses should be made comfortable, put at ease and offered an explanation of the process and aims of the investigation. The tone and approach adopted in the interview should convey messages of fact-finding, not fault finding.

Do not rush witnesses while they are describing the incident; do not be judgmental, hostile, or argumentative; do not display anger, suggest answers, threaten, intimidate, or blame the witness; do not make promises of confidentiality, use inflammatory words, ask questions that suggest an answer, or omit questions because you think you know the answer.

Where, Possible and Appropriate, Take Initial Witness Statements in the Witnesses' Mother Tongue to Maximise the Information from the Interviewee at a Time when they Might be Traumatised.

Box 5.1 details a suggested approach called the funnelling technique to adopt when undertaking an interview.

Finally, before each interview, interviewees should be apprised of their rights and obligation. Check with the Legal department for relevant legislation that impacts on their statement (e.g. disclosure and freedom of information).

Behavioural Observations
A witness's state of mind may affect the account they provide. In conducting witness interviews, investigators should consider and note any behavioural observations that may impact the witness's statement:

- The amount of time between the incident and the interview. People normally forget 50 to 80 percent of the details in just 24 hours.
- Contact between this witness and others who may have influenced how this witness recalls the events.
- Signs of stress, shock, amnesia, or other trauma resulting from the incident. Details of unpleasant experiences are frequently blanked from one's memory.
- Other influences (e.g. nervousness, tiredness, drunkenness, etc).

Box 5.1 The Funnelling Technique

The Funnelling Technique is a specific interviewing technique designed to discourage blame and focus instead on work practices, management systems and fine details surrounding the incident and the incident response. It is only applicable to a single witness interview and should not be used for group interviews.

It should only be applied to those witnesses that were on the incident scene (principal witnesses and eyewitnesses) and who will be able to help understand what happened and which system gaps at site level allowed the incident to happen. Other interviewees (operation managers, HR managers, country managers, and senior managers) should be interviewed with traditional questioning techniques.

The technique involves five steps, as detailed below.

1. Plan and Prepare Roles
   The interviewing technique recommends using a team of two:
   1. The Leader who focuses on asking the questions and managing the interview structure and technique; and
   2. The Support who writes notes.

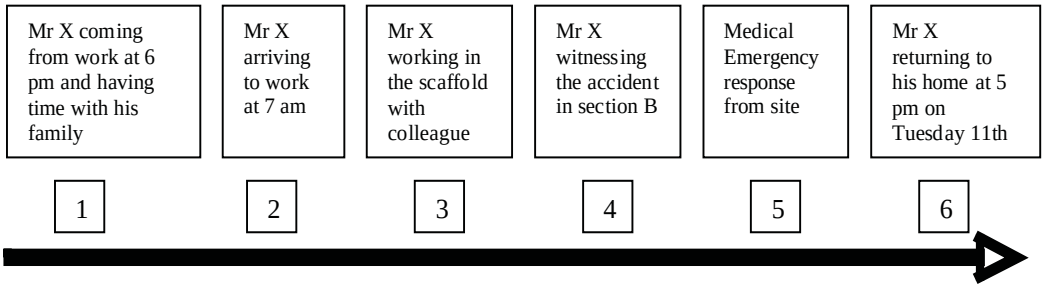
2. Engage and Explain
   An engaging and reassuring interview style should be used whereby interviewees are told that their input will be used to prevent future incidents and not to assign blame. The Lead Interviewer should also explain how the interview is going to be conducted, roles of the interviewers, and what type of questions will be asked. It is advisable to check with the witness whether they have any questions.

   The witness should be encouraged to contact the team following the interview if they can provide additional information or have any concerns.

3. The Funnelling Process
   The funnelling process is based on creating a timeline for the incident and then dividing that timeline up into discrete blocks of time (e.g. evening before, morning of the incident, etc). The interview then is structured around these time blocks.

   This funnelling process involves:
   Defining the time period that you want to cover in the interview. This will depend on a number of issues, e.g. characteristics of the job, incident time, and people involved and may, for example, include the day before the incident in order to take into account:

   a. Fatigue issues.
   b. Dividing the total period of time into smaller blocks of time for interviewing (These are the areas of time for which you will be developing more detail – see below).



Ask questions around each block of time in a sequenced way. Ask the witness to describe the sequence of events from the start of your timeline.
Begin the questioning around each block using open questions and follow up with closed questions (funnelling down) to ensure understanding and confirm events with the witness.

4. Closure
Finish the interview by asking the interviewee if there is anything else he would like to add. If not, you can end the conversation thanking the witness for his commitment and time.

5. Evaluate
Review the outcome of each interview with the Investigation Team before engaging into the next one. Share findings and see if there are gaps that you need to fill. Are the descriptions of the events consistent? Is there a need for re-interviewing a witness? With second interviews ensure they are seen as part of the normal process and not an indicator of any blame.

5.3.5 Model Opening Statement

The opening statement should start with the following details:

- Interviewer's name(s) and employment affiliation(s);
- Co-interviewers name; and
- Lawyer or Union representatives

"Anglo American has established an incident investigation team to determine the facts that lead to the (incident date) incident at (place of incident). The principal purpose of this investigation is to determine the facts surrounding the incident so that proper remedial measures can be instituted to prevent the recurrence of incidents.

This interview is entirely voluntary, and you may stop it at any time. Are you happy to proceed?

I need to let you know that you have the right to be accompanied by a lawyer or a union representative. We would like to record this interview to ensure an accurate record of the conversation – is that okay?

We will produce a transcript of this discussion, and you will have an opportunity to review it.

We will attempt to keep what you tell us confidential, but we cannot guarantee it. At a later date we may be required to release the details in the case of litigation".

5.4 Collecting Physical Evidence

Physical evidence (including liquids and gases) needs to be collected, documented, inspected and removed/stored.
When collecting physical evidence, the condition of the evidence (including any damage, or markings) shall also be recorded.
Evidence shall be carefully documented at the time it is obtained or identified. The Incident Investigation Physical Evidence Log Form (Form 6) can help investigators document and track the collection of physical evidence (see also Forms 7-12 for additional templates to guide physical evidence collection). Additional means of documenting physical evidence include sketches, maps, photographs, and videotape.

Physical evidence shall be systematically inspected through:
- Surveying the involved equipment, vehicles, structures, etc., to ascertain whether there is any indication that component parts were missing or out of place before the incident;
- Noting the absence of any parts of guards, controls, or operating indicators (instruments, position indicators, etc.) among the damaged or remaining parts at the scene;

- Identifying as soon as possible any equipment or parts that shall be cleaned prior to examination or testing and transferring them to a laboratory or to the care of an expert experienced in appropriate testing methodologies; and
- Noting the routing or movements of records that can later be traced to find missing components.

There shall be procedures in place for removing evidence and these must take account of applicable legal requirements. These should be followed in a systematic fashion.

5.4.1 Preserving and Controlling Physical Evidence

- Evidence should be photographed and/or videotaped in its original location immediately following the incident, provided it does not interfere with rescue or amelioration activities.
- A log should be maintained stating the location, date, and time that photos and videos are taken. The Incident Investigation Photographic Log Sheet can be used for this purpose. Avoid using photographic attachments that digitally record the date and time on the negative because these images become a permanent part of the photo and may obscure evidence or important details in the photo or video. The computerized/printed date on the back of photos provided by film processors should be used in conjunction with, not in lieu of, a photo log, because the date on photos gives the day the film was processed, not the day the photos were taken.
- Team members should prepare and sign an inventory of all evidentiary items collected, including statements regarding the following:
    - Items removed from the scene
    - Date and time items were removed
    - Person who removed items
    - Location where those items will be stored.
- Evidence should be controlled by signature transfer (signatures of the recipient and the person relinquishing custody) and made available only to those who need to examine and use the evidence during the incident investigation. The Incident Investigation Physical Log Form may be used for this purpose.
- Secure storage should be obtained immediately, and access to evidence controlled throughout the investigation.
- Access to the room or suite of offices used by the investigation team should be restricted. No one other than team members, advisors, and support staff should have access to the team's office space; this includes janitorial staff.
- The Investigation Team Leader should determine the disposition of evidence at the conclusion of the investigation.

5.4.2 Collecting Physical Evidence

Physical evidence should be systematically collected, protected, preserved, evaluated, and recorded to ultimately determine how and why failures occurred and whether use, abuse, misuse, or non-use was a causal factor.

The most obvious physical evidence related to an incident or incident scene often includes solids such as:

- Equipment;
- Tools;
- Materials;
- Plant facilities;
- Pre- and post-incident positions of incident-related elements;
- Scattered debris; and
- Patterns, parts, and properties of physical items associated with the incident.

Less obvious but potentially important physical evidence includes fluids (liquids and gases). Many facilities use a multitude of fluids, including chemicals, fuels, hydraulic control or actuating fluids, and lubricants. Analysing such evidence can reveal much about the operability of equipment and other potentially relevant conditions or causal factors.
Care should be taken if there is the potential for pathogenic contamination of physical evidence (e.g. blood); such material may require autoclaving or other sterilisation. Specialised technicians experienced in fluid sampling should be employed to help the team collect and analyse fluid evidence. If required, expert analysts can be requested to perform tests on the fluids and report results to the team.
When handling potential blood borne pathogens, universal precautions such as those listed in the table below should be observed to minimise potential exposure. All human blood and body fluids should be treated as if they were infectious. The precautions should be implemented for all potential exposures. Exposure is defined as reasonable anticipated skin, eye, mucous membrane, or potential contact with blood or other potentially infectious materials.

Hands and other skin should be washed with soap and water immediately or as soon as feasible after removal of gloves or other personal protective equipment.
Hand washing facilities that are readily accessible to employees should be provided.
When provision of hand washing facilities is not feasible, appropriate antiseptic hand cleanser in conjunction with clean cloth, paper towels, or antiseptic towellettes should be used. Hands should be washed with soap and water as soon as possible thereafter.
Mucous membranes should be flushed with water immediately or as soon as feasible following contact with blood or other potentially infectious materials.
Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed except by approved techniques.
Immediately or as soon as possible after use, contaminated reusable sharps shall be placed in appropriate containers until properly reprocessed.
Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.
Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets, or on countertops or bench tops where blood or other potentially infectious materials are present.
All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimise splashing, spraying, spattering, and generation of droplets of these substances.
Mouth pipetting or suctioning of blood or other potentially infectious materials is prohibited.
Specimens of blood or other potentially infectious materials shall be placed in a container to prevent leakage during collection, handling, processing, storage, transport, or shipping.
Equipment, which may become contaminated with blood or other potentially infectious materials, shall be examined prior to servicing or shipping and shall be decontaminated as necessary.
Ensure disposal is by licensed contractor.
The minimum PPE when working in areas where there may be exposure to pathogens/sharps includes gloves (hardwearing rubber type), goggles, safety boots and overalls.
Any member of the team who has a cut on their person should not be involved in such activities.
Potentially contaminated objects should be placed in dedicated individual containers.
Any body parts discovered should be recovered by specialists rather than the investigation team.
Refer to police or railways incident response guidance.
Hands and other skin should be washed with soap and water immediately or as soon as feasible after removal of gloves or other personal protective equipment.

5.4.3 Documenting Physical Evidence

Sketching and Mapping Physical Evidence.
Position maps convey a visual representation of the scene immediately after an incident (the position of debris, equipment, tools, and injured persons). Evidence may be inadvertently moved, removed, or destroyed, especially if the incident scene can only be partially secured. Therefore, sketching and mapping should be conducted immediately after recording initial witness statements. It is advisable to use a site map, which clearly labels NESW for positioning of information.

Precise scale plotting of the position of elements can subsequently be examined to develop and test incident causal theories.
The Incident Investigation Site Sketch, Incident Investigation Site Map, Incident Investigation Position Mapping Form, and Incident Investigation Sketch of Physical Evidence Locations and Orientations are useful for drawing sketches and maps and recording positions of objects.

Photographing and Videotaping Physical Evidence.
Photography is a valuable and versatile tool in incident investigation. Photos or videos can identify, record, or preserve physical incident evidence that cannot be effectively conveyed by words or collected by any other means.

Photographic coverage should be detailed and complete, including standard references to help establish distance and perspective (e.g. rulers and special lighting). Videotapes should cover the overall incident scene, as well as specific locations or items of significance.

A thorough videotape allows the team to minimise trips to the incident scene. This may be important if the scene is difficult to access or if it presents hazards. The Incident Investigation Photographic Log Sheet can be used to record photograph or videotape subjects, dates, times, and equipment settings and positions.

Even if photos are taken by a skilled photographer, the investigation team should be prepared to direct the photographer in capturing certain important perspectives or parts of the incident scene. Photographs of evidence and of the scene itself should be taken from many angles to illustrate the perspectives of witnesses and injured persons. In addition, team members may wish to take photos for their own reference.

If improper assembly is suspected, investigators should direct that the part or equipment be photographed and otherwise documented as each subassembly is removed.

If available, digital photography will facilitate incorporation of the photographs into the investigation report. However, if this is not practical, high-quality 35mm photographs can be scanned for incorporation in the report.

As photos are taken, a log should be completed noting the scene/subject, date, time, direction, and orientation of photos, as well as the photographer's name. The Incident Investigation Photographic Log Sheet can be used for this purpose. The Incident Investigation Sketch of Photography Locations and Orientations is helpful when reviewing photos and analysing information.

5.4.4 Inspecting Physical Evidence

Following initial mapping and photographic recording, a systematic inspection of physical evidence can begin. The inspection involves the following:

- Surveying the involved equipment, vehicles, structures, etc., to ascertain whether there is any indication that component parts were missing or out of place before the incident.

- Noting the absence of any parts of guards, controls, or operating indicators (instruments, position indicators, etc.) among the damaged or remaining parts at the scene.
- Identifying, as soon as possible, any equipment or parts that must be cleaned prior to examination or testing and transferring them to a laboratory or to the care of an expert experienced in appropriate testing methodologies.
- Noting the routing or movements of records that can later be traced to find missing components.
- Preparing a checklist of complex equipment components to help ensure a thorough survey.
- These observations should be recorded in notes and photographs so that investigators avoid relying on their memories. Some investigators find a small cassette tape recorder useful in recording general descriptions of appearance and damage; however, the potential failure of a recorder, inadvertent tape erasure, and limitations of verbal description suggest that verbally recorded descriptions should be used in combination with notes, sketches, and photographs.

5.4.5 Removing Physical Evidence

Following the initial inspection of the scene, investigators may need to remove items of physical evidence. To ensure the integrity of evidence for later examination, the extraction of parts must be controlled and methodical. The process may involve simply picking up components or pieces of damaged equipment, removing bolts and fittings, cutting through major structures, or even recovering evidence from beneath piles of debris.

Before any evidence is removed from the incident scene, its integrity should be preserved by:

- Recording the exact location and orientation of evidence at the scene, using measurements, logs, sketches, photography, and video.
- Establishing secure storage locations for evidence.
- Establishing and maintaining a strict chain of custody (documentation showing physical custody) for each item of evidence.
- Ensuring that access to evidence is limited only to those who are investigating the incident until transfer of the evidence to the incident investigation team.
- Carefully packaging and clearly labelling (a pre-assembled investigator's kit can provide general-purpose card team tags or adhesive labels for this purpose).
- Equipment or parts thought to be defective, damaged, or improperly assembled should be removed from the incident scene for technical examination. The removal should be documented using position maps and photos to display the part in its final, post-incident position and condition.
- Items that have been fractured or otherwise damaged should be packaged carefully to preserve surface detail. Delicate parts should be padded and boxed. Both the part and the outside of the package should be labelled.

When preparing to remove physical evidence, these guidelines should be followed:

- Normally, extraction should not start until witnesses have been interviewed, since visual reference to the incident site can stimulate one's memory.
- Extraction and removal or movement of parts should not be started until position records (measurements for maps, photographs and videotape) have been made.

- Be aware that the incident site may be unsafe due to dangerous materials or weakened structures.
- Locations of removed parts can be marked with orange spray paint or wire-staffed marking flags; the marking flags can be annotated to identify the part removed and to allow later measurement.
- Care during extraction and preliminary examination is necessary to avoid defacing or distorting impact marks and fracture surfaces.
- The Team Investigation Team Leader and investigators should concur when the parts extraction work can begin, in order to assure that team members have completed all observations requiring an intact incident site.
- Any samples taken must be done so in accordance with recognised techniques and collection methods and, dependent upon the substance concerned, specific PPE may be required.

5.5 Collecting Documentary Evidence

Documentary evidence can provide important data and should be preserved and secured as methodically as physical evidence.

Documents often provide important evidence for identifying causal factors of an incident. This evidence is useful for:

- Thoroughly examining the policies, standards, and specifications that moulded the environment in which the incident occurred;
- Indicating the attitudes and actions of people involved in the incident; and
- Revealing evidence that generally is not established in verbal testimony.

Collectively, this evidence gives important clues to possible underlying causes of errors, malfunctions, and failures that lead to the incident.

Documentary evidence generally can be grouped into four categories:

- Management control documents that communicate management expectations of how, when, where, and by whom work activities are to be performed;
- Records that indicate past and present performance and status of the work activities, as well as the people, equipment, and materials involved;
- Reports that identify the content and results of special studies, analyses, audits, appraisals, inspections, inquiries, and investigations related to work activities; and
- Follow-on documentation that describes actions taken in response to the other types of documentation.

This information might be in the form of paper, photos, videotape, magnetic tape, or electronic media, either at the site or in files at other locations.

Incident investigation preplanning shall include procedures for identifying records to be collected – (in particular, those only retained for the work day or week), as well as the people responsible for their collection.

Typical documents to collect include:

- Evacuation logs
- Action logs
- Production and maintenance reports
- Deputy and co-ordinator inspection
- Section reports

- Permit to work forms
- Risk assessments
- Inspection reports
- Operating procedures/work instructions
- Task analyses
- Site layouts
- Process unit details
- Equipment descriptions
- Records
- PLC logs
- Methanometer logs
- Gas monitoring data
- SCADA system databases, fluid samples
- Logbooks
- Instrument charts
- As-built drawings
- Engineering analyses
- Vendor information
- Correspondence and computer hard-drives
- Mobile telephones
- Telephone call records
- Electronic databases
- Hand-held instruments with data recording capability
- Mobile equipment data loggers
- PLC and SCADA software

Incident investigation preplanning shall also include seeking legal advice to ensure any documents collected are part of the documentation attracting privilege (where applicable).

5.6 Organisational Factors and Management Systems

Incident investigations shall thoroughly examine organisational factors and management systems to determine whether deficiencies in these areas contributed to causes of the incident. The investigation team should consider the full range of management systems from the first-line supervisor level, up to and including site and Corporate offices, as appropriate. It is important to note that this focus should not be directed toward individuals.

In determining sources and causes of any management system inadequacies and, if applicable, the failure to anticipate and prevent the conditions leading to the incident, investigators should use the Anglo Management System Standards (e.g. Anglo Safety Way-ASW) as the framework for determining the requirements of the management system.

These safety management system elements (the ASW) should be considered when deciding who to interview, what questions to ask, what documents to collect, and what facts to consider pertinent to the investigation. Even more importantly, these elements should be considered when analysing the facts to determine their significance to the causal factors of the incident.

In many incidents, deficiencies in implementing the five core management functions cause or contribute to the incident. The five core functions are: (1) define the scope of work; (2) identify and analyse the hazards associated with the work; (3) develop and implement risk controls; (4) perform work safely within the controls; and (5) provide feedback on adequacy of the controls and continuous improvement in defining and planning the work.

The questions below may be used by the team. These are not intended to be exhaustive. Team members should adapt these questions or develop new ones based on the specific characteristics of the incident. The answers to the questions may be used to determine the facts of the incident, which, along with the analytical tools described in Chapter 6, will enable the team to determine whether deficiencies found in management systems are causal factors for the incident.

Table 5.8 Typical Questions for Addressing the Five Core Functions of Integrated SHE Management

Function #1: Define the Scope of Work.
• Were the purpose and scope of the work to be performed clearly defined so that workers could identify any unanticipated conditions and actions that would be outside the authorised work scope? • Were expectations regarding the removal or control of hazards clearly defined and communicated to the workers? • Were the required safety support activities identified? • Were roles, responsibilities, and authorities for the work activity defined and executed appropriately? • Were the worker qualifications required to safely perform the work identified? • Were the design, operation, and configuration of equipment known and considered in work planning? • Were the characteristics of the work environment known and considered in work planning?
Function #2: Identify and Analyse the Hazards.
• Were the type and magnitude of all possible hazards clearly understood by line management, supervisors, and workers? • Were the hazards analysed and potential consequences documented? • Did the workers provide input to the hazard analysis? • Did the workers receive any feedback regarding their input? • Were the standards and requirements associated with the hazards identified?
Function #3: Develop and Implement Hazard Controls.
• Were required physical and engineering hazard controls evaluated for likely effectiveness under the expected work conditions? • Were the required administrative controls, such as technical procedures and safety support personnel, in place? • Were the workers qualified and given hazard- or activity-specific training? • Was a proper review, approval, and configuration control process in place?
Function #4: Perform Work within Controls.
• Was the readiness to perform the work checked and confirmed prior to starting work? • Was appropriate authorisation received to start work? • Was the work performed as planned (i.e. by the intended workers using the pre-approved procedures with the required level of supervision and safety support present with effective hazard controls in place)? • Were the workers empowered to stop work if unanticipated or unsafe conditions arose?
Function #5: Provide Feedback and Continuous Improvement.
• Was there a system to collect and use feedback from workers on workplace hazards? • Were workers aware of any hazard affecting the work activity that was not addressed in planning for it? • Was management aware of the hazard(s) identified by the workers? • Were there any lessons learned locally, from audit or evaluation results or from external operating experience that applied to the work activity but that were not addressed in planning for it?

Table 5.9 Typical Questions for Addressing the Seven Guiding Principles of Integrated Safety Management

Guiding Principle #1: Line Management is Directly Responsible for the Protection of the Public, Workers, and the Environment.
• Did Anglo American Plc assure and contractor line management establish documented safety policies and goals? • Was integrated safety management policy fully implemented down to the activity level at the time of the incident? • Was Anglo American Plc line management proactive in assuring timely implementation of integrated safety management by line organisations, contractors, subcontractors, and workers? • Were environment, safety and health (S&H) performance expectations for Anglo American Plc and contractor organisations clearly communicated and understood? • Did line managers elicit and empower active participation by workers in safety management?
Guiding Principle #2: Clear Lines of Authority and Responsibility for Ensuring Safety shall be Established and Maintained at all Organisational Levels within the Department and its Contractors.
• Did line management define and maintain clearly delineated roles and responsibilities for S&H to effectively integrate safety into site wide operations? • Was a process established to ensure that safety responsibilities were assigned to each person (employees, subcontractors, temporary employees, visiting researchers, vendor representatives, lessees, etc.) performing work? • Did line management establish communication systems to inform the organisation, other facilities, and the public of potential S&H impacts of specific work processes? • Were managers and workers at all levels aware of their specific responsibilities and accountability for ensuring safe facility operations and work practices? • Were individuals held accountable for safety performance through performance objectives, appraisal systems, and visible and meaningful consequences? • Did Anglo American Plc line management and oversight hold contractors and subcontractors accountable for S&H through appropriate contractual and appraisal mechanisms?
Guiding Principle #3: Personnel shall Possess the Experience, Knowledge, Skills, and Abilities that are Necessary to Discharge their Responsibilities.
• Did line managers demonstrate a high degree of technical competence and understanding of programs and facilities? • Did line management have a documented process for assuring that Anglo American Plc personnel, contractors, and subcontractors were adequately trained and qualified on job tasks, hazards, risks, and Departmental and contractor policies and requirements? • Were mechanisms in place to assure that only qualified and competent personnel were assigned to specific work activities, commensurate with the associated hazards? • Were mechanisms in place to assure understanding, awareness, and competence in response to significant changes in procedures, hazards, system design, facility mission, or life cycle status? • Did line management establish and implement processes to ensure that S&H training programs effectively measure and improve performance and identify training needs? • Was a process established to ensure that (1) training program elements were kept current and relevant to program needs, and (2) job proficiency was maintained?
Guiding Principle #4: Resources shall be Effectively Allocated to Address Safety, Programmatic, and Operational Considerations. Protecting the Public, the Workers and the Environment shall be a Priority Whenever Activities are Planned and Performed.
• Did line management demonstrate a commitment to ensuring that S&H programs had sufficient resources and priority within the line organisation? • Did line management clearly establish that integrated safety management was to be applied to all types of work and address all types of hazards? • Were prioritisation processes effective in balancing and reasonably limiting the negative impact of resource reductions and unanticipated events on S&H funding?

Guiding Principle #5: Before Work is Performed, the Associated Hazards shall be Evaluated and an Agreed-Upon Set of Safety Standards shall be Established that, if Properly Implemented, will Provide Adequate Assurance that the Public, the Workers, and the Environment are Protected from Adverse Consequences.
• Was there a process for managing requirements, including the translation of standards and requirements into policies, programs, and procedures, and the development of processes to tailor requirements to specific work activities? • Were requirements established commensurate with the hazards, vulnerabilities, and risks encountered in the current life cycle stage of the site and/or facility? • Were policies and procedures, consistent with current Anglo American Plc policy, formally established and approved by appropriate authorities? • Did communication systems assure that managers and staff were cognizant of all standards and requirements applicable to their positions, work, and associated hazards?
Guiding Principle #6: Administrative and Engineering Controls to Prevent and Mitigate Hazards shall be Tailored to the Work Performed and Associated Hazards.
• Were the hazards associated with the work activity identified, analysed, and categorised so that appropriate administrative and engineering controls could be put in place to prevent or mitigate the hazards? • Were hazard controls established for all stages of work to be performed (e.g. normal operations, surveillance, maintenance, facility modifications, decontamination, and decommissioning). • Were hazard controls established that were adequately protective and tailored to the type and magnitude of the work and hazards and related factors that impact the work environment? • Were processes established for ensuring that Anglo American Plc contractors and subcontractors test, implement, manage, maintain, and revise controls as circumstances change? • Were personnel qualified and knowledgeable of their responsibilities as they relate to work controls and work performance for each activity?
Guiding Principle #7: The Conditions and Requirements to be Satisfied for Operations to be Initiated and Conducted shall be Clearly Established and Agreed upon.
• Were processes in place to assure the availability of safety systems and equipment necessary to respond to hazards, vulnerabilities, and risks present in the work environment? • Did Anglo American Plc and contractor line management establish and agree upon conditions and requirements that must be satisfied for operations to be initiated? • Was a management process established to confirm that the scope and authorisation documentation is adequately defined and directly corresponds to the scope and complexity of the operations being authorised? • Was a change control process established to assess, approve, and re-authorise any changes to the scope of operations ongoing at the time of the incident?

5.7 Preserving and Controlling Evidence

Preserving and controlling evidence are essential to the integrity and credibility of the investigation. Security and custody of evidence are necessary to prevent its alteration or loss and to establish the accuracy and validity of all evidence collected. It is necessary therefore to put in place effective procedures to preserve and control evidence.

The Incident Controller is responsible for assuring that a chain of custody is established for all evidence removed from the incident scene before the team arrives.

The Team Investigation Team Leader is responsible for establishing an evidentiary custody protocol to ensure that all evidence is well-documented at the incident scene and carefully controlled when it is removed and stored after the team arrives.

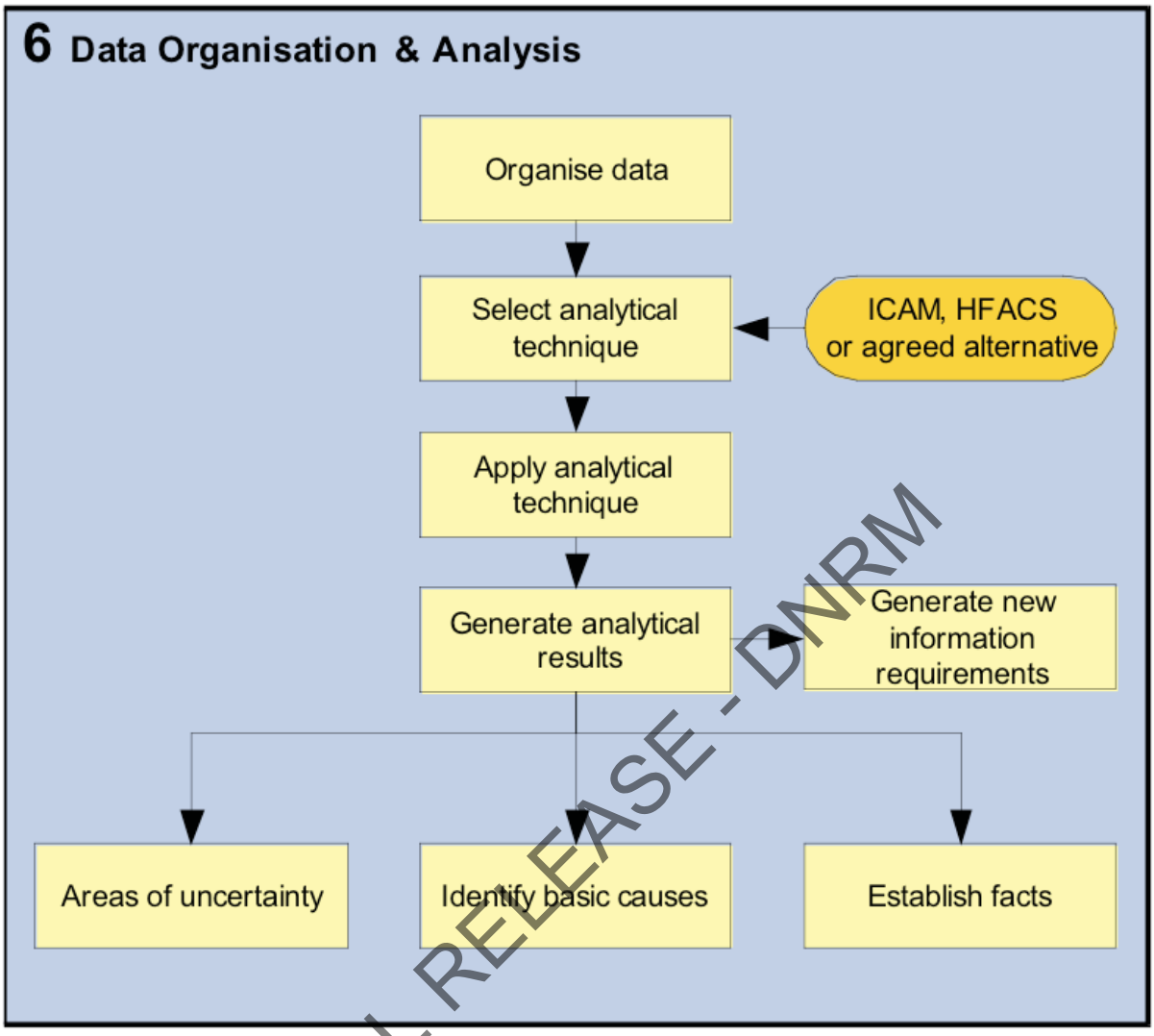
Evidence control procedures similar to the following guidelines will help assure that evidence is not adulterated, corrupted, or lost and that subsequent engineering tests, if conducted and other analytical results are valid.

Documentary evidence can easily be overlooked, misplaced, or taken. Documents can be altered, disfigured, misinterpreted, or electronically corrupted. Computer software and disks can be erased by exposure to magnetic fields. As with other evidence collected during the investigation, documentary evidence should be collected, inventoried, controlled, and secured (in locked containers, if necessary).

Storing Records.
During the course of the investigation, many sources of information will be reviewed and potentially many types of records produced. In order to maintain the safety, security and confidentiality of these records the following steps are recommended:

- The investigation team will be using a dedicated room and this should be locked at all times when not occupied by the team.
- All hard copies of documents should be listed, categorised according to the investigation and stored in the room.
- Any electronic records such as procedures, training records should either be retained in electronic format on CD or copies printed out which are authorised and verified as a true record.
- Any photographs should be electronically stored in one place – usually the Investigation Team Leader's computer.
- All witness statements and medical information (if released) should be treated as confidential and should be stored so as to prevent general access.
- Upon completion of the investigation report all electronic files should be copied to CD (or other suitable data storage format).
- All hard copy items and items of evidence that need to be retained should be archived in accordance with company requirements in a secure archive facility.
- In particular, items of evidence such as components that may have allegedly failed should be stored securely as they may be required for future examination in the event of litigation.

Section 6



Section 6

Data Organisation and Analysis

6.1 Objective

To ensure comprehensive analyses of the causes of an incident are conducted in order to drive appropriate corrective and preventive measures.

6.2 Approach

The analysis portion of the incident investigation is not a single, distinct part of the investigation. Instead, it is the central part of the iterative process that includes collecting facts and determining causal factors. Well chosen and carefully performed analytical methods are important for providing results that can aid investigators in developing an investigation report that has sound corrective and preventive measures.

In order to facilitate straightforward and consistent incident investigations across the organisation, Anglo American has selected ICAM- Incident Cause Analysis Method, as the standards analysis and classification tool for incidents level 4 & 5, (actual and potential).

6.3 Organising Data

Once all pertinent data has been gathered as per Section 5, it is important to organise/ correlate this data in a logical way to facilitate subsequent analyses.

6.3.1 Determining Facts

Following any serious incident, much of the available information may be conflicting and erroneous. The volume of data expands rapidly as witness statements are taken, emergency response actions are completed, evidence is collected, and the incident scene is observed by more individuals.

The principal challenge of the investigation team is to distinguish between accurate and erroneous information, and between factors which are relevant to the incident and those which are irrelevant, in order to focus on areas that will lead to identifying and substantiating the incident's causal factors. This can be accomplished by:

- Understanding the activity that was being performed at the time of the incident;
- Personally conducting a walkthrough of the incident scene;
- Challenging "facts" that are inconsistent with other evidence (e.g. physical);
- Corroborating facts through interviews;
- Testing or inspecting pertinent components to determine failure modes and physical evidence; and
- Reviewing policies, procedures, and work records to determine the level of compliance or implementation.

Prevention is at the heart of the entire investigation process; therefore, any incident investigation shall focus on fact-finding, not fault-finding.

Fact-finding begins during the collection of evidence. All sources of evidence (e.g. incident site walkthroughs, witness interviews, physical evidence, policy or procedure documentation) contain facts that, when linked, create a chronological depiction of the events leading to an incident. Facts are not

hypotheses, opinions or conjecture. However, not all facts can be determined with complete certainty, and such facts are referred to as assumptions. Assumptions should be reflected as such in the investigation report and in any closeout briefings.

Investigation team members should immediately begin developing a chronology of events as facts and evidence is collected. Facts should be reviewed on an ongoing basis to ensure relevance and accuracy. Facts and evidence later determined to be irrelevant should be removed from the incident chronology but retained in the official investigation file for future consideration.

Contradictory facts can be resolved in closed team meetings, recognising that the determination of significant facts is an iterative process that evolves as gaps in information are closed and questions resolved. The team revisits the prescribed scope and depth of their investigation often during the fact-finding and analysis process.

Causal factors of an incident are identified by analysing the facts. Recommendations for prevention and the subsequent corrective actions are based on the identified causes of the incident. Therefore, the facts are the foundation of all other parts of the investigative process.

Case Study Introduction

Case Study
This section of the workbook begins with a case study of an electrical incident. It is selectively referenced throughout this and subsequent sections to illustrate the process of determining facts and the use of six analytic techniques: four core techniques and two tree-based techniques. In this workbook, particular emphasis is placed on these techniques because they can be used in most incident investigations. However, for extremely complex incidents, additional, more sophisticated techniques may be needed that require specialised training. Training for these techniques is beyond the scope of this workbook and can be obtained through government, private, and university sources.

Incident Description
The incident occurred at approximately 9:34 a.m. on January 16, 1996, in Building XX, during the excavation of a sump pit in the floor of the building. Workers were attempting to correct a waste stream outfall deficiency. Two workers arrived at the job site at approximately 8:40 a.m. and resumed the excavation work begun the previous day. The workers were employed by WS, the primary subcontractor for construction and maintenance. They used a jackhammer, pry bar, and shovel to loosen and remove the rubble from the sump pit. At about 9:34 a.m., at a depth of 39 inches, Worker A, who was operating the jackhammer, pierced the conduit containing an energized 13.2 kV electrical cable. He was transported to the local medical centre where cardiac medications were administered.

Incident Facts
Using the case study incident, the following three factual statements were derived during the investigation:

- The injured worker had not completed safety training prior to the incident, as required by WS Environment, Safety, and Health Manual Procedure 12340.
- Design drawings for the project on which the injured employee was working did not show the location of the underground cable.
- A standing work order system, without a safety review, was used for non-routine, non-repetitive tasks.

6.3.2 Determining Causal Factors

The process of determining causal factors seeks to answer the questions what happened? and, why did it happen?

Causal factors are the events and conditions that produced or contributed to the occurrence of the incident. There are three types of causal factors:

- Direct cause;
- Contributing causes; and
- Basic causes.

Direct Causes

The direct cause of an incident is the immediate events or conditions that caused the incident. The direct cause should be stated in one sentence, as illustrated in the examples below.

EXAMPLES:

INCIDENT DIRECT CAUSES

- The direct cause of the incident was contact between the chisel bit of the air-powered jackhammer and the 13.2 kV energised electrical cable in the sump pit being excavated.
- The direct cause of the incident was the inadvertent activation of electrical circuits that initiated the release of CO_2 in an occupied space.

While it may not be necessary to identify the direct cause in order to complete the causal factors analysis, the direct cause should be identified for completeness and future trend analysis.

Contributing Causes

Contributing causes are events or conditions that collectively with other causes increased the likelihood and/or severity of an incident but that individually did not cause the incident. Contributing causes may be longstanding conditions or a series of prior events that, alone, were not sufficient to cause the incident, but were necessary for it to occur. Contributing causes are the events and conditions that "set the stage" for the incident and, if allowed to persist or reoccur, increase the probability of future incidents.

There may also be contributory factors which have increased the consequences of the incident rather than the likelihood (e.g. poor condition of PPE or an emergency response deficiency). These need to be identified by the incident investigation team and a determination made as to the impact they may have had upon the outcome of the incident.

EXAMPLES:

INCIDENT CONTRIBUTING CAUSES

- Failure to implement safety procedures in effect for the project contributed to the incident.
- Failure to erect barriers or post warning signs contributed to the incident.
- The standing work order process was used by facility personnel as a convenient method of performing work without a job ticket and work package, allowing most work to be field-directed.
- Inadequate illumination in the area of the platform created visibility problems that contributed to the fall from the platform

Basic Causes

Basic causes are the causal factors that, if corrected, would prevent recurrence of the same or similar incidents. Basic causes may be derived from or encompass several contributing causes. They are higher-order, fundamental causal factors that address classes of deficiencies, rather than single problems or faults. Correcting basic causes would not only prevent the same incident from recurring, but would also solve line management and management system deficiencies that could cause or contribute to other incidents. They are identified using root cause analysis.

In many cases, basic causes are failures to properly implement the principles and core functions of the Anglo Management System Standards (Anglo Safety Way). Basic causes can include failures in management systems to:

- Define clear roles and responsibilities;
- Ensure that staff are competent to perform their responsibilities;
- Ensure that resource use is balanced to meet critical objectives and goals;
- Ensure that standards and requirements are known and applied to work activities;
- Ensure that hazard controls are tailored to the work being performed;
- Ensure that work is properly reviewed and authorised;
- Ensure that regular inspections were carried out;
- Ensure that hazards were identified; and
- Ensure that equipment maintenance programmes were in place.

TIP
Even though the team should avoid placing individual blame for an incident, the team has an obligation to seek out and report all causal factors, including deficiencies in management, SHE, or line management systems.

Basic cause statements, as shown in the examples below, should identify the Anglo and contractor line organisations responsible for management failures. Root cause statements should also identify the specific management system(s) that failed.

EXAMPLES:

INCIDENT BASIC CAUSES

- Contractor management and the Anglo field office failed to clearly define responsibilities for safety reviews of planned work. The lack of clarity in roles and responsibilities for safety reviews was a root cause of the incident.

- Contractor management allowed the standing work order process, intended for routine work, to be used to accomplish non-routine, complex modification and construction work. Anglo field office failed to detect and ensure correction of this practice. Misuse of the standing work order process was a root cause of the incident.

- Contractor management systems were ineffective in translating lessons learned from past occurrences into safer day-to-day operations at the facility. The failure to implement lessons learned was a root cause of the incident.
- Assessments performed by the Anglo program office failed to identify that some safety standards were not addressed by contractor safety management systems. Implementation of these requirements would have prevented the incident.

The Importance of Causal Factors

The primary purpose of any incident investigation is to help line management prevent recurrence of incidents by identifying all of an incident's causal factors. The team is responsible for identifying the local causal factors that, if corrected, would prevent another incident from occurring when the same work activity is performed again. However, more is required than simply detecting and removing immediate local causes. The team is also responsible for identifying and describing any failures in management systems and processes that allow hazards to exist that could lead to other incidents at other facilities. Modern incident investigation theory indicates that generally the basic causes of incidents are found in management system failures, not in the most directly related causal factor(s) in terms of time, location, and place.

Generally, the higher the level in the management chain at which a basic cause is found, the broader the scope of the activities that the basic cause can affect. Because these higher-level basic causes, if not corrected, have the largest potential to cause other incidents, it is incumbent on a team to ensure that the investigation is not ended until the basic causes are identified. If a team cannot identify basic causes, this should be stated clearly in the investigation report, along with an explanation.

6.3.3 Core Data Organisation and Classification Techniques

This Section provides a summary of the key methods or techniques that can be used to assist with data organisation. These should not be used without a member of the investigation team being trained and competent in their use.

1. Event and Causal Factors Charting

Incidents rarely result from a single cause. Events and causal factors charting is useful in identifying the multiple causes and graphically depicting the triggering conditions and events necessary and sufficient for an incident to occur.

For purposes of this workbook, events and causal factors charting and events and causal factors analysis are considered one technique. They are addressed separately because they are conducted at different stages of the investigation. Events and causal factors charting is a graphical display of the incident's chronology and is used primarily for compiling and organising evidence to portray the sequence of the incident's events. It is a continuous process performed throughout the investigation. Events and causal factors analysis is the application of analysis to determine causal factors by identifying significant events and conditions that led to the incident. As the results of other analytical techniques (e.g., change analysis and barrier analysis) are completed, they are incorporated into the events and causal factors chart. After the chart is fully developed, the analysis is performed to identify causal factors.

Events and causal factors charting is a widely used analytic technique because the events and causal factors chart is easy to develop and provides a clear depiction of the data. By carefully tracing the events and conditions that allowed the incident to occur, team members can pinpoint specific events and conditions that, if addressed through corrective actions, would prevent a recurrence. The benefits of this technique are highlighted in Table 6.1.

Table 6.1 Benefits of Events and Causal Factors Charting

The benefits of events and causal factors charting include:

- Illustrating and validating the sequence of events leading to the incident and the conditions affecting these events;
- Showing the relationship of immediately relevant events and conditions to those that are associated but less apparent — portraying the relationships of organisations and individuals involved in the incident;
- Directing the progression of additional data collection and analysis by identifying information gaps;
- Linking facts and causal factors to organisational issues and management systems;
- Validating the results of other analytic techniques;
- Providing a structured method for collecting, organising, and integrating collected evidence;
- Conveying the possibility of multiple causes;
- Providing an ongoing method of organising and presenting data to facilitate communication among the investigators;
- Clearly presenting information regarding the incident that can be used to guide report writing; and
- Providing an effective visual aid that summarises key information regarding the incident and its causes in the investigation report.

TIP
To identify causal factors, team members must have a clear understanding of the relationships among the events and the conditions that allowed the incident to occur. Events and causal factors charting provides a graphical representation of these relationships.

Constructing the Chart
Constructing the events and causal factors chart should begin immediately. However, the initial chart will be only a skeleton of the final product. Many events and conditions will be discovered in a short amount of time, and therefore, the chart should be updated almost daily throughout the investigative data collection phase. Keeping the chart up to date helps ensure that the investigation proceeds smoothly, that gaps in information are identified, and that the investigators have a clear representation of incident chronology for use in evidence collection and witness interviewing.

Investigators and analysts can construct an Events and Causal Factors Chart, using either a manual or computerised method.
Incident investigation teams often use both techniques during the course of the investigation, developing the initial chart manually and then transferring the resulting data into computer programs.

The manual method employs removable adhesive notes to chronologically depict events and the conditions affecting these events. The chart is generally constructed on a large conference room wall or many sheets of poster paper. Incident events and conditions are recorded on removable adhesive notes and affixed sequentially to the wall in the team's conference room or "command centre." Because the exact chronology of the information is not yet known, using removable adhesive notes allows investigators to easily change the sequence of this information and to add information as it becomes available. Different coloured notes or inks can be used to distinguish between events and conditions in this initial manual construction of the events and causal factors chart.

If the information becomes too unwieldy to manipulate manually, the data can be entered into a computerised analysis program. Using specialised analytical software, investigators can produce an events and causal factors graphic, as well as other analytical trees or incident models.

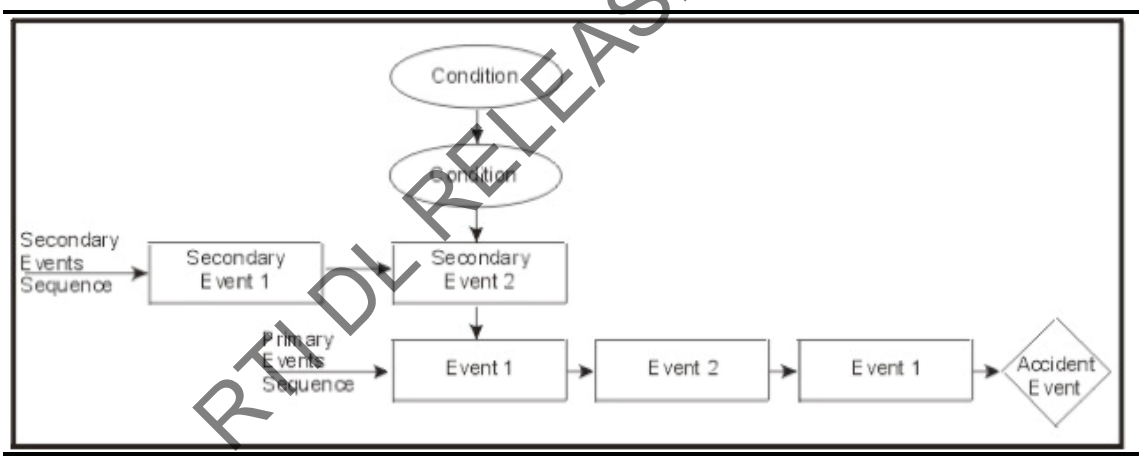
Whether using a manual or a computerised approach, the process begins by chronologically constructing, from left to right, the primary chain of events that led to an incident. Secondary and miscellaneous events are then added to the events and causal factors chart, inserted where appropriate in a line above the primary sequence line. Conditions that affect either the primary or secondary events are then placed above or below these events.

Figure 6.1 illustrates the basic format of the events and causal factors chart. Guidelines for constructing the chart are shown in Table 6.2.

A sample summary events and causal factors chart (Figure 6.2*)* uses data from the case study incident. It illustrates how data may become available during an incident investigation, and how a chart would first be constructed and subsequently updated and expanded.

Depending on the complexity of the incident, the chart may result in a very large complex sequence of events covering several walls in the "command centre." For the purpose of inclusion in the investigation report and closeout briefings, the chart is generally summarised. Note that "assumed conditions" appear in the final chart. These are conditions the team presumed impacted the incident sequence, but the effect could not be substantiated with evidence.

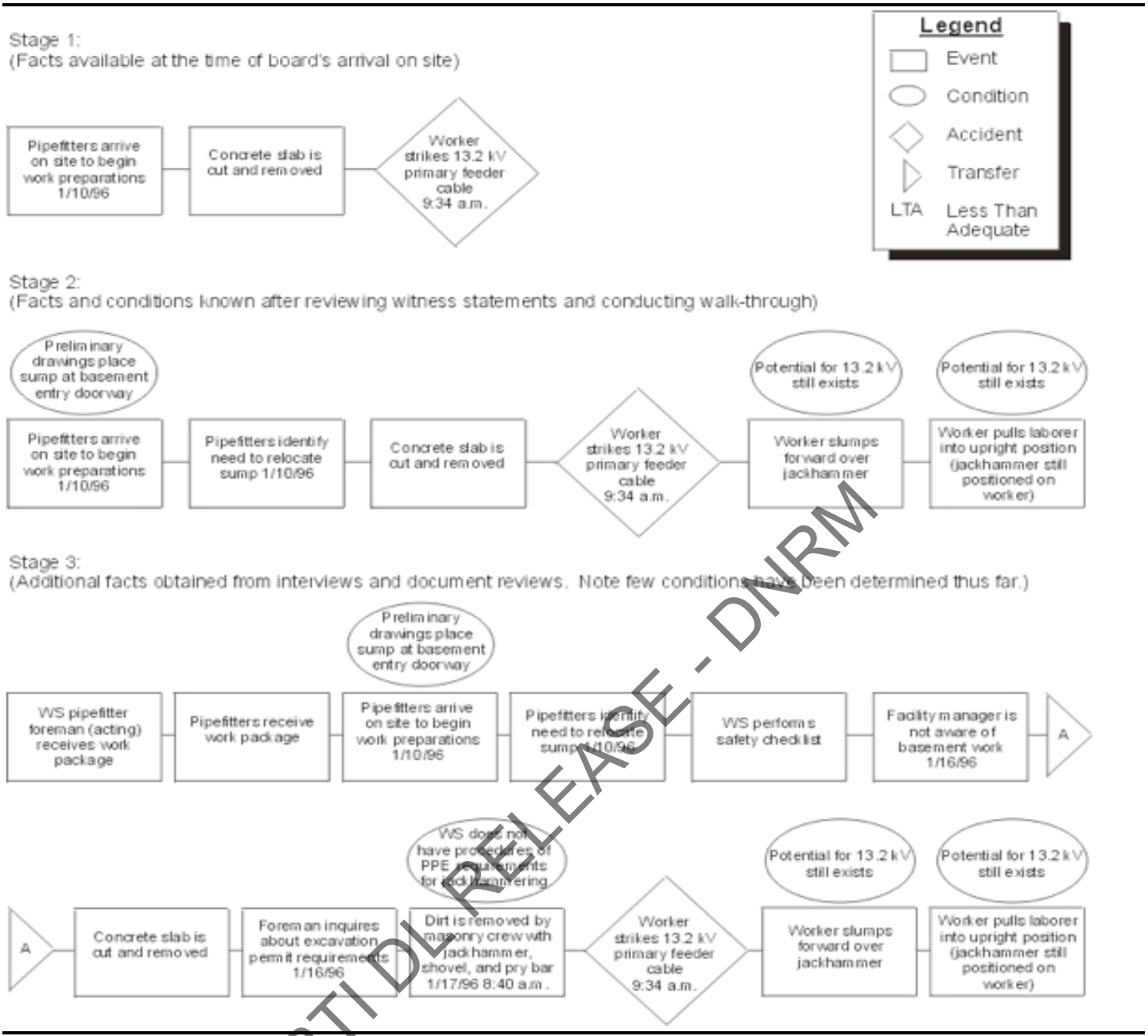
Figure 6.1 Simplified Events and Causal Factors Chart



Simplified Events and Causal Factors Chart

Symbols	■ □ — Events ■ ◇ — Accidents ■ ⬭ — Conditions ■ ::: — Presumptive events ■ ⬭ — Presumptive conditions or assumptions ■ → — Connect events ■ --> — Connect conditions ■ ▸ — Transfers one line to another ■ LTA — Less than adequate; a judgment of the board
Events	■ Are active (e.g., "crane strikes building") ■ Should be stated using one noun and one active verb ■ Should be quantified as much as possible and where applicable (e.g., "the worker fell 26 feet," rather than, "the worker fell off the platform") ■ Should indicate the date and time of the event, when they are known ■ Should be derived from the event or events and conditions immediately preceding it.
Conditions	■ Are passive (e.g., "fog in the area") ■ Describe states or circumstances rather than occurrences or events ■ As practical, should be quantified ■ Should indicate date and time if practical/applicable ■ Are associated with the corresponding event.
Primary Event Sequence	Encompasses the main events of the accident and those that form the main events line of the chart.
Secondary Event Sequence	Encompasses the events that are secondary or contributing events and those that form the secondary line of the chart.

Figure 6.2 Sample of an Events and Causal Factors Chart (In Progress)



3. Events and Causal Factors Analysis

The following describes the process for using the events and causal factors chart to determine the causal factors of an incident. This process is an important first step in later determining the root causes of an incident. The results of this analysis can be used with a tier diagram if desired. The quality and accuracy of root cause analysis depends on the results of the events and causal factors analysis. Therefore, the events and causal factors analysis must be complete and thorough.

Events and causal factors analysis requires deductive reasoning to determine which events and/or conditions contributed to the incident.

Getting Started.
Before starting to analyse the events and conditions noted on the chart, the team must first ensure that the chart contains adequate detail. Both change and barrier analyses should be conducted and the results incorporated into the chart before the analysis begins. Also, the team must resolve any obvious gaps in data before this analysis begins.

By the time the team is ready to conduct a preliminary analysis of the chart, a great deal of time will have been devoted to adding, removing, and rearranging events and conditions on the chart. In all likelihood, the chart will be lengthy, possibly containing 100 events or more. Given the magnitude of data, one can become overwhelmed with where to begin identifying causal factors. It is easiest and most efficient to begin with the event on the chart that immediately precedes the incident and work backwards.

Conducting the Analysis.
Examine the first event that immediately precedes the incident. Evaluate its significance in the incident sequence by asking, "If this event had not occurred, would the incident have occurred?" If the answer is, "The incident would have occurred whether this event happened or not" (e.g. worker clocked in (checked in) to work at 06:00), then the event is not significant. Proceed to the next event in the chart, working backwards from the incident.

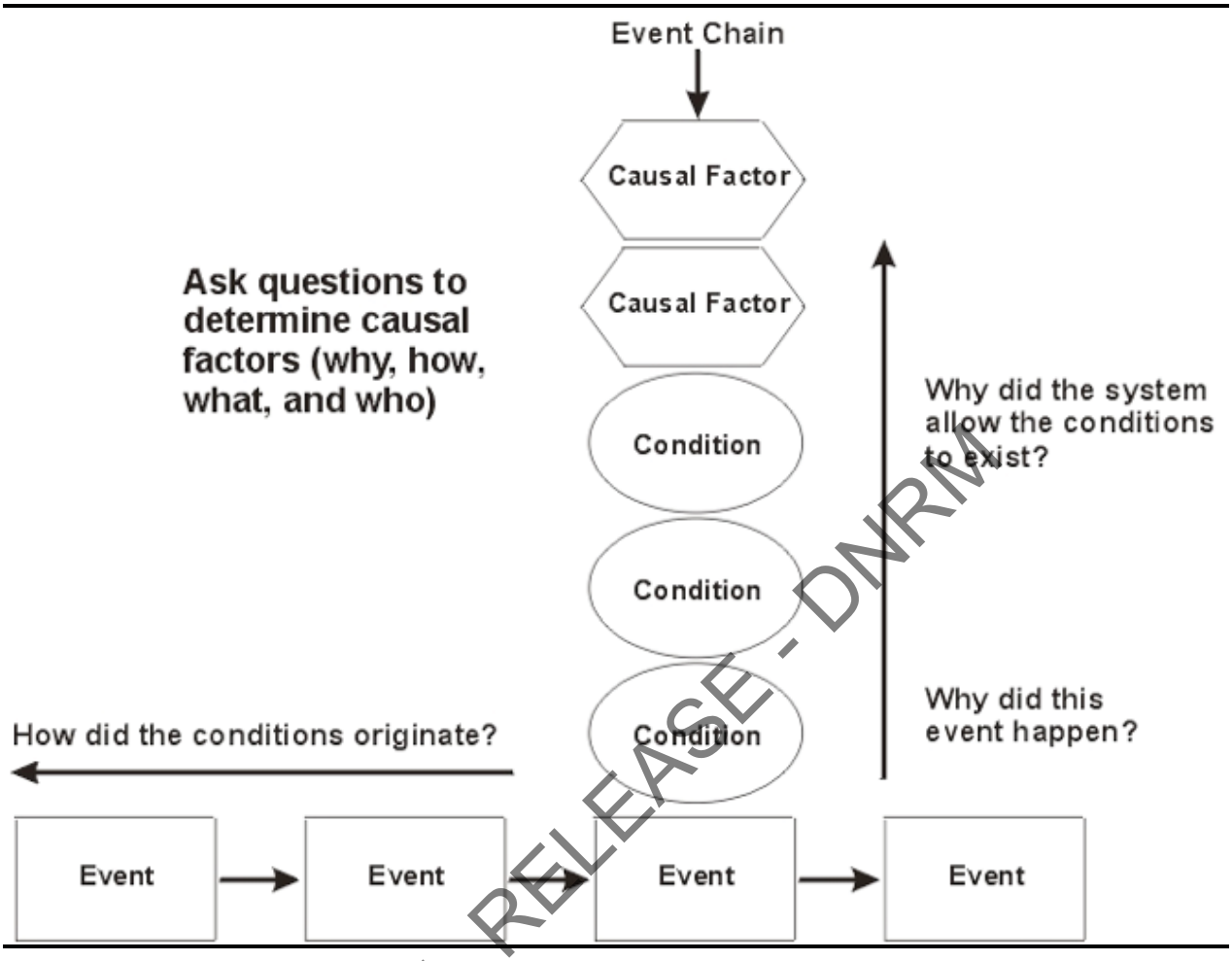
If the answer to the evaluation question is, "The incident would not have occurred without this event," then determine whether the event represented normal activities with the expected consequences. If the event was intended and had the expected outcomes, then it is not significant. However, if the event deviated from what was intended or had unwanted consequences, then it is a significant event. Carefully examine the events and conditions associated with the significant event by asking a series of questions about this event chain, such as:

- Why did this event happen?
- What events and conditions led to the occurrence of the event?
- What went wrong that allowed the event to occur?
- Why did these conditions exist?
- How did these conditions originate?
- Who had responsibility for the conditions?
- Are there any relationships between what went wrong in this event chain and other events or conditions in the incident sequence?
- Is the significant event linked to other events or conditions that may indicate a more general or larger deficiency?

The significant events, and the events and conditions that allowed the significant events to occur, are the incident's causal factors.

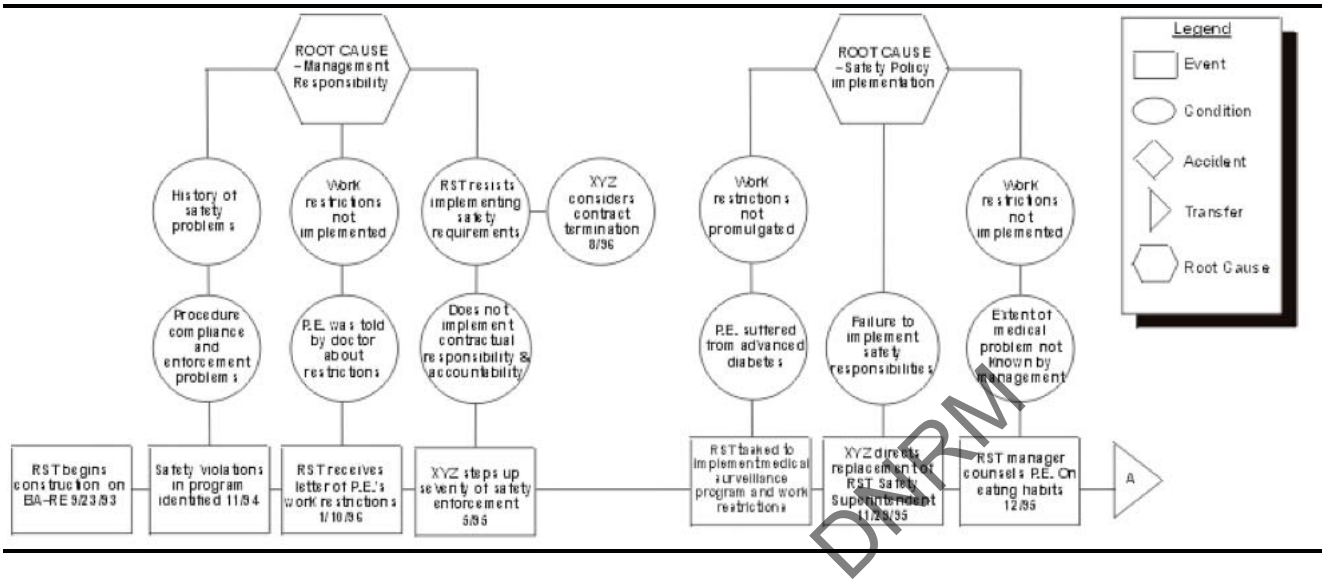
Repeat this questioning process for every event in the chart. As a causal factor is identified, write a summary statement that describes the causal factor on an adhesive note of a unique colour and place the note above the event chain from which it was derived, as shown in Figure 6.8 below, when constructing the chart manually. If a computer graphics program is used to construct the chart, use a hexagon to represent causal factors.

Figure 6.8 Events and Causal Factors Analysis; Driving Events to Causal Factors



Sometimes events and conditions from several different event chains are related and suggest a larger, more significant causal factor. For example, in two side-by-side event chains, the conditions "procedure did not address electrical hazard" and "electrical hazard not discussed in pre-job brief" may indicate that the electrical hazard was not identified in the hazard analysis for the activity. In such a case, the team can write a causal factor concerning the hazard analysis, place it on the chart, and connect it with an arrow to the two event chains from which it was derived (see Figure 6.9). Alternatively, the team can record the same causal factor twice and place it above each of the applicable event chains.

Figure 6.9 Grouping Root Causes on the Events and Causal Factor Chart



TIP
Not all event chains will produce causal factors. However, it is important to prepare a complete set of events in order to understand the circumstances leading up to the incident and to assure that all significant events have been identified.

After these steps have been completed for each event on the chart, the process should be repeated with all team members to ensure that nothing has been overlooked and that consensus has been reached.

6.4 Classification and Analysis of Causal Factors

As stated in section 6.2, Anglo American has selected ICAM- Incident Cause Analysis Method*, as the standards analysis and classification tool for incidents level 4 & 5, (actual and potential), in order to achieve consistency in incident investigations across the organisation.

This does not preclude the selective use of other tools or incorporation from other tools, where this is justified based on the circumstances of the incident and as agreed with the Group SHE Discipline Head. Other potential tools are described in Appendix 1.

* method drawn from BHP Incident Investigation Guide.

The ICAM model organises incident causal factors into the following elements:

- Absent or Failed Defences: These failures result from inadequate or absent defences that failed to detect and protect the system against technical and human failures arising from the three following elements. These are the last minute measures which failed or were missing and did not prevent the outcome after an active failure.

  Check question: Does the item describe the situation, system, conditions, equipment or attribute which normally prevents this type of incident?

- Individual/Team Actions: These errors or violations have an immediate adverse effect and are typically associated with personnel having direct contact with the equipment, such as operators or maintenance personnel. These are acts or omissions which led directly to the incident.

  Check question: Does the item tell you about an error or violation of a standard or procedure made in the presence of a hazard?

- Task/Environment Conditions: These are the conditions in existence immediately prior or at the time of the incident. These are task, situational, and environmental conditions that directly influence human and equipment performance in the workplace.

  Check question: Does this item describe something about the working situation, social environment or a person's thought process which influenced him to act in a certain way?

- Organisational Factors: These are system failures which led to the Task/Environmental Conditions. They may lie dormant or undetected for a long time within an organisation and their repercussions may only become apparent when they combine with the task/environmental conditions to breach the system's defences.
  Organisational factors may include management decisions, poorly designed equipment, inadequate procedures, ineffective training or poor maintenance of equipment.

  Check question: Does this item identify a standard OFT present before the incident and which resulted in the Task/Environmental Conditions?

Identify Absent or Failed Defences

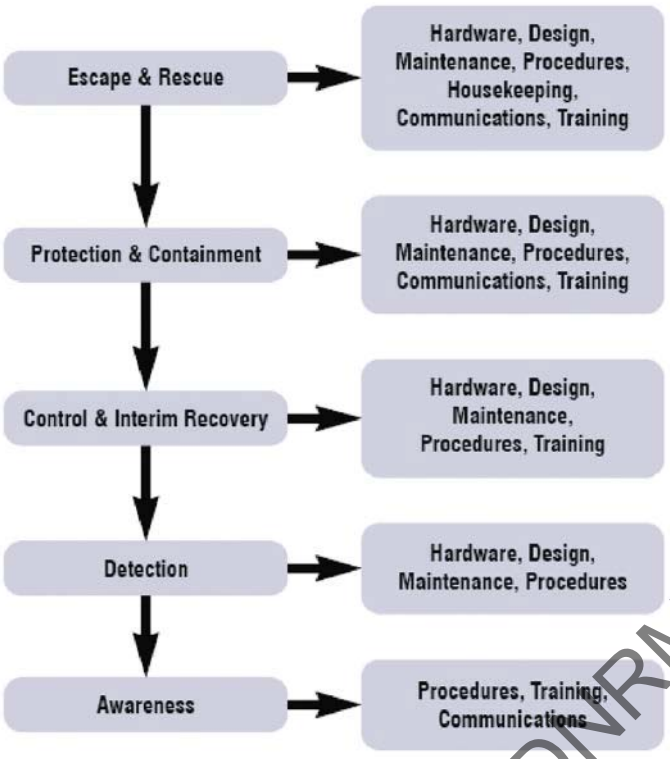
Defences are those measures designed to prevent the consequences of a human act or component failure producing an incident.

Defences are designed to serve five basic functions. The Categories represent successive lines of defence where each defensive layer comes into operation on the failure of its predecessor:

Hierarchy of Absent/ Failed Defences

Defence Category	Definition	Defence Example
Awareness	To understand the nature and severity of the hazardous conditions present at the worksite. Awareness problems can apply to those involved or those supervising or managing processes.	Induction Training, Ongoing Training, Communication, Risk Assessment, Competency, Reporting
Detection	To provide clear warning of both the presence and the nature of a potentially hazardous condition.	Signage, Warning Lights, Traffic Warning, Sirens, Gas Detectors, Speed Sensors, Temp. Sensors
Control and Interim Recovery	To restore the process to a safe state with minimal injury or damage.	Procedures, Protocols, Safety Switch, By-pass Valves, Emergency Shut Down Systems, Guards
Protection and Containment	To limit the adverse consequences of any unplanned release of mass, energy or hazardous material.	PPE, Fire Extinguishers, Spill Response Kits, Bunded Areas
Escape and Rescue	To evacuate all potential victims from the hazard locations as quickly and as safely as possible.	Safe Access/Exit, Emergency Escape, Emergency Planning, Emergency Communication

The next diagram shows the five categories of Absent or Failed Defences together with Organisational Factors-OFTs which are most likely to be the underlying causes of failure of each type. These Absent or Failed Defences are the active failures and are not the same as the Defences OFT unless there is evidence that the system has tolerated their existence for a significant time. Use these suggestions in compiling your ICAM chart.

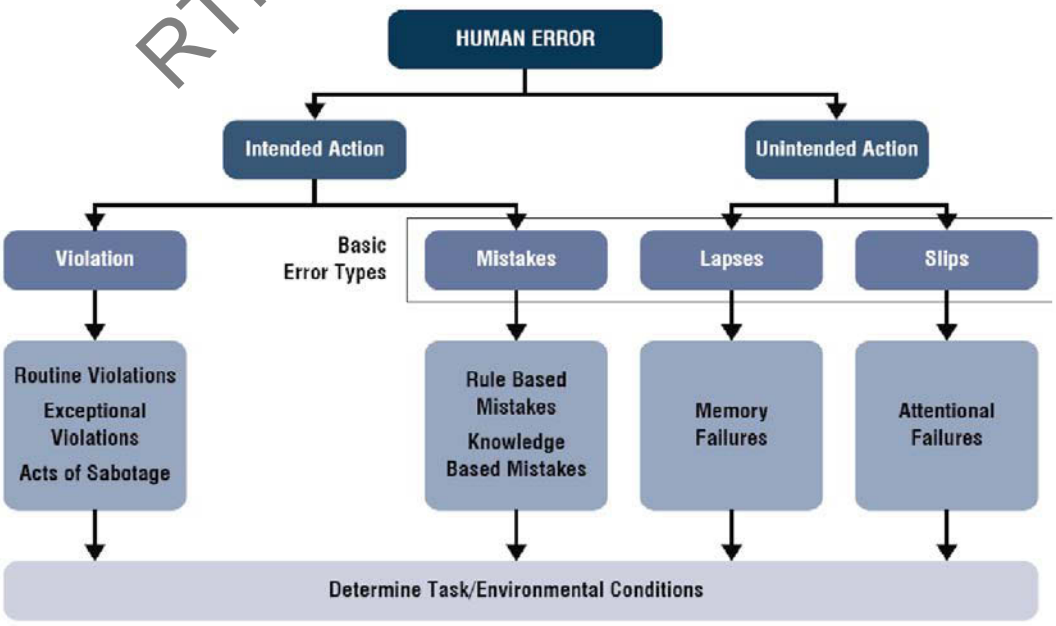


Identify the Individual/Team Actions

Active failures or unsafe acts are either errors or violations of a standard or procedure. When incurred in the presence of a potential hazard that is not properly controlled, active failures or unsafe acts can lead to injury and/or damage. For most of the time however, the defences built into our operations prevent these 'human errors' from causing harm.

The diagram below shows the various categories used to classify active failures, which basically comprise two main groups: slips, lapses and mistakes (unintended) and violations (intended).

Once again, keep asking 'why?' someone acted (or was allowed to act) in the way they did before the incident. Successful use of the ICAM technique depends on you uncovering the underlying or root causes of an incident and the conditions which made the failure possible.



Identify the Task/Environmental Conditions
These are task, situational and human conditions that directly influence performance in the workplace. Deficiencies in these conditions can promote the occurrence of unsafe acts. They may also be an Organisational Factor Type such as Error Enforcing Conditions or Housekeeping, when the system tolerates their long-term existence.

The Task/Environmental Conditions can be categorised in two groups: Work Factors and Human Factors. Within the two groups we can find factors that encourage or facilitate the commission of unsafe acts (errors or violations). The tables on these two pages detail some of these preconditions that promote/ facilitate unsafe acts.

Work Factors

Error Factors	Common Factors (error or violation)	Violation Factors
Change of routine	Time shortage	Violations tolerated
Negative transfer	Inadequate tools and equipment	Compliance goes unrewarded
Poor signal/noise ratio	Poor procedures and instructions	Procedures protect the system not the individual
Poor man/system interface	Poor tasking	Little or no autonomy
Designer/user mismatch	Inadequate training	Macho culture
Educational mismatch	Hazards not identified	Perceived licence to bend rules
Hostile environment	Undermanning	Adversarial industrial climate
Domestic problems	Inadequate supervision	Low operator pay
Poor communications	Poor access to job	Low operator status
Poor mix of hands-on work and written instruction (Reliance on undocumented knowledge)	Poor housekeeping	Unfair management sanctions
Poor shift patterns and overtime working	Poor supervisor/worker ratio	Blame culture
	Poor working conditions	Poor supervisory example
	Inadequate mix of experience and inexperienced workers	Task allows for easy short-cuts

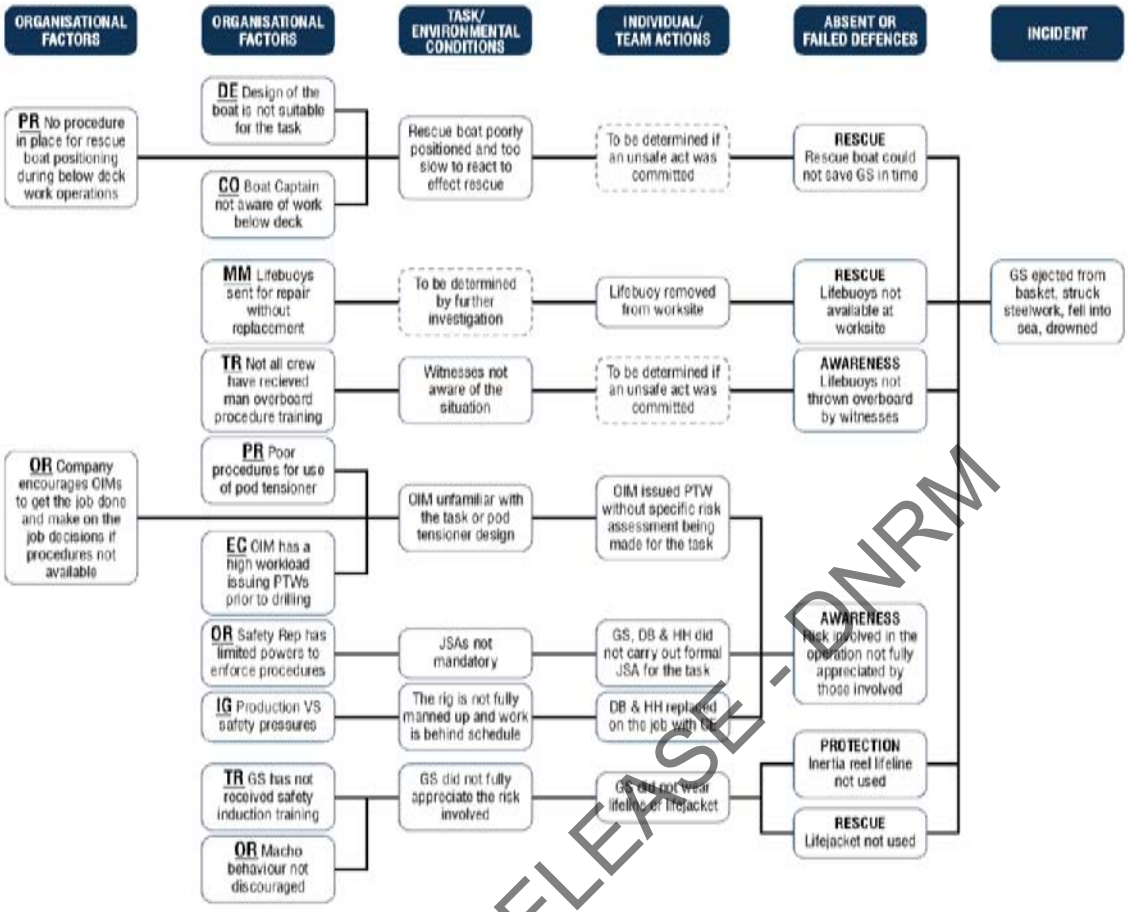
Human Factors

Error Factors	Common Factors (error or violation)	Violation Factors
Attention capture: preoccupation distraction	Insufficient ability	Age and gender
Memory failures: encoding interference storage loss retrieval failure prospective memory	Inadequate skill	High-risk target
Strong motor programmes: frequency bias similarity bias	Skill overcomes danger	Behavioural beliefs (gains > risks)
Perceptual set	Unfamiliarity with task	Subjective norms condoning violations
False sensations	Poor judgment: illusion of control least effort	Personality: Unstable extrovert Non-compliant
False perceptions	Overconfidence	Perceived behavioural control
Confirmation bias	Performance anxiety	Low morale
Situational awareness	Time pressures	Bad mood
Incomplete knowledge	Arousal state: monotony and boredom emotional status	Job dissatisfaction
Inaccurate knowledge		Attitude to the system
Inference and reasoning		Misperception of hazards
Stress and fatigue		Low self-esteem
Disturbed sleep patterns		Learned helplessness
Error proneness		

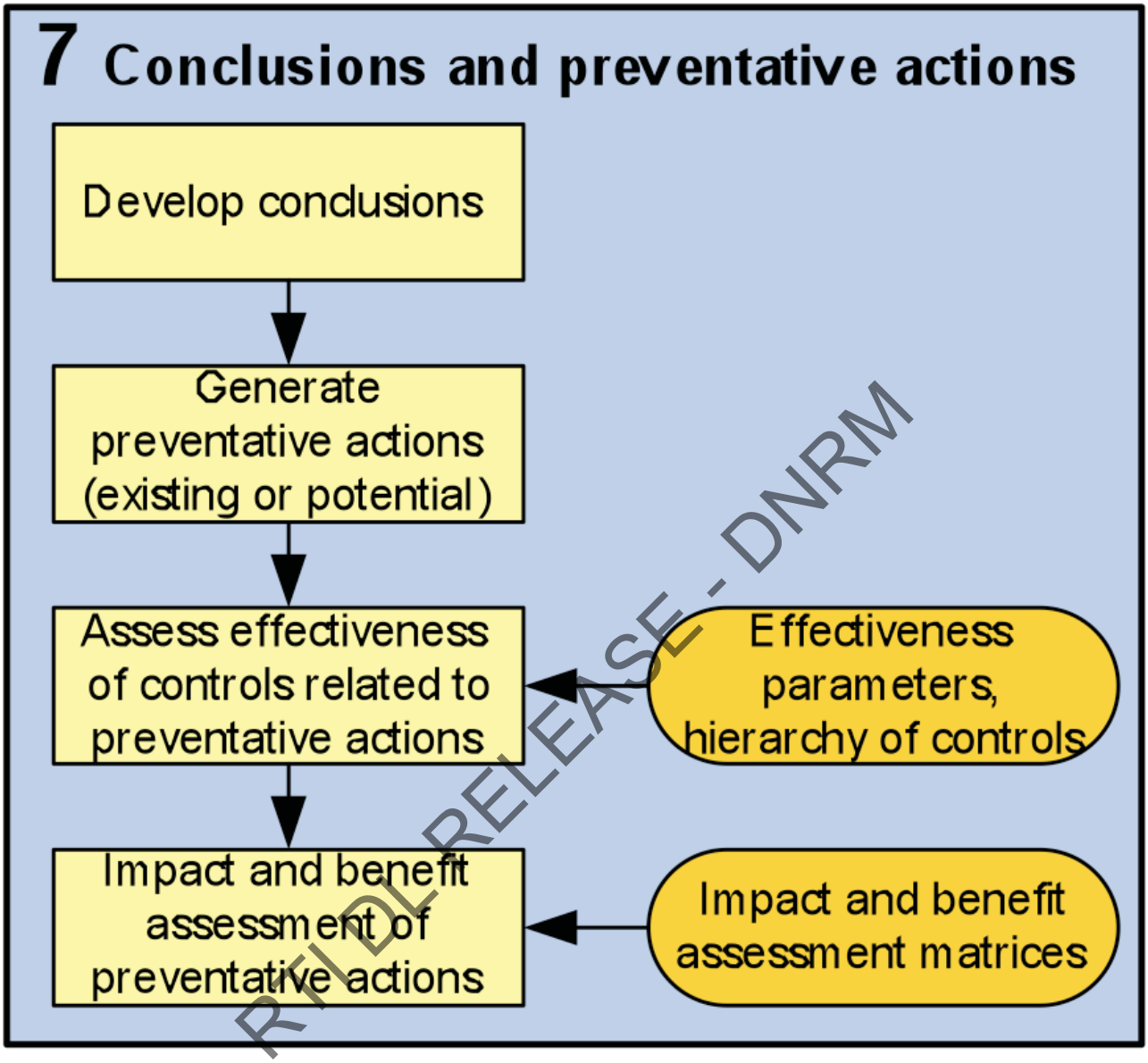
Identify the Organisational Factors

Organisational Factor Types (OFTs)

Hardware (HW)	The quality, availability and position in the life-cycle of tools, equipment and components. It is concerned with the materials selected rather than the design or poor maintenance of the equipment.
Training (TR)	The provision of the correct knowledge and skills to employees which are necessary for them to do their job safely. Failures may involve insufficient or too much training, lack of resources or assessment and mismatch of abilities to tasks.
Organisation (OR)	Deficiencies in the structure of responsibility and accountability, which are not appropriate to current work. May involve co-ordination, supervision and provision of communication and feedback.
Communication (CO)	Failures to communicate when the target is known, but the message fails to get through or is late. Involves inadequate hardware and miscomprehension by those involved. Failure to validate reception.
Incompatible Goals (IG)	The presence of conflicts between production, safety, planning and economic goals as well as conflicts between group and peer pressures and personal goals. Incompatible goals become a problem when senior management give no guidelines on priorities.
Error Enforcing Conditions (EF)	The conditions of the individual or the workplace that can lead to the performance of unsafe acts, e.g. haste, lack of knowledge, poor information presentation as well as workers' attitudes, motivation and physical condition.
Procedures (PR)	The presence of accurate, understandable procedures which are known and used. Relates to the way in which procedures are written, tested, documented and controlled.
Maintenance Management (MM)	The appropriateness of the management of the maintenance system, involving planning, resourcing and type of maintenance rather than the execution of maintenance jobs. Poor practices, involving procedures, tools and training are covered elsewhere.
Housekeeping (HR)	The tidiness and cleanliness of facilities, together with the provision of adequate resources for cleaning and waste removal. Long-term tolerance, by management, of poor housekeeping makes this an Organisational Factor Type.
Design (DE)	The way in which equipment is constructed to make certain operations difficult or allow unexpected usage. Poor design may require extra effort and unusual maintenance. Inadequate design capacity may lead to extending the equipment beyond limits. Many design failures result from the physical and professional separation of the designer and end user.
Defences (DF)	Failures in systems for detection warning, recovery, containment, escape and evacuation as well as individual awareness and use of protective equipment.



Section 7



Section 7

Conclusions and Preventative Actions

7.1 Objective

To ensure appropriate conclusions and preventative measures are identified.

7.2 Conclusions

Conclusions are significant deductions derived from the investigation's analytical results. They are derived from, and must be supported by the facts, the results of testing and the various analyses conducted. The depth and nature of conclusions may vary according to whom the investigation team is reporting. For example, regulators may require that conclusions be presented in a specific format.

Conclusions may:

- Include concise statements regarding the causal factors of the incident determined by analysis of the facts;
- Be statements that alleviate potential confusion on issues that were originally suspected causes; and
- Address significant concerns arising out of the incident that are unsubstantiated or inconclusive, e.g. where it has not been possible to establish sufficient confidence regarding the relevance of a suspected potential causal factor or aspect of the incident.

Be used to highlight positive aspects of performance revealed during the investigation, where appropriate.

When developing conclusions, the team should:

- Organise conclusions sequentially, preferably in chronological order, or in logical sets (e.g. infrastructure, systems and people);
- Base conclusions on the facts and the subsequent analysis of the facts;
- Include only substantive conclusions that bear directly on the incident, and that reiterate significant facts and pertinent analytical results leading to the incident's causes;
- Keep conclusions as short as possible and, to the extent possible, limit reference citations (if used) to one per conclusion; and
- Consider to whom the conclusions will be reported.

EXAMPLE: CONCLUSIONS

XYZ contractor failed to adequately implement a medical surveillance program, thereby allowing an individual with medical restrictions to work in violation of those restrictions. This was a contributing factor to the incident.

Welds did not fail during the steam line rupture.

Blood tests on the injured worker did not conclusively establish his blood alcohol content at the time of the incident.

The implementation of comprehensive response procedures prevented the fire from spreading to areas containing dispersible radioactive materials, averting a significant escalation in the consequences of the fire.

TIP
The process of determining conclusions seeks to answer the questions—what happened and why did it happen?

7.3 Preventative Actions

Preventative Actions are actions which, if adopted, should prevent or reduce the likelihood of the incident recurring. The actions may involve changing, replacing or adding to existing operational activities or controls which affect the risk of the incident under investigation.

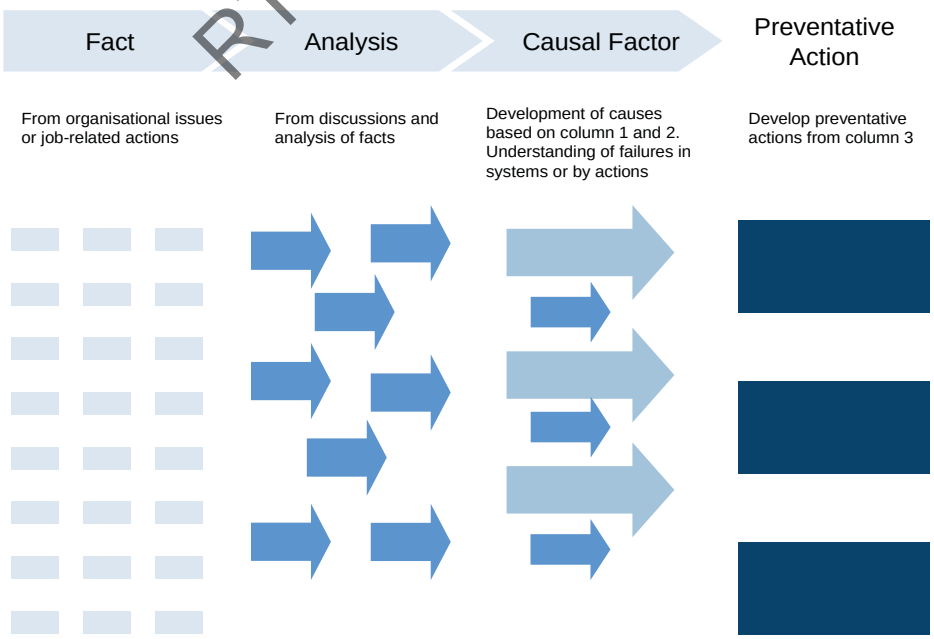
Preventative Actions should be linked to causal factors and logically flow from the conclusions. They should be:

- Stated in a clear, concise, and direct manner;
- Based on the facts/evidence; and
- Stated so that they can be the basis for preventative action plans.

An interactive process is the preferred approach for generating Preventative Actions. The investigation team shall reach consensus on the most appropriate preventative measures based on the information gathered in the investigation process. This process should be performed independent of line/site management involvement (with the exception of those site/line management team who are actually included in the Incident Investigation team).

The investigation team shall evaluate the effectiveness of previous controls when identifying preventative measures.

To develop the preventative actions the investigation team must identify and categorise all the factors that may have led to the incident occurring. The following chart provides a simple representation of how these are to be constructed. The preventative actions must be connected to the causal factors in the sense that they should address and either eliminate, reduce or mitigate these causal factors in future.



In determining which preventative actions to propose, it is important for the investigation team to evaluate the effectiveness of controls – i.e. how well controls reduce the risk of incidents.

Controls are any device, system, procedure or action which reduce risk if effective and which may increase risk if not effective. Controls are often categorised using the concept of the "hierarchy of controls", where controls that eliminate some or all of the risk are at the top of the hierarchy, and controls which mitigate the effects of the risk are at the bottom of the hierarchy. In most situations a blend of controls taken from across the hierarchy is needed. An example of a hierarchy of controls for reducing risk from vehicle incidents onsite is shown below.

Table 7.1 Example: Hierarchy of Controls for Vehicle Incident Risk

Hierarchy	Aim	Example Controls
Eliminate	The complete elimination of the hazard	Replace certain vehicles with conveyors
Substitute	Replacing the material or process with a less hazardous one	Speed controls
Engineer/ Redesign	Redesign the equipment or work processes	Road surface/curvature improvements; improved visibility
Separate	Isolating the hazard by guarding or enclosing it	Segregate vehicle types; improved vehicle despatching; separation of counterflow traffic
Administrate	Providing control such as training, procedures, etc	Traffic surveillance; driver training
Protect with Personal Protective Equipment	Use properly fitted PPE where other controls are not practical; impact minimisation equipment such as spill clean up material or dust suppression measures	Improved vehicle collision protection; enforcement of seatbelt use
Emergency response/mitigation of effect	NB This level of hierarchy is not currently represented in Anglo's HoC	Enhanced emergency response to vehicle incidents

Existing control measures must be evaluated as part of the incident investigation process, and potential new controls should be evaluated in the course of preparing a set of preventative actions. By evaluating the effectiveness of potential new controls it may be possible to identify opportunities to reduce risk by the introduction of highly effective new controls.

Effectiveness of controls may be characterised in a number of different ways. In order to be highly effective, a control must have sufficient levels of each of these characteristics to be effective in controlling the associated risk.

- Functionality – this is the capability of a control to reduce the risk, assuming it works as intended. For example, a fixed waterspray system designed to provide cooling of LPG bullets in the event of a fire may be able to protect the LPG bullets if the fire is in a nearby tank area but it may not be able to provide protection in the case of a fire impinging directly on the LPG bullets. A system for preventing counterflow traffic will reduce the risk of head-on collisions but it will not affect rear-end collisions or single vehicle incidents.

- Reliability/Availability – if a control is likely to be unable to work as intended when required, its effectiveness in reducing risk will be compromised. This may arise if the control could fail on demand due to unreliability, or it has poor availability because it may take ages to detect that it has failed, or that it is difficult to fix (poor maintainability), or is routinely overridden or even taken away (i.e. absent).

- Survivability/Interdependence – if the control is destroyed before it can be effective or it depends on another system to function and that system fails, the control effectiveness can be reduced. For example a firewall designed to protect a control room would be compromised in its effectiveness if it was damaged by an explosion before the fire.

An evaluation of control effectiveness should consider some or all of these characteristics in order to gain an appreciation of how effective a given control would be or has been in reducing the risk in question.

TIP
Preventative actions that create or improve controls that apply to root causes of incidents are generally the most effective in reducing the risk of repeat incidents.

7.4 Prioritisation

Following the identification of Preventative Action opportunities, an Impact and Potential Benefit Assessment shall be conducted to determine the appropriateness and priority of each individual action.

This is a three step process based on the following criteria:

- Subjective ranking of the potential benefit;
- Estimation of Implementation Effort– which shall include time, budgetary and cost implications;
- Determination of Justification of Implementation.

The incident investigation team should ensure that the most practical solutions are recommended as preventative actions and as the Site Management will have collaborated during the investigation process they fully understand the team's recommendations and the likelihood of these being implemented.

Through the investigation process, the preventative actions are determined from the organisational factors and from the absent or failed defences. The team, through a collaborative approach should develop actions to directly address the causal factors identified and then prioritise these through the benefit matrix detailed in Table 7.2. The evaluation of effectiveness (discussed above) should be used to help determine how much benefit each preventative action is likely to provide.

The purpose of these matrices (provided here) is to assist the investigation team in assigning priorities on the preventative actions and determining on a time and impact basis the priority in which they should be implemented.

The impact assessment matrix is used to determine the benefits of implementing a solution (taking into account cost and budget implications), versus the amount of time the solution will take to implement. The user should simply determine the amount of time likely to implement a solution and (qualitatively) assess the benefit this will produce in doing so.

As an example if the time taken to implement a solution is between 21-30 days but the benefit to be gained will be minimal, then the team should rank this accordingly.

For ease of reference the team may also choose to display the numbers of each preventative action in the appropriate square of the matrix to simplify the process for the reader of the report.

Table 7.2 Potential Benefit Matrix

Potential Benefit	Definition
Substantial	Benefits will be immediate and have direct bearing on safety performance and risk reduction. Implementation will have clear link to the prevention of fatalities and permanent disabilities. Could be safety critical, policy or legislative requirement.
Significant	Benefits will be closely related to safety performance and risk reduction. Implementation will have clear link to the reduction of lost time injuries. May be safety critical, policy or legislative requirement.
Moderate	Benefits will have some link to safety performance. Implementation is limited to the reduction of medical treatment injuries.
Minimal	Benefits will have limited impact on safety performance. System enhancers that do not have direct impact on effectiveness.
No Significant Benefit	Benefits have almost no impact on safety performance. May offer some benefit, but are generally non-essential.

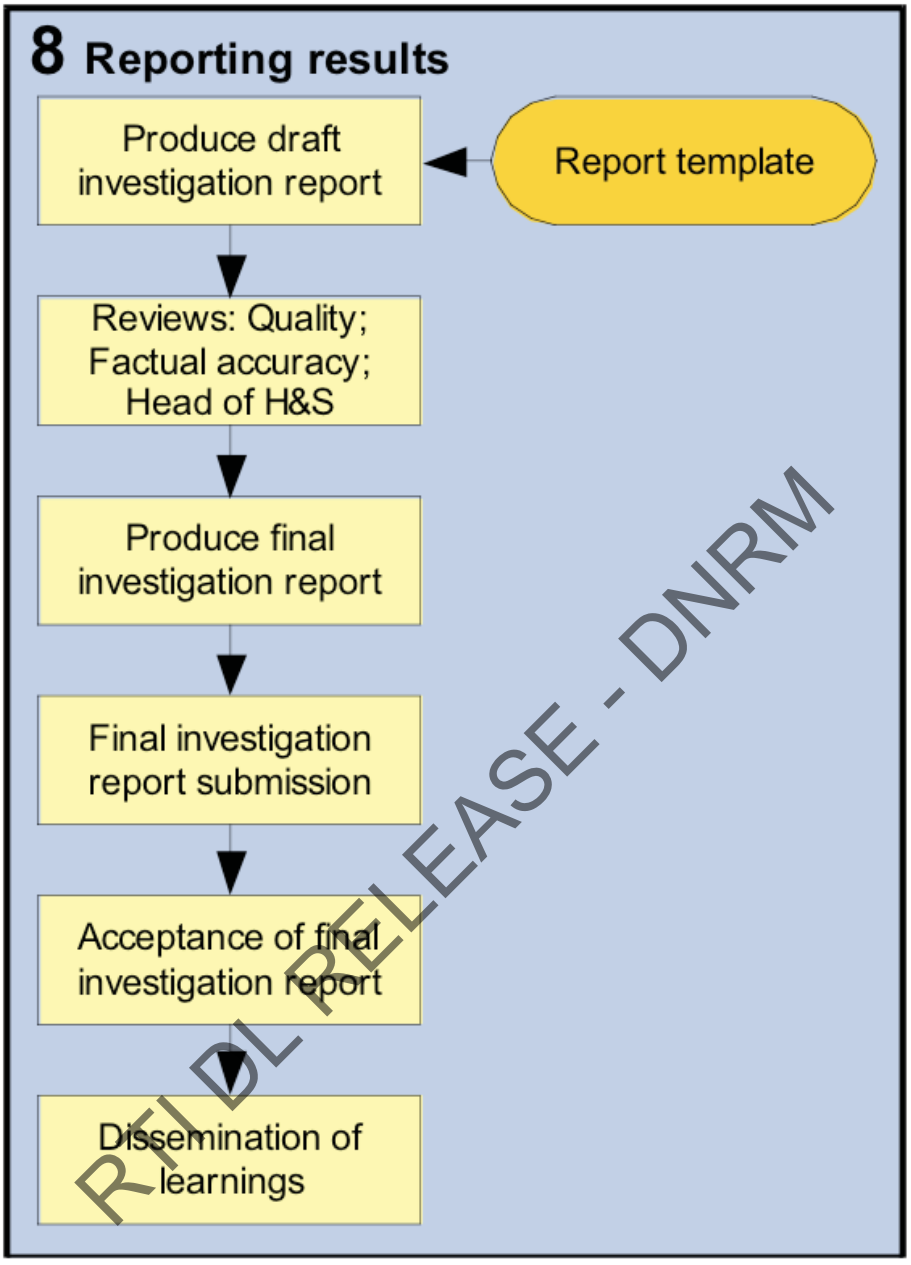
Table 7.3 Impact Assessment Matrix

Potential Benefit	Implementation Timeframe – Including Cost and Budget Considerations				
	> 30 days	21 – 30 days	11 – 20 days	5 – 10 days	< 5 days
Substantial					
Significant					
Moderate					
Minimal					
No Significant Benefit					

Table 7.4 Code

Impact Assessment	Definition	Priority
Substantial	Control measure justified	1
Significant	Control measure justified	2
Moderate	Control measure justified; other controls may prove beneficial	3
Minimal	Not justified, other controls must be considered	n/a
No Significant Benefit	Other controls must be used	n/a

Section 8



Section 8

Reporting Results

8.1 Objective

To ensure the investigation report is clearly and concisely written to convey the results of the investigation in a manner that will help the reader understand what happened (the incident description and chronology), why it happened (the causal factors), and what can be done to prevent a recurrence (the preventative actions). Investigation results shall be reported without attributing individual fault or proposing punitive measures. Before writing the report, the investigation team should be clear to whom the report is to be disclosed and whether it attracts legal privilege. In some jurisdictions, the report may only be protected by privilege if it is written by or for a lawyer.

8.2 Approach

The investigation report constitutes an accurate and objective record of the incident and provides complete and accurate details and explicit statements of:

- The team's investigation process;
- Facts pertaining to the incident, including relevant management systems involved;
- Analytical methods used and their results;
- Conclusions of the team, including the causal factors of the incident; and
- Preventative Actions and Corrective Actions to prevent recurrence of the incident.

When completed, this report is submitted to the appointing official for acceptance and dissemination.

The quality of the investigation will be judged primarily by the report, which will provide the affected site and Anglo American as a whole with the basis for developing the corrective actions necessary to prevent or minimise the severity of a recurrence, as well as sharing lessons learned. The Investigation Team Leader should plan for adequate time to write and review (or, where applicable, arrange for a lawyer to write and/or review) the report within the overall investigation schedule. Guidelines for writing a report can be found in the following sections.

TIP
Many previous teams have conducted thorough and competent accident investigations, yet failed to communicate the results effectively in the report. As a result, the causes, Preventative Actions, and lessons learned often appear unsupported or are lost in a mass of detail.

The report writing process is interactive, yet focused. Guidelines for drafting a report, provided in Table 8.1 below, will help the team work within the investigation cycle and schedule to maximise their efficiency and effectiveness in developing a useful report.

Table 8.1. Useful Strategies for Drafting the Investigation Report

Establish clear responsibilities for writing each section of the report.
Establish deadlines for writing, quality review, and production, working back from the scheduled final draft report due date.
Use an established format (as described in Section 8.2). Devise a consistent method for referencing titles, acronyms, appendices, and footnotes to avoid last-minute production problems.
Use a single point of contact, such as the administrative coordinator, to control all electronic versions of the report, including editing input, and to coordinate overall report production.
Start writing as soon as possible. Write the facts as bulleted statements as they are documented. Write the accident chronology as soon as possible to minimise the potential for forgetting the events and to save time when generating the first draft.
Begin developing illustrations and photograph captions early. These processes take more time than generally anticipated.
Allow time for regular editorial and team member review and input. Don't wait until the last few days on site for the team to review each other's writing and the entire draft report. This step is important for assuring that primary issues are addressed and the investigation remains focused and within scope.
Use a zip drive to save the report during text processing if the file is extremely large.
Use a technical writer or editor early in the process to edit the draft report for readability, grammar, content, logic, and flow.
Share information with other team members.
Plan for several revisions.

Management is placing increasingly greater emphasis on generating concise (nominally less than 50 pages), yet thorough investigation reports. This approach requires team members to communicate the significant facts, analyses, causal factors, conclusions, and Preventative Actions with as little extraneous narrative as possible. Inherent in this approach is the need for reports to provide helpful and useful information to line managers to assist them in enhancing their safety programs.

8.3 Preparing the Report

Form 13 (report template) provides guidance on the preferred report format for the investigation report. While an alternative format may be used, the report at a minimum shall consist of the elements listed in Table 8.2 below.

Table 8.2 The incident investigation report should include these items

- Disclaimer
- Appointing Official's Statement of Report Acceptance
- Table of Contents, including list of exhibits, figures, and tables
- Acronyms and Initialisms
- Glossary of Technical Terms (if necessary)
- Executive Summary
- Introduction & Scope of Investigation, Description of the Incident, Brief Description of Site, Facility, or Area where the Incident Occurred
- Facts and Analysis
- Conclusions and Preventative Actions
- Minority Report (if necessary)
- Team Signatures
- Team Members, Advisors, Consultants, and Staff
- Appendices

8.3.1 Disclaimer

The accident investigation report disclaimer should appear on the back of the title page of the report. The disclaimer is a statement that the report neither determines nor implies liability.

> This report is an independent product of the incident investigation team appointed by [Name of Appointing Official].
>
> The team was appointed to perform an investigation of this incident and to prepare an investigation report in accordance with Anglo American plc requirements.
>
> The discussion of facts, as determined by the team, and the views expressed in the report do not assume, and are not intended to establish, the existence of any duty at law on the part of [Name of Business Unit] their employees, agents or subcontractors at any tier or any other party.
>
> This report neither determines nor implies liability.

8.3.2 Statement of Acceptance

After reviewing the draft final report, the appointing official signs and dates a statement indicating that the investigation has been completed in accordance with procedures specified by the division and that the findings of the accident investigation team have been accepted. An example of this statement is provided below.

> On *[Date of Appointment],* I established an Incident Investigation Team with *[Name and Position of Investigation Team Leader]* as Investigation Team Leader , to investigate the incident at the *[Name of Affecting Mine]* on *[Date of Incident],* that resulted in the *[Description of Outcome]*.
>
> The team's responsibilities have been completed with respect to this investigation.
>
> The analysis, identification of direct, contributing and basic causes and the framing of the Recommendations reached during the investigation were performed in accordance with Anglo American plc guidelines.
>
> I accept the findings of the team and authorise the release of this report.
>
> Signed Dated
> …… ……..
> *[Head of Business Unit]*

8.3.3 Executive Summary

The purpose of the executive summary is to convey to the reader a reasonable understanding of the accident, its causes and the actions necessary to prevent recurrence. Typical executive summaries are two to five pages, depending on the complexity of the accident.

The executive summary should include a brief account of:

- Essential facts pertaining to the occurrence and major consequences (what happened).
- Conclusions that identify the causal factors (including organisational factors) that allowed the accident to happen (why it happened).
- Recommendations of Preventative Actions to prevent recurrence (what must be done to correct the problem and prevent it from recurring).

The executive summary should be written for the general reader who may be relatively unfamiliar with the subject matter. It should contain only information discussed in the report, but should not include the facts and analyses in their entirety.

8.3.4 Table of Contents

- Disclaimer
- Statement of acceptance
- Executive summary
- Table of contents
- Acronyms and initialisms
- Prologue – Interpretation of significance
- Introduction
- Facts
- Analysis
- Direct cause analysis
- Change analysis
- ICAM chart
- Recommendations
- Impact and potential benefit assessment
- Potential benefit matrix
- Impact assessment matrix
- Recommendation priority
- Team affirmation
- Minority opinion
- List of appendices

8.3.5 Acronyms and Initialisms

Use of acronyms and initialisms* is common among divisional staff and contractors; however, to people outside of the division who may read the report, use of such terms without adequate definition can be frustrating and hinder understanding. This element of the report assists readers by identifying, in alphabetical order, terms and acronyms used in the report. Acronyms and initialisms should be kept to a minimum (see example below). Proliferation of acronyms makes it difficult for managers and those unfamiliar with the site, facility, or area reading and comprehending the report. Acronyms or initialisms should not be used for organisational elements in the field or position titles. If necessary, a glossary of technical terms should follow this section.

8.3.6 Prologue – Interpretation of Significance

The prologue is a one-page synopsis of the significance of the accident with respect to management concerns and the primary lessons learned from the accident The prologue should interpret the accident's significance as it relates to the affected site, other relevant sites, field offices and headquarters.

8.3.7 Introduction

This section of the report normally contains three major subsections:

- A brief background description of the accident and its results, and a statement regarding the authority to conduct the investigation.
- A facility description defining the area or site and the principal organizations involved, to help the reader understand the context of the accident and the information that follows.
- Descriptions of the scope of the investigation, its purpose, and the methodology employed in conducting the investigation.

8.3.8 Facts

This section of the report states the facts related to the accident. It focuses on the events connected to the accident and the factors that allowed those events to occur. This section should include:

- Accident description and chronology, including a description of the responses to the accident.
- Hazards, controls, and management systems pertinent to the accident.
- Photographs, position maps and diagrams, which may provide perspectives that written narrative cannot capture should be included.
- Witness statements.
- An Evidence Matrix that validates the evidence as fact, speculation, heresay or assumption based on cross-referencing and correlating the evidence from the various sources.

8.3.9 Analysis

Subsections on the facts surrounding the accident, and the analysis of those facts, should follow the accident description and chronology subsection. These sections must provide the full basis for stating the accident's causes.

In writing the Report, it is important to clearly distinguish facts from analysis.

Facts are objective statements that can be verified by physical evidence, by direct observation, through documentation, or from statements corroborated by at least one witness or interviewee other than the one making the statement. Analysis is a critical review and discussion of the implications of the facts, leading to a logical interpretation of those facts and supportable conclusions. The analysis should include a brief statement of the impact of the factual circumstances on the accident. Table 8-3 illustrates this distinction.

.

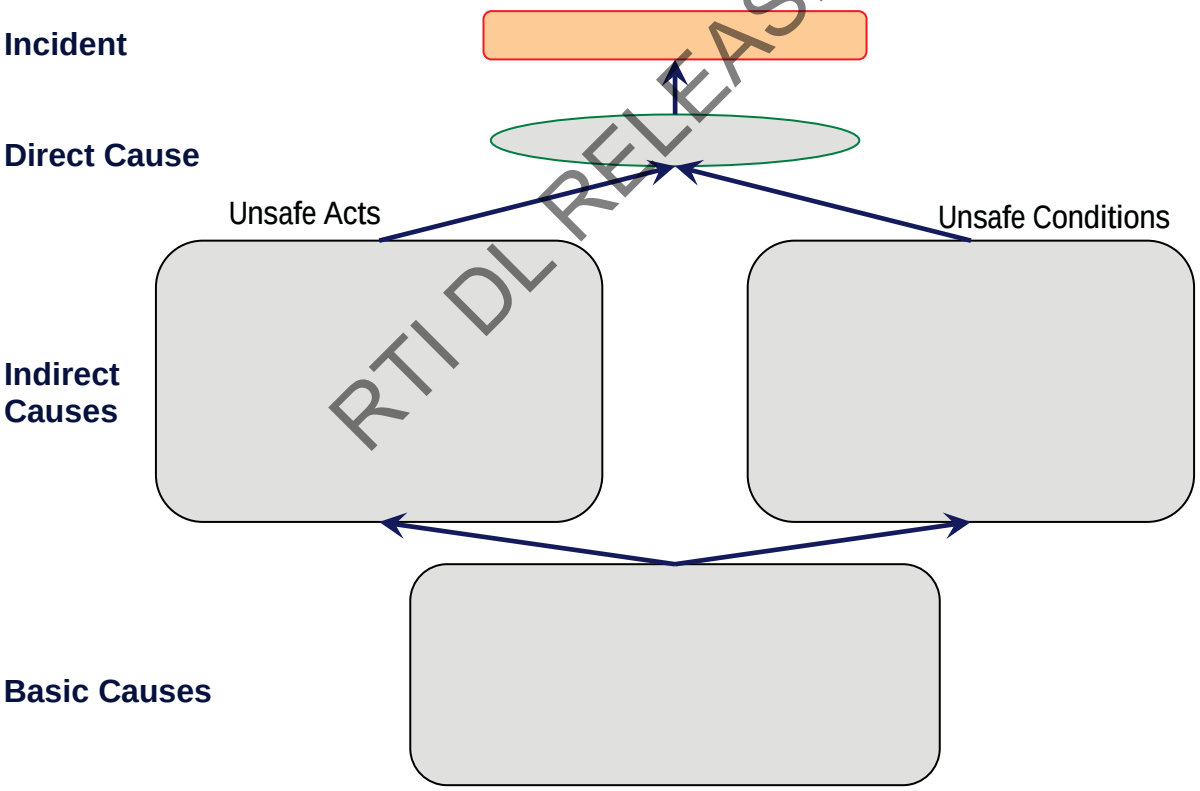
* An acronym is a term that is pronounceable formed from the initial letters or parts of a compound expression, such as FORTRAN (formula translation). Initialisms are an unpronounceable abbreviation pronounced as letters formed from the initial letters of a compound expression, such as EPA (Environmental Protection Agency).

Table 8.3 Facts versus Analysis

Facts	Analysis
At 8:30 a.m. the outside temperature was 36° F and the sky was clear.	Meteorological conditions at the time of the accident did not contribute to the accident.
In September 1885, the Environmental Group implemented its own alternate work authorisation process. This process did not include a job hazards analysis prior to construction activities.	The alternate work authorisation process was not adequate to assure worker safety.

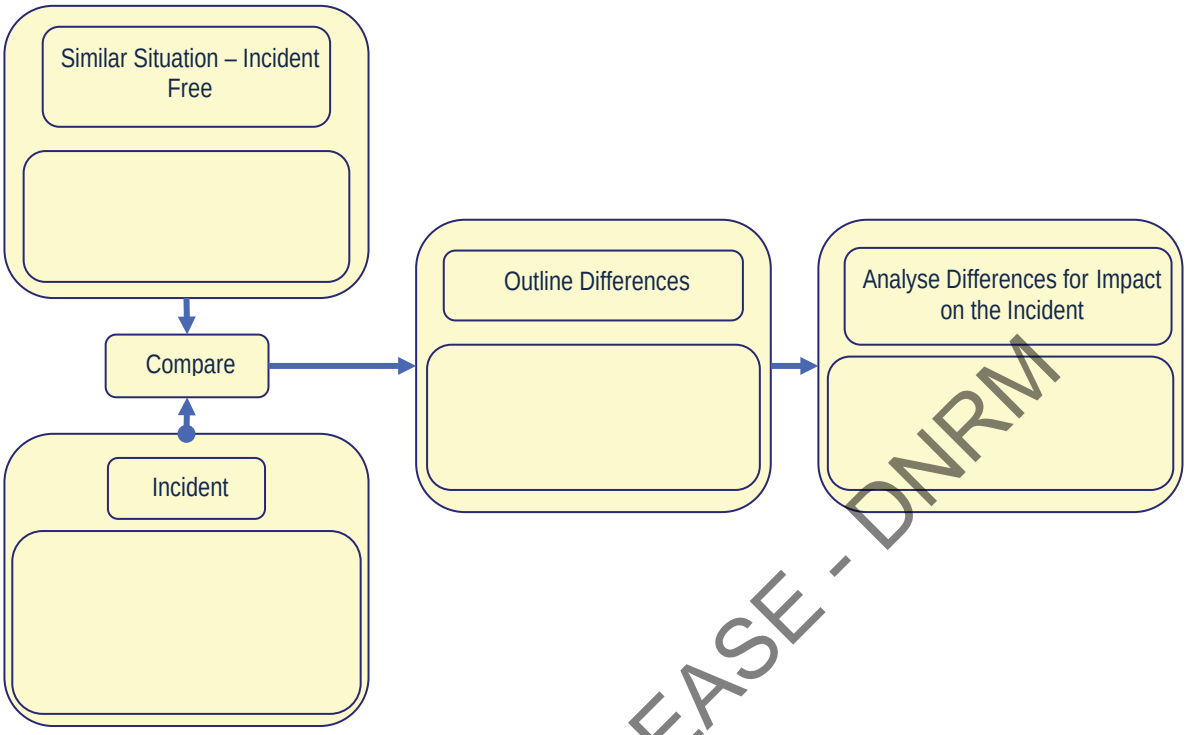
8.3.10 Direct Cause Analysis

Three types of causal factors are identified using analytic methods: direct cause, indirect causes and basic causes. A figure (a summary Incident and Causal Factor Chart) showing the logical flow of events and causal factors for the accident should be included in the report. Each causal factor is generally a brief, explicit statement that summarises the cause and any of its contributing factors. The causal factors that are identified in the report must be fully supported by the facts and analysis described in the report. If they are not, the team risks reaching erroneous conclusions and producing insufficient or unnecessary recommendations that will affect the report's credibility.



8.3.11 Change Analysis

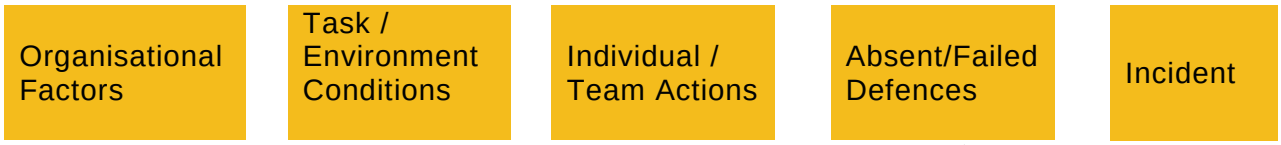
Change analysis is a simple, easy to use tool that can readily identify the circumstances, events or conditions that were different at the time of the incident from those is place that did not result in an incident. It is most useful in analysing routine common tasks.



8.3.12 ICAM Chart

Anglo American has determined that the use of the Incident Cause Analysis Method (ICAM) shall be its primary tool for the classification and reporting of Incident Causation.

Developed by Safety Wise Solutions and used here with their permission, ICAM provides an excellent methodology and world leading insight into causation analysis. The consistent and regular application of ICAM to incident investigation across the business units will provide a best practice solution for Anglo American to learn from its incidents, report consistently, share information in a common framework and prevent recurrence.



8.3.13 Recommendations

Following the conclusion of the investigation and the development of a ICAM Causation Chart, the Investigation Team must frame its recommendations on the basis of the S.M.A.R.T.E.R. framework. That is, they are to be:

- Specific;
- Measurable;
- Accountable;
- Reasonable;
- Timely;
- Effective; and
- Reviewed.

8.3.14 Impact and Potential Benefit Assessment

Following the drafting of the Recommendations, an impact and potential benefit assessment must be conducted to determine the priority for implementing these recommendations.

This is a three-step process based on the following criteria:

- Subjective ranking of the potential benefit
- Estimation of implementation time
- Determination of justification of implementation

Potential Benefit Matrix

Potential Benefit	Definition
Substantial	Benefits will be immediate and have direct bearing on safety performance and risk reduction. Implementation will have clear link to the prevention of fatalities and permanent disabilities. Could be safety critical, policy or legislative requirement.
Significant	Benefits will be closely related to safety performance and risk reduction. Implementation will have clear link to the reduction of lost time injuries. May be safety critical, policy or legislative requirement.
Moderate	Benefits will have some link to safety performance. Implementation is limited to the reduction of medical treatment injuries.
Minimal	Benefits will have limited impact on safety performance. System enhancers that do not have direct impact on effectiveness.
No significant benefit	Benefits have almost no impact on safety performance. May offer some benefit, but are generally non-essential.

Impact Assessment Matrix

Potential Benefit	Implementation Timeframe				
	> 30 days	21 – 30 days	11 – 20 days	5 – 10 days	< 5 days
Substantial					
Significant					
Moderate					
Minimal					
No significant benefit					

Write the recommendation number in the relevant cell.

Impact Assessment	Definition
Substantial	1 Control measure justified
High	2 Control measure justified
Moderate	3 Control measure justified, other controls may prove beneficial
Low	4 Not justified, other controls must be considered
No significant benefit	5 Other controls must be used

Recommendation No	Priority
1	Prioritise in accordance with Impact Assessment Matrix above
2	
…etc	

8.3.15 Team Affirmation

The Investigation Team Leader and team members must sign and date the report, even if there is a minority opinion. The signature page identifies the name and position of each team member and the Investigation Team Leader. It also indicates whether each team member is an Anglo incident investigator or not.

8.3.16 Minority Opinion

If used, this section contains the opinions of any team member(s) that differ from the majority of the team. The minority report should:

- Address only those sections of the overall report that warrant the dissenting opinion
- Follow the same format as the overall report, addressing only the points of variance
- Not be a complete rewrite of the overall report

8.3.17 List of Appendices

Appendices are added, as appropriate, to provide supporting information and would normally include:

1. Witness lists and classification;
2. Plan of area;
3. Witness statements;
4. Photographs; and
5. Level 1 notification.

8.3.18 Examples and Tips

EXAMPLE: PROLOGUE

INTERPRETATION OF SIGNIFICANCE

The fatality at the [Site] on [Date] resulted from deficiencies in [name BU], contractor, and subcontractor management systems and the unsafe act of the fatally injured worker.

While all the appropriate contractual and procedural requirements were in place, the subcontractor systems and procedures were not capable to achieve their full implementation, providing the space for violations of site Safety and Health requirements to occur. These deficiencies had been recognised by the prime contractor, who was instituting progressively stronger controls over the subcontractor.

The prime contractor's oversight was focused on selected aspects of the subcontractor's safety performance and did not identify the subcontractor's failure to implement its own procedures, or institute appropriate fall protection measures in this case.

Business Unit oversight focused on the subcontractor's performance and did not identify the gaps in the prime contractor's management focus. As a result, hazards were not identified and barriers were not in place to prevent the accident, which could have been avoided.

This fatality highlights the importance of a complete approach to safety that stresses individual and line management responsibility and accountability, implementation of requirements and procedures, and thorough and systematic oversight by contractor and line management. All levels of line management must be involved. Contractual requirements and procedures, implementation of these requirements, and line management oversight are all necessary to control the hazards that exist in the workplace. Particular attention must be paid to individual performance and changes in the workplace. Sound judgment, constant vigilance, and attention to detail are necessary to deal with hazards of immediate concern. When serious performance deficiencies are identified, there must be strong, aggressive action to mitigate the hazards and re-establish a safe working environment. Proactive actions up to and including swift removal of organisations and/ or managers that do not exhibit full commitment with safety, are appropriate and should be taken.

EXAMPLE: EXECUTIVE SUMMARY

A fatality was investigated in which a construction subcontractor fell from a temporary platform in the [Facility] at the [Site]. In conducting its investigation, the accident investigation team used various analysis techniques, including events and causal factors charting and analysis, barrier analysis, change analysis, and root cause analysis. The team inspected and videotaped the accident site, reviewed events surrounding the accident, conducted extensive interviews and document reviews, and performed analyses to determine the causal factors that contributed to the accident, including any management system deficiencies. Relevant management systems and factors that could have contributed to the accident were evaluated using with the components of Anglo's integrated safety management system, as described in Anglo's Safety Way.

ACCIDENT DESCRIPTION
The accident occurred at approximately [Time] on [Date] at the [Facility], when a construction worker, employed by [Subcontractor], fell from a temporary platform. The platform had been installed to catch falling tools and parts, but it was also used as a work platform for personnel activities when 100 percent fall protection was used. The worker was transported by helicopter to the medical center, where he died at [Time] from severe head and neck injuries.

DIRECT AND BASIC/ROOT CAUSES
The direct cause of the accident was the fall from an unprotected platform.
The indirect causes of the accident were: (1) the absence of signs and barricades in the vicinity of the platform, (2) visibility problems created by poor illumination in the area of the platform, and (3) lack of implementation of job safety analysis, work controls, and the medical surveillance program.

The basic/root causes of the accident were: (1) failure by [Subcontractor] to implement requirements and procedures that would have mitigated the hazards, (2) failure by [Subcontractor] to effectively implement components of the Anglo's integrated safety management policy, and (3) failure of the (prime contractor) and (site) management systems to enforce compliance with Anglo's integrated safety management policy mandating line management responsibility and accountability for safety performance .

CONCLUSIONS AND PREVENTATIVE ACTIONS
Conclusions of the team and Preventative Actions as to managerial controls and safety measures necessary to prevent or mitigate the probability of a recurrence are summarised in Table 1.

Table 1. Conclusions and Preventative Actions

Conclusions	Preventative Actions
Comprehensive safety requirements existed, were contractually invoked, and were appropriate for the nature of [Facility] construction work.	None
[Subcontractor] failed to follow procedures required by its contract and by its S&H Program Plan, including: [Subcontractor] failed to adequately implement fall protection requirements contained in its S&H Program Plan for the [Facility] project, including enforcement of a three-tiered approach to fall protection. The third tier (choice of last resort) requires anchor points, lanyards, shock absorbers, and full-body harness. The worker was not wearing any fall protection equipment and did not obtain a direct reading dosimeter before entering the radiological control area.	[Subcontractor] line management and safety personnel need to implement existing safety requirements and procedures.
[Subcontractor] and [Contractor] did not fully implement the hazard inspection requirements of the [Facility] contract and [Subcontractor's] S&H Program Plan, and therefore did not sufficiently identify or analyse hazards and institute protective measures necessary due to changing conditions.	[Subcontractor] and [Contractor] need to ensure that an adequate hazards analysis is performed prior to changes in work tasks that affect the safety and health of personnel.

Executive Summary should not include a laundry list of all the facts, conclusions, and Preventative Actions. Rather, to be effective, it should summarise the important facts; causal factors; conclusions; and Preventative Actions.

EXAMPLE: INTRODUCTION

1.1 BACKGROUND

On [Date], at approximately [Time], a construction subcontractor working at the [Site] fell approximately 17 feet from a temporary platform. The platform was built to catch falling tools and parts in the [Facility]. The worker was transported by helicopter to the medical center, where he died from severe head and neck injuries.

On [Date], [Appointing Official Name and Title] appointed an investigation team to investigate the accident, in accordance with [name division], Guidelines.

1.2 FACILITY DESCRIPTION

Contractor activities at [Site] are managed by the [name BU] Operations Office. The facility in which this accident occurred is under the direction of _____.

[Provide a brief discussion of site, facility, or area operations and descriptive background that sheds light on the environment or location where the accident occurred.]

1.3 SCOPE, CONDUCT, AND METHODOLOGY

The team commenced its investigation on [Date], completed the investigation on [Date], and submitted its findings to the divisional Head of Safety and Health on [Date].

The scope of the team's investigation was to review and analyse the circumstances to determine the accident's causes. During the investigation, the team inspected and videotaped the accident site, reviewed events surrounding the accident, conducted interviews and document reviews, and performed analyses to determine causes.

The purposes of this investigation were to determine the nature, extent, and causation of the accident and to assist in the improvement of policies and practices, with emphasis on safety management systems.

The team conducted its investigation, focusing on management systems at all levels, using the following methodology:

- Facts relevant to the accident were gathered.
- Relevant management systems and factors that could have contributed to the accident were evaluated in accordance with the components of [name division], integrated safety management system, as described in [name division], Policy.
- Events and causal factors charting and analysis, along with barrier analysis and change analysis, was used to provide supportive correlation and identification of the causes of the accident.

TIP

Site and facility diagrams and organisational charts for relevant management systems may be appropriate in either the Introduction or the Facts and Analysis section. However, include this information only when it is needed to clarify the accident's context and the role of related organisations.

EXAMPLE: DESCRIPTION AND ANALYSIS OF FACTS

FACTS AND ANALYSIS
PHYSICAL HAZARDS, CONTROLS, AND RELATED FACTORS
Physical barriers

Facts related to physical barriers on the day of the accident are as follows:

- There were no general barriers, warning lines, or signs to alert personnel on top of the construction materials to the fall hazards in the area. There were no other safety barriers for the platform.
- The platform was intended to catch falling tools or parts, but it was also used as a work platform for personnel with 100 percent fall protection.
- There were no static lines or designated (i.e., engineered) anchor points for personnel to connect fall protection equipment in the vicinity of the platform.
- Lighting in the area of the platform was measured at 2 foot-candles.

Following is the analysis of these facts.

Anglo Fatal Risk Standard xxxyyyzzz requires that, when working from an area greater than 2.5 metres in height or near unprotected edges or sides, personal protection in the form of a fall protection system be in place during all stages of active work. Violations of fall protection requirements usually constitute an imminent danger situation. Lighting in the area was less than the minimum of five foot-candles prescribed by the OSHA standards (28 CFR 1825.56). This level of illumination may have contributed to the accident, taking into consideration the visual adjustment when moving from a brighter area to a progressively darker area, as was the case in the area where the accident occurred. There were no permanently installed fall protection systems, barriers, or warnings; each subcontractor was expected to identify the fall hazards and provide its own fall protection system as they saw fit. The combination of these circumstances was a contributing cause of the accident.

Avoid lengthy narratives. It is more important to lay out the facts in a clear, concise manner that is understandable to the reader. Precede the bulleted facts with a statement identifying them as facts. Include only facts not conjecture, assumptions, analysis, or opinions.

EXAMPLE: DESCRIPTION AND RESULTS FROM ANALYSES

FACTS AND ANALYSIS
CHANGE ANALYSIS

Change analysis was performed to determine points where changes are needed to correct deficiencies in the safety management system and to pinpoint changes and differences that may have had an effect on the accident.

Changes directly contributing to the accident were failure to execute established procedures for fall protection, signs and barricades, and Job Safety Analysis/Construction Safe Work Permit; unsafe use of the temporary platform; insufficient lighting in the platform area; and un-enforced work restrictions for the construction worker. No job safety analysis was performed and/or Construction Safe Work Permit obtained for work on the platform, leading to a failure in the hazard analysis process and unidentified and uncorrected hazards in the workplace. Deficiencies in the management of the safety program within [Subcontractor] are also related to failures in the medical surveillance program.

Changes brought about by [Subcontractor] management failures resulted in a deficient worker safety program. Management failed to implement the contractual safety requirements necessary to prevent the accident and avoid deficiencies in the worker safety program.
[Contractor's] progressive approach to improving [Subcontractor's] compliance with safety requirements was successful to a degree, but failed to prevent recurrence of imminent danger situations.

8.4 Review

Before releasing the report outside the investigation team, the team shall review it to ensure its technical accuracy, thoroughness, and consistency, and to ensure that organisational concerns, safety management systems processes are properly analysed as possible causes of the incident. The following are further considerations for quality review of the report.

Structure and Format – The report should be reviewed to ensure that it follows the format and contains the information outlined in Section 8.3. Variation in the format is acceptable, as long as it does not affect the report's quality or conflict with the requirements of the order.

Technical and Policy Issues – All technical requirements applicable to the investigation should be reviewed by appropriate subject matter experts to assure their accuracy. Likewise, a knowledgeable team member or advisor should review whether policy, requirements, and procedures were followed. A team member or advisor knowledgeable in such policy and requirements should also review the report to determine whether these requirements were adequately considered.

Requirements Verification Analysis – Requirements verification analysis should be conducted on the draft report after all the analytical techniques are completed. This analysis ensures that all portions of the report are accurate and consistent, and verifies that the conclusions are consistent with the facts, analyses, and Preventative Actions. The requirements verification analysis determines whether the flow from facts to analysis to causal factors to Preventative Actions is logical. That is, the Preventative Actions are traced back to the supporting facts. The goal is to eliminate any material that is not based on facts.

TIP
One approach to requirements verification is to cut a copy of the draft report apart; compare the facts, analysis, causal factors, and Preventative Actions on a wall chart; and validate the continuity of facts through the analysis and causal factors to the Preventative Actions. This method also identifies any misplaced facts, insufficient analyses, and unsupported conclusions or Preventative Actions.

When the accident investigation report has been drafted in its final form, but before it is submitted to the appointing official for acceptance, the facts presented in the Facts and Analysis section of the report should be reviewed by affected [name Business Unit], and contractor line management to validate the factual accuracy of the report contents.

Generally, only the "facts" portion should be distributed for this review, in order to protect the integrity of the investigation and prevent a premature reaction to preliminary analyses. However, other portions of the report may be provided at the discretion of the Investigation Team Leader . The review is important for ensuring an accurate report and verifying that all affected parties agree on the facts surrounding the accident. This is consistent with the approach of identifying system deficiencies so that corrective actions can be taken, rather than fixing blame. It also supports and is consistent with the divisional management philosophy of openness in the oversight process.

Some teams have conducted this review in the team's dedicated conference room. This allows representatives of affected organisations to review the draft description of the facts and to ask follow-up questions of team members, while ensuring that dissemination of the draft document remains closely controlled.

Comments and revisions from Business Unit and contractor management are incorporated into the draft final report, as appropriate.

Finally, Anglo American requires reviews of all draft L4 and L5 reports by the respective Business Unit Head of S&SD and the internal legal team and external lawyer before they are finalised. Comments are provided to the appointing official for incorporation prior to report publication and distribution. Coordination of these reviews should be made with the site General Manager. Investigation Team Leader s should plan and schedule sufficient time for this review to maintain the appropriate investigation cycle.

8.5 Submitting the Report

Once the report has been finalised, the Investigation Team Leader provides the draft final report to the appointing official for acceptance. If the appointing official determines that the team has met its obligation to conduct a thorough investigation of the incident, that the report fully describes the incident and its causal factors, and that it provides Preventative Actions sufficient to prevent recurrence, the report is formally accepted. The statement of report acceptance from the appointing official is included in the final report.

In some cases there may be reason to release information to regulatory authorities. The determination as to whether this is necessary and if so, what information or documentation should be released, will be done in conjunction with the legal team.

Once the report has been finalised, the Investigation Team Leader provides the draft final report to the appointing official for acceptance. If the appointing official determines that the team has met its obligation to conduct a thorough investigation of the accident, that the report fully describes the accident and its causal factors, and that it provides Preventative Actions sufficient to prevent

recurrence, the report is formally accepted. The statement of report acceptance from the appointing official is included in the final report (see Section 8.2.2).

8.6 Close out of Actions

Site management shall create an action plan to address the recommendations identified in the report. Each action should be owned by a particular named individual with an identified deadline for implementation. This should be entered into local action tracking systems.

The electronic incident reporting system enables users to identify particular actions in the reports and assign them to certain key personnel to ensure they are implemented as required. The system will allow reports to be generated to ascertain those actions outstanding and an escalation process built in to alert the responsible personnel once a due date is approaching or has passed.

Actions shall be signed off by an appropriate senior person as determined through the incident investigation process and at the point of sign-off, the senior manager is acknowledging the robustness of the action and that implementation has been completed and as required.

8.7 Learning from Events

To prevent recurrences, learnings from incidents should be shared between relevant businesses and feedback sought to determine whether other areas have identified similar situations and have implemented alternate control measures (see Procedure for Sharing Learnings).

Contact your divisional S&SD departments for advice on how to share the learnings from the investigation or where you are interested in finding out how other divisions or countries have learnt from similar incidents.

Key points to remember

- Begin writing the report as soon as initial evidence is collected.
- Keep pace with writing as the investigation proceeds to avoid having to do all the writing during the third and fourth weeks.
- The primary portions of the report include:
  - Prologue – Interpretation of significance
  - Executive summary
  - Introduction
  - Facts and analysis
  - Conclusions and preventative actions
  - Minority report (if applicable)
  - Team signatures
  - Appendices.
- Provide a concise, yet clear discussion of the facts and analyses of the investigation.
- Clearly distinguish between facts and analysis.
- Ensure that the facts and analyses logically lead the reader to the conclusions and Preventative Actions determined by the team.
- Describe Preventative Actions so that they can be translated into corrective actions.
- Include appendices as needed, but do not bury important facts in appendices.

- Quality reviews of the report prior to finalization include processes for reviewing structure and format, technical and policy issues, and a requirements verification analysis.
- The factual accuracy of the report is reviewed by submitting it to affected site and contractor line management to validate the factual content. This ensures an accurate report and that all affected parties agree on the facts surrounding the accident. Comments and revisions are incorporated as appropriate.
- Requirements verification analysis is conducted on the draft report to ensure that all portions of the report are accurate and consistent. It also verifies that the conclusions are consistent with the facts, analyses, and Preventative Actions and that the flow from facts to analysis to causal factors to Preventative Actions is logical. Preventative Actions are traced back to the supporting facts. One method of doing this is to create a wall chart using the applicable portions of the report to depict the flow visually.
- Submit the draft report for review and comment to the Head of Safety & Health, before submitting it to the appointing official.

Glossary of Terms & Acronyms

Term	Definition
Activity,	Measurable action or operation to convert inputs into outputs in a certain timeframe. In the context of Incident Investigation is used to identify the physical activity being undertaken at the time of the incident.
Basic Cause (root cause)	Higher-order, fundamental causal factors relating to failures to properly implement integral management and leadership controls, which lead to the direct and contributing causes. Root causes address classes of deficiencies, rather than single problems or faults and hence correction of root causes prevents recurrence of both similar incidents and other incidents. Root causes address personal factors and/or job factors, systems failures and organisational factors.
Cause, Causal Factor	Events and conditions that produced or contributed to the occurrence or severity of the incident. Three types of cause: Direct, Contributing, Basic/Root.
Contributing causes	Events or conditions that increase the likelihood (or severity) of the incident.
Control, Barrier	Control or barrier is defined as “anything used to control, prevent or impede energy flows or the loss of control of a hazard”. Types of barriers include physical, equipment design, warning devices, procedures, work processes, knowledge and skills, and supervision.
Direct cause	Immediate events or conditions (usually one or two specific factors) causing the incident. These immediate events normally comprise sub-standard acts and/or sub-standard conditions including errors, mistakes and violations.
Emergency Response Team	Directed to deal with immediate resolution of emergency situation. May be singular or in combination with first aid/medical response, fire response or mine's rescue team.
First Response Team	Team providing first reaction to the incident. Also responsible for recording the incident scene as it exists after the incident.
Hazard	A source of potential harm to people, facilities, the environment or the community that, should it involve potential damage, will be an ‘energy’ such as electricity, pressure or a chemical.
High Potential Hazard	A Hazard which has the potential for an ISR 4 or 5 Safety consequence, can be a condition or behaviour e.g. unauthorised person entering a loaded blast pattern, Coal hang up in a rear dump when in the workshop with tray raised.
High Potential Incident (HPI)	An incident with a potential consequence level (ISR rating) of 4 or 5 on the Anglo 5X5 Risk Matrix.
Incident	Any event that could or does cause an undesired alteration in the operating process resulting in injuries to people, property damage, environmental, social or health effects or non compliance with applicable regulations. Significant unplanned deviations from standard operating procedures are also classed as an incident. Additionally, ongoing conditions that have the potential to result in adverse consequences are considered to be incidents.
Incident Management Team	Formed by Site Senior Executive. Responsible for identifying, coordinating and implementing strategy to resolve and emergency situation. Reports to the Incident Controller.
Investigation	Investigation is one of the core aspects of Anglo’s overall approach to Learning From Incidents, involving processes for reporting, investigating and learning from incidents to make sure that there are ‘no repeats’.
Near Hit (Near Miss)	An incident or occurrence or situation that has the potential for adverse consequences to people, the environment, property, and/or reputation.
Risk	A combination of the likelihood of an occurrence of a hazardous event or exposure and the severity of injury, illness and/or impact that may be caused by the event or exposure.
Severity	Outcomes of incident, in particular the extent and nature of injury, harm, environmental damage and property damage arising from the incident.
Task	Piece of work to be done, an activity or set of activities that might be defined as part of a process. In the context of Incident Investigation is used to identify the physical activity being undertaken at the time of the incident.
Unsafe Act or Condition	Significant deviations from standard operating procedures, work instructions, site safety rules etc. Ongoing conditions that have the potential to result in or contribute to incidents.
Witness	A witness is anyone who either directly observed or was affected by the incident, or who was directly or indirectly involved in the process, equipment, or system affected.

This document contains the forms and templates (numbered 1-16) required to support incident Investigation and its various processes. Please refer to the Incident Investigation Procedure Document to identify how and when each should be used.

Contents

1 – Incident Notification Logging Form

NOTIFICATION (To be completed by the end of shift when direct entry into Cintellate is not possible / permitted) * Mandatory fields			
*NOTIFICATION TYPE	INCIDENT ☐ NEAR MISS ☐		SSI #
*KEY PERSON INVOLVED		*REPORTED BY	
OTHER PERSON INVOLVED			
*REPORTED DATE		*REPORTED TIME	
*INCIDENT DATE		*INCIDENT TIME	
*PHYSICAL LOCATION			
SPECIFIC LOCATION			
*RESPONSIBLE DEPT			
*ACTIVITY			
*SUMMARY OF EVENT			
*WHAT IMMEDIATE ACTIONS WERE IMPLEMENTED AS A RESULT OF THE EVENT? (what was done to make the area safe & prevent recurrence?)			
*Responsible Supervisor:			
RESPONSIBLE SUPERVISOR			
RESPONSIBLE SUPERINTENDENT			

INCIDENT DETAILS (TO BE COMPLETED WITHIN 24 HOURS OF EVENT)			
IF CONTRACTOR INVOLVED			
Contract Holder		Contracting Company	
*DETAILED DESCRIPTION OF EVENT (what job was being done, what unplanned event occurred, what was the outcome etc)			
*SHIFT DURATION		*HOURS INTO SHIFT	
*OVERTIME TYPE		*CREW	
*DUTY STATUS			
*DAYS WORKED PRIOR		D&A TEST	YES ☐ NO ☐
*EQUIPMENT INVOLVED			
***PRIMARY INCIDENT TYPE**			
Environmental Harm ☐ Equipment Damage ☐ Injury/Illness ☐ Business Loss ☐ Security ☐ Occ Hygiene ☐			
***SECONDARY INCIDENT TYPE**			
Environmental Harm ☐ Equipment Damage ☐ Injury/Illness ☐ Business Loss ☐ Security ☐ Occ Hygiene ☐			
PRELIMINARY SEVERITY RATINGS (REFER TO MATRIX IN GUIDELINE FOR INVESTIGATIONS)			
*ACTUAL	People ☐ Environ ☐ Assets/Business Loss ☐ Legal & Regulatory ☐ Reputation/Social/Community ☐		
	CONSEQUENCE:	FREQ OF EXPOSURE:	SCORE:
*POTENTIAL	People ☐ Environ ☐ Assets/Business Loss ☐ Legal & Regulatory ☐ Reputation/Social/Community ☐		
	CONSEQUENCE:	FREQ OF EXPOSURE:	SCORE:
REPORTABLE INCIDENTS			
*Is the incident potentially reportable (High potential) to ACApl?			YES ☐ NO ☐
*Is the Incident Potentially Reportable to External bodies?			YES ☐ NO ☐
People to Notify			
BUSINESS LOSS			
*TYPE	Reputation ☐ Commercial ☐ Property ☐ Coal Quality ☐ Production Loss ☐ Major Hazard ☐		
*DESCRIPTION OF LOSS			
IMPACT ON OPERATION			
COSTS	No Costs ☐ Insignificant ☐ Minor ☐ Moderate ☐ Major ☐ Extensive ☐		
ENVIRONMENTAL DAMAGE			
WAS THIS A NEAR MISS ENVIRONMETNAL INCIDENT : YES ☐ NO ☐			
*ENVIRONMENTAL VALUE AFFECTED			
*HAZARD DETAILS			
VALUE/AMOUNT		AMOUNT RECOVERED	

DISTANCE/AREA AFFECTED		OFF LEASE EFFECTS?	YES □ NO □
COSTS ($)			
LOST PRODUCTION	FINES	CLEAN UP LABOUR	CLEAN UP MATERIALS
*ENVIRONMENTAL INCIDENT LEVEL	LEVEL 1 □ LEVEL 2 □ LEVEL 3 □ LEVEL 4 □ LEVEL 5 □		

EQUIPMENT DAMAGE			
*DAMAGE CLASSIFICATION			
*EQUIPMENT DESCRIPTION			
*EQUIPMENT CATEGORY			
EQUIPMENT ITEM		*CONTRACTOR EQUIPMENT	YES □ NO □
*DESCRIPTION OF DAMAGE			
COSTS	No Costs □ Insignificant □ Minor □ Moderate □ Major □ Extensive □		

INJURY/ILLNESS		
*INJURED PERSON		EMP □ CONTRACTOR □
*INJURY TYPE	RPO □ NWR □ JRI □ FAC □ MTC □ LTI □ OCIL □ FAT □	
*BODY LOCATION		LHS □ RHS □
*INJURY NATURE (Eg sprain, cut, fracture)		
*TREATMENT		
F/A OFFICER		

OCCUPATIONAL HYGIENE					
*EXPOSURE DATE		*NUMBER OF SAMPLES TAKEN IN SESSION			
*EXPOSURE TYPE	Diesel Particulates - DPM □ Noise □ Other Exposure Type □ Radiation - ionising □ Respirable dust / Inhalable Dust □ Silica – Quartz Dust □ Spon Comp Gases □ UV □ Vibration □ Water Monitoring □ WBGT – Hot Humid Environment □ Whole Body Vibration □				
*SAMPLE TYPE	Area Monitoring Sample □ Equipment Monitoring Sample □ Other Sample Type □ Personal □ Dosimetry □				
*MONITORING TYPE	Monitoring to Investigate Concern □ Other Monitoring Type □ Routine Monitoring Program □				
*PERSON MONITORED		*RESULT			
SEG (If Available)		*OEL		*OEL REFERENCE	

SECURITY			
*TYPE	Contraband □ IT □ Procedural □ Terrorism □ Theft □ Trespass □ Unexplained Loss □ Vandalism □		
*DETAILS			
*COST	$	*POLICE NOTIFIED	YES □ NO □
POLICE REPORT DETAILS			

INVESTIGATION (TO BE COMPLETED BY SUPERVISOR)			
START DATE		END DATE	
*INVESTIGATION TEAM			
WITNESS(ES)	INTERVIEWED? YES □ NO □		
NAME(S)			
Note: Witness statements need to be recorded and attached to this report			
REFER TO GUIDE FOR INCIDENT INVESTIGATION TO COMPLETE THE FOLLOWING SECTIONS			
*MECHANISM PARENT		*MECHANISM	
*AGENCY PARENT		*AGENCY	
*FATAL RISK / NON FATAL RISK STANDARD	FRS □ Non FRS □	A*PPLICABLE STANDARDS	
*PRIMARY GENERAL FAILURE TYPE	Communication □ Design □ Defences □ Error-Enforcing Conditions □ Housekeeping □ Maintenance Management □ Hardware □ Procedures □ Incompatible Goals □ Training □ Organisation □ N/A □		
SECONDARY FAILURE TYPE			
*FINDINGS, ACTIONS TAKEN FROM INVESTIGATION *(Attach additional pages, sketches etc)*			

***GOLDEN RULES (ADHERED TO, BREACHED OR NOT INVOLVED)**			
*The Fundamentals		*Energy & Machinery Isolation	
*UG & Surface Mining		*Lifting & Mechanical Handling	
*Mobile Equip & LV		*Water Bodies & Liquid Storage	
*Confined Space		*Chemicals & Hazardous Substances	
*Working at Heights		*No Golden Rule Applied	

***SEVERITY RATINGS (REFER TO MATRIX IN GUIDELINE FOR INVESTIGATIONS)**			
*ACTUAL	People □ Environ □ Assets/Business Loss □ Legal & Regulatory □ Reputation/Social/Community □		
	CONSEQUENCE:	FREQ OF EXPOSURE:	SCORE:
*POTENTIAL	People □ Environ □ Assets/Business Loss □ Legal & Regulatory □ Reputation/Social/Community □		
	CONSEQUENCE:	FREQ OF EXPOSURE:	SCORE:

FREQUENCY OF EXPOSURE				
Definition: How often the task or activity & the general circumstances (that contributed to the incident) occur at the same time				
A: Daily or more	B: Weekly	C: Monthly to fortnightly	D: 1 – 4 times per year	E: Once per year
ROOT CAUSE ANALYSIS				

CORRECTIVE ACTION(S) (Attach individual sheet if more than 2 corrective actions)					
Hard or Soft Barrier	Action Category?		If Soft does it relate to Hard Barrier	Rating (1,2, 3)	
	Hard:1. Elimination □ 2. Substitution □ 3.Engineering Soft: 4. Administration □ 5. PPE □				
Assigned To Person:		Department:		Due Date:	

Hard or Soft Barrier	Action Category?		If Soft does it relate to Hard Barrier	Rating (1,2, 3)	
	Hard: 1. Elimination □ 2. Substitution □ 3. Engineering Soft: 4. Administration □ 5. PPE □				
Assigned To Person:		Department:		Due Date:	

Signature of supervisor completing investigation:	Name:

2 – Incident Investigation Preliminary Interview List

Interviewee/Title	Reason for Interview	Phone Number	Location/Shift/ Company Affiliation	Notes

3 – Incident Investigation Initial Witness Statement Form

Name:		Job Title:	
Telephone No.		Supervisor:	
Interviewer: Title/Position:		Date/Time:	
Work Location:			
Location of Incident:			
Incident Time and Date:			
Please describe fully everything that you saw and heard before, during and after the incident (use additional paper as needed):			
Please describe all that you know about the work and conditions leading up to the incident (use additional paper as needed):			
Note anything unusual you observed before or during the incident (sights, sounds, odours, etc.):			
Please also state what you were doing before (during and after) the incident?			

What conditions influenced the incident (weather, time of day, equipment malfunctions, etc.)?			
How could the incident have been prevented?			
Please list other possible witnesses:			
Additional comments/observations:			
Signature:		Date/Time:	

4 – Incident Investigation Interview Schedule Form

Date / Time of interview	Location of interview	Team member(s) interviewing	Individual to be interviewed	Title/Position of interviewee	Notes

5 – Incident Investigation Follow-up Witness Statement Form

Interviewee: Title/Position:		Interviewer: Title/Position:		Page__ of __	
Others present:				Date:	
				Time:	
Initial Questions:					
Follow-Up Questions:					
Observations of Interviewee:					
Notes:					
Evaluation:					

6 – Incident Investigation Physical Evidence Log Form

					Acknowledgements of Transfer	
Tag Number	Evidence Description	Original Location Reference	Storage Location	Inventoried & Tagged by: Name/Signature/ Date/Time	Released By: Name/Signature/ Date/Time	Received by: Name/Signature/ Date/Time

Attach copy of Incident Investigation Sketch of Physical Evidence Locations

7 – Incident Investigation Site Sketch

Team Member:		Date:	
Title:		Time:	

Attach copy of Incident Investigation Position Mapping Form

8 – Incident Investigation Site Map

Team Member:		Date:	
Title:		Time:	

Attach copy of Incident Investigation Position Mapping Form

9 – Incident Investigation Position Mapping Form

Team Member:		Date:	
Title:		Time:	

Code #	Object	Reference Point	Distance	Direction

Attach copy of Incident Investigation Site Map and Incident Investigation Site Sketch

10 – Incident Investigation Sketch of Physical Evidence Locations and Orientations

Team Member:		Date:	
Title:		Time:	

Attach copy of Incident Investigation Physical Evidence Log Form

11 – Incident Investigation Photographic Log Sheet

Photographer		Location	
Camera Type		Date	
Lighting Type		Time	
Film Roll No			

Photo No.	Scene/Subject	Date of Photo	Time of Photo	Lens f/R	Direction of Camera	Distance from Subject

12 – Incident Investigation Sketch of Photography Locations and Orientations

Team Member:		Date:	
Title:		Time:	

Attach copy of Incident Investigation Position Mapping Form

13 – Report Template

EXAMPLE: TABLE OF CONTENTS	
1.0 Overview 2.0 Timeline 3.0 Investigation Team 4.0 Root Cause Analysis Descriptors 5.0 Causal Analysis Chart 6.0 Key Findings / Conclusions 7.0 Key Learning's 8.0 Recommendations 9.0 Investigation Report Sign Off	
Appendix A. (as required) Appendix B.	

14 - Investigation File Note

Description of Incident:

Date	Activity

15 – PEEPO Chart(Who do we interview, what do we need to collect, what do we look at?)

PEOPLE	ENVIRONMENT	EQUIPMENT	PROCEDURES	ORGANISATIONAL

16 – Investigation Checklist

Date: **Time:** **hours**
Location:

No.	Action Required	Completed	N / A	Comments
1	Secure scene			
2	Immediate preventive actions			
3	Notifications (Internal & External)			
4	Complete internal report form/s			
5	Determine level of investigation			
6	Appoint investigation team			
7	Conduct scene inspection			
8	Conduct witness statements			
9	Collect data PEEPO			
10	Establish sequence of events, Event & condition chart and Timeline			
11	Determine basic causes / Causal Analysis			
12	Conclusions/recommendations/ Corrective actions			
13	Complete report			
14	Manager report review			
15	Assign responsibilities			
16	Distribute final report			
17	Follow – up / sign-off			

APPENDIX 1 Other Causal Factors Analysis and Classification Tools

1 Human Factors Analysis and Classification System-HFACS

(Drawn from FAA Civil Aeromedical Institute)

Human factors analysis identifies elements that influence task performance, focusing on operability, work environment, and management elements. Humans are often the weakest link in a system and can be the system component most likely to fail. Often machines are not optimally designed for operators, thereby increasing the risk of error. High-stress situations can cause personnel fatigue and increase the likelihood of error and failure. Therefore, methods that focus on human factors are useful when human error is determined to be a direct or contributing cause of an incident.

HFACS framework bridges the gap between theory and practice by providing investigators with a comprehensive, user-friendly tool for investigating and classifying the human cause of incidents.
The system is based upon Reason's (1990) Model of Latent and Active Failures (Shappell & Wiegmann, 1997) and encompasses all aspects of human error, including the conditions of operators and organisational failures.

HFACS has recently been employed by the U.S. Navy, Marine Corp, ARMY, Airforce and Coast Guard for use in aviation incident investigation and analysis.

Safety professionals are ideally suited to applying human error analysis in the field and HFACS can track those errors (the holes in the cheese) responsible for incidents. HFACS allows the tracking of the success or failure of specific intervention programmes designed to reduce specific types of human errors and subsequent incidents. In doing so, safety programmes can be adjusted or reinforced to meet changing needs.

Application of the HFACS framework for incident investigations and database analysis of past incidents provides for a systematic, data-driven investment into an effective No Repeat strategy.

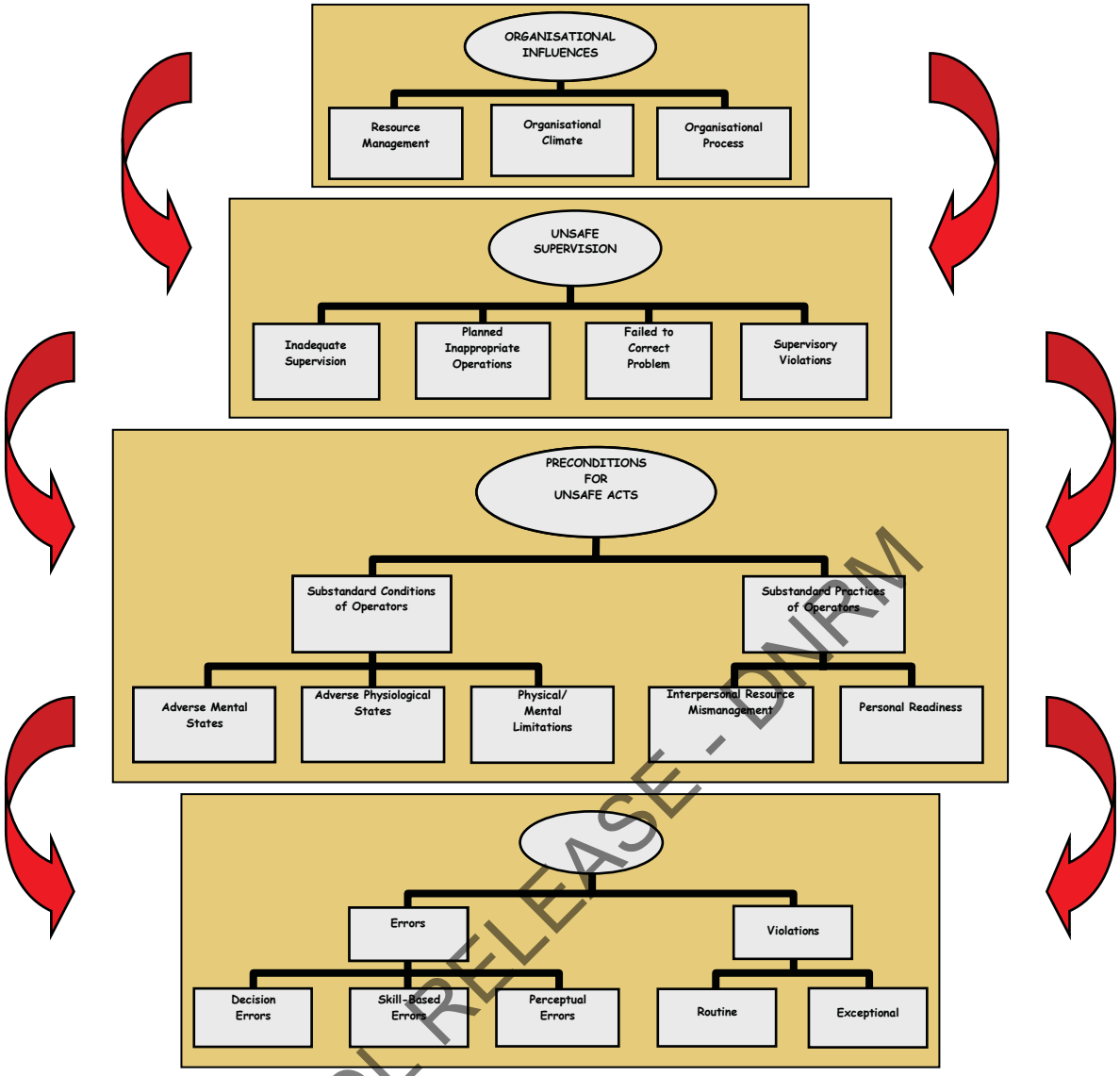
Unsafe Acts				
Errors			Violations	
Decision Errors	Skill-based Errors	Perceptual Errors	Routine	Exceptional
Rule-based decisions If X, then do Y Highly procedural Choice decisions Knowledge-based Ill-structured decisions Problem-solving	Attention failures Breakdown in visual scan Inadvertent operation of control Failure to see and avoid Memory failure Omitted item in checklist Omitted step in procedure	Misjudge distance Speed Disorientation Visual illusions	Violation of regulations or SOP Failed to conduct pre-start check Failed to investigate alarm Failed to comply with TRAP Failed to comply with SOP Failed to conduct JRA Failed to report incident Conducted operations against safety requirement Failed to stop unsafe operations	Violated Act / Regulations / SOP Performed task without required permit to work Accepted unnecessary risk Not current / qualified for task Failed to adhere to shift briefing Violation of Golden Rules

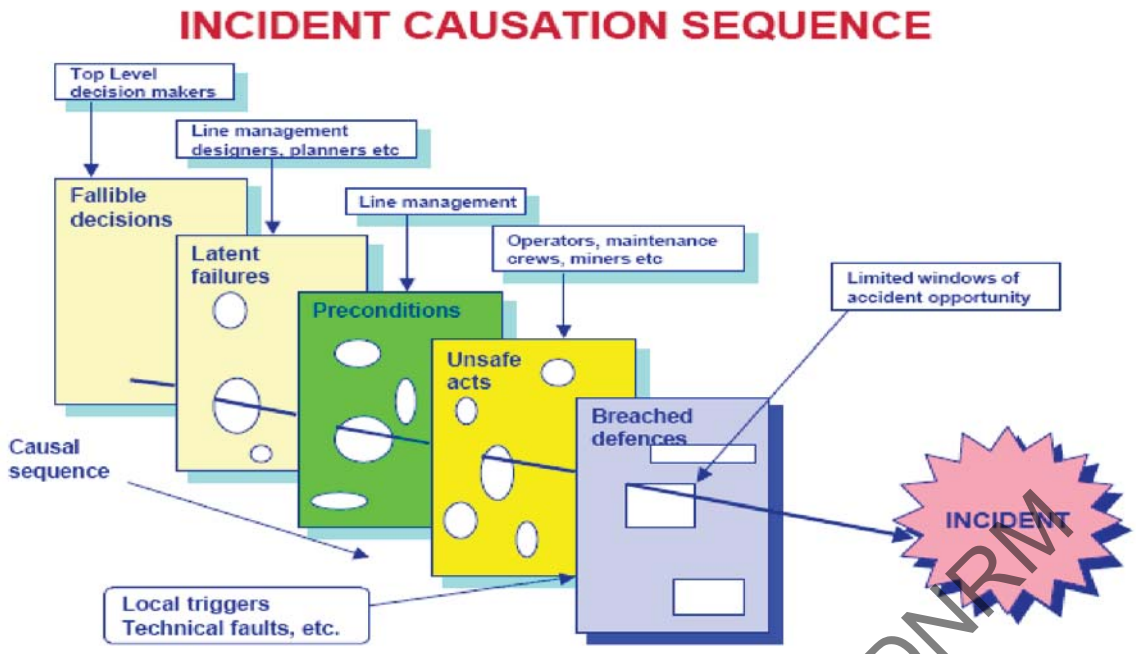
			Failed to use correct equipment Failed to use PPE Not current / Qualified for task Exceeded speed limit Violation of Golden Rules	

Pre-Conditions for Unsafe Acts				
Substandard Conditions of Operators			Substandard Practices of Operators	
Adverse Mental State	Adverse Physiological State	Physical / Mental Limitations	Resource Management	Personal Readiness
Failure to recognise changing circumstances Loss of awareness Circadian dysrhythmia Fatigue, alertness, drowsiness Overconfidence Complacency Task fixation	Heat stress / strain Dehydration Medical illness Intoxication	Poor visibility Limited reaction time Incompatible physical capabilities Incompatible aptitude	Not working as a team Poor crew coordination Improper shift briefing Inadequate shift hand-over Personality conflicts	Readiness Violations Rest requirements Self-medicating Poor judgement Poor dietary practices Overexertion while off shift

Unsafe Supervision			
Inadequate Supervision	Planned Inappropriate Operations	Failed to Correct Problem	Supervisory Violations
Failure to provide proper training Lack of professional guidance	Performed task without reviewing / conducting Risk Assessment Performed task using incorrect or faulty equipment Improper work tempo (job & knock) Poor team pairing	Failure to correct inappropriate behavior Failure to correct a safety hazard Failure to report a safety hazard	Not adhering to rules and regulations Wilful disregard for authority by supervisors

Organisational Influences		
Resource Management	Organisational Climate	Operational Process
Human Monetary Equipment / machinery / facility	Structure Policies Culture	Operations Procedures Management





An explanation of these levels of failure is presented below:

Fallible Decisions
In the first instance latent failures are set in train by the fallible decisions of people or groups at the top levels of the organisation and/ or in the design and early development stages of a project. Hence, these are difficult to address once a mine or facility is in operation.

Latent Failures or General Failure Types
A range of latent deficiencies in the organisation (many of which have been in existence for years), establish the conditions for subsequent failures which occur immediately before an incident occurs.

These organisational deficiencies have been categorised into twelve groups called General Failure Types (GFTs). The nature of these GFTs is explained in the section – General Failure Types that appears below.

Preconditions
A precondition or series of preconditions is allowed to exist or occur as a result of one or more GFTs. These preconditions encourage, allow or force people to behave unsafely and to commit unsafe or inappropriate acts.

Unsafe Acts
The unsafe acts of people cause the defensive barriers in place to be defeated or breached.

Defences
At the time of the incident, failures in all or several stages of the last line defences allow the incident event to occur and to cause (or potentially cause) an unplanned outcome – injury, damage or other mishap.

There are five progressively staged layers of effective 'last line defences' and these are applicable to certain time periods within the incident sequence. As a result, examination of these defences essentially results in dividing the incident sequence time zones which facilitates the in-depth analysis of the incident.

The Levels of Defences

In order to understand the time zones and sequence of events it is critical that an understanding of the term 'Incident Event' is gained. The Incident Event is the initial release of energy in the incident sequence, not the final outcome (consequences) of the incident. By way of example, let us consider the case of a person working on an overhead crane in a workshop. At some stage this person kicks a heavy object over the edge of the crane platform and this land on the head of someone walking underneath. The incident event in this case is the heavy object being kicked over the edge of the platform. The consequence or outcome is the (presumably) severe head injury sustained when the object struck the person below.

Five last line defences have been identified. These are:

Awareness Defences – these enable an understanding of the hazards of the task, job or activity at hand, so that appropriate actions can be taken to negate the potential for an incident. Typically the training and skills of the persons involved in the job; the availability of procedures and job instructions and the mechanism of identification and management of the hazards pertaining to the job or activity are examined under this defence. The time zone involved in this defence is some appreciable time before the incident event.

Detection/Warning Defences – these enable persons on the job to detect that something is amiss, that there has been a departure from the normal process or activity and a problem could arise. Examples include warning alarms and gauges, visual indicators of potential trouble such as observing unexpected physical reactions or responses, feeling or smelling unusual temperatures or odours. The time zone in this defence is closer to the incident event.

Control & Interim Recovery Defences – these defences enable people to correct a situation once it has commenced to go out of control. High level system trips, experience and training in recovery situations, emergency braking and steering systems of heavy equipment. The time zone under review in this instance is immediately before the incident event.

Incident Event Occurs

Protection & Containment Defences – this defence deals with the time zone immediately after the incident event has occurred and considers those things that could have minimised the consequences of the incident event. Examples include personal protective equipment, electrical protective devices, ROPS canopies, escape chambers.

Escape & Rescue Defences – escape and rescue defences deal with all of the 'escape and rescue' activities subsequent to the incident and therefore consider the means by which the consequences are minimised or otherwise. Emergency procedures and response, integrity of fire systems and rehabilitation programmes are examples.

APPENDIX 2 Data Collection – additional tips

Data collected into the above five main categories should be broadly derived from the following sources:

1. **Site Inspection:** This should look at the nature of the task being conducted and the local environmental conditions. The physical environment, and especially sudden changes to that environment, are factors that need to be identified. The situation at the time of the incident is important, not what the "usual" conditions were. It is therefore important to visit the incident scene at approximately the same time of day as the incident occurred.
2. **Photography:** Both close up and contextual photographs should be taken for reference later in the investigation process.
3. **Physical evidence collection:** Where physical evidence will support investigation ensure this is collected via methods to maintain the integrity of the sample for analysis.
4. **Witness interviews:** Try to identify all the people who might have information about the incident and conduct interviews with them as soon as possible. Interview people individually and away from distractions. If possible, interview them at the scene of the incident to confirm “at the scene” information.
5. **Document collection:** Examine the work procedures and the scheduling of the work to ascertain whether they contributed to the incident. Examine the availability, suitability, use and supervisory requirements of standard operating procedures or work instructions. Ensure the actual work procedure being used at the time of the incident is explored.
6. **Records collection:** Records such as training records, qualifications, time in position, hours worked etc. should be gathered.
7. **Organisational information:** This may include factors such as shift rosters, risk and change management systems etc.

The investigation process involves continual review and verification of evidence as required. For example interviewing additional witnesses may result in changes to the data collected that may require further consideration.

For the incident investigation to be successful in identifying all of the contributing factors and underlying causes, it will be necessary to establish:

• Events leading up to the incident
• Facts of the incident itself, and
• Relevant facts of what occurred immediately after the incident

Refer to the Data Collection Checklist, Incident Investigation Photograph Log Form, and Witness Interview Form for further guidance.

Further guidance on Photography Techniques

Consider the angles at which the photographs should be taken and whether reference items (e.g. rulers and coins) are required to give the picture size perspective. All photographs used in the

report shall be numbered and captioned. Captions shall explain in detail what the picture is intended to show. Captions will include type of equipment, date of the incident, and location of the incident. The direction toward which the photograph was taken may be included; for example, NSEW. Photographs taken at the incident scene may include the following:

- An overall view of the incident site taken from a minimum of four directions.
- If movement of equipment was involved, record a view of the path of the equipment from point of initial and major impact to the place where it came to rest. Impact marks are vulnerable to rain and traffic; therefore, a photographic record of this type of evidence should be collected as soon as possible
- Aerial views of the incident scene (equipment and weather permitting)
- Photos of objects struck by the equipment
- Larger portions of the equipment damage
- Detailed photographs of suspected failed parts that contributed to the incident
- Photos of failed personal protective clothing and equipment and the agents suspected of causing the failure
- Photograph and measure any vehicle skid marks, ground scars, and so forth
- Any other photographs deemed of interest to the investigation team

Further Guidance on Interview Techniques

1. General Principles of Witness Interviewing

- **Timeliness:** Conduct interview as soon as possible after the incident. Delays in conducting interviews can affect the quality and quantity of information collected as memories deteriorate or are contaminated by outside influences i.e. media, other witnesses etc. Try to conduct all interviews before witnesses discuss the incident among themselves.
- **Preparation:** Preparation is essential to the success of the interview. Take the time to gather background information on the accident/incident prior to the interview. Give some considered thought to information that is required, how best to structure the interview, who will be involved and the background of witnesses.
- **Witness assessment:** Prioritise the order of witness interviews according to availability or relationship to occurrence. Consider their experience and expertise i.e. how familiar are they with the equipment or operation. Assess their motivation and credibility e.g. explore the possibility they may be protecting someone.
- **Location/setting:** Ensure witnesses are interviewed in a private setting with no distractions. It may be beneficial to interview witnesses at the incident site to allow the environmental context to aid recall. It's best to interview each witness individually with a team of two interviewers – one to lead the interview and one to provide support and take notes. This will allow verification of statements made in the interview, if required at a later date. Use diagrams to assist the witness to recall the details of the incident
- **Record of interview:** The record of the witness's testimony should accurately and

completely reflect all information obtained. Keep a set of notes as detailed as possible, preferably using a standard form. The record of the witness's testimony should be verified by the witness after the interview by having them read the document. This will ensure correct interpretation and accuracy. Legal, organisational and personal issues should be considered prior to the use of a tape/digital recorder.

- **Explanation of the interview process:** To avoid intimidation and enhance cooperation, introduce yourself and explain the aim of the interview prior to asking questions. Develop an early rapport with witnesses. Reassure the witness that the main purpose is to fact-find and promote Zero Harm, not apportion blame.
- **Active listening:** Be attentive and ensure your body language reflects your interest e.g. maintain eye contact, sit facing the witness, give feedback to indicate you are listening and understand what has been said. Avoid interrupting the witness.
- **Communication:** Use everyday language. Try to avoid technical terms, jargon and acronyms to avoid misunderstanding or confusion. Ask the witness to answer questions in as much detail as they can
- **Understanding and empathy:** Remain conscious of the witness' emotional state e.g. defensive, anxious, stressed, confused, angry or distressed. If the witness becomes emotional, offer a glass of water, a short break or reschedule the interview. If the witness would feel more comfortable with a friend or representative present, try to arrange this.
- **Ending the interview:** Always end the interview on a positive note and thank the witness for their time and cooperation. Ensure they have your contact details to pass on any information they may recall after the interview has finished.
- **Follow up:** After an interview, many witnesses spend time thinking about the event again, the information they related during an interview and quite frequently will recall additional details they did not remember during the interview. It is well worth the time and effort to call witnesses a few days after the initial interview to see if they have recalled any added information.

2. Questioning Techniques

The types of questions asked during an interview influence the amount and type of information received. Three basic types of questions used during investigative interviewing are:

- Open
- Closed (which includes multiple choice questions)
- Leading

During the interview other techniques such as the use of Active Listening and Paraphrasing can enhance the success of an interview. Each of the three main types of questions, when used appropriately, can provide the investigator with varying levels of information.

Each type of question has a different purpose and it is important to be aware of how and when they are best used in an interview.

The diagram below displays a Hierarchy of Witness Questioning Techniques showing how the interview should start out broadly and gradually narrow down to obtain specific detail. It should be noted that Closed Questions and Leading Questions have their place in an interview; however, they should only be used to clarify information already gained through open-ended questioning or other sources. Loaded questions that trigger an emotional reaction or response should be avoided.

Type, Explanation and Examples

Free recall / narrative

A broad invitation to the witness to mentally recreate the incident and say whatever they want. In order to gain an overall idea of what the witness can recall, this is the best way to start the interview.

"Could you tell me in your own words what you can remember about the incident?"

Open ended questions

Allow for an unlimited and general response from the witness in his/her own words. Such questions tend to result in unrestricted, broad ranging responses.

"What happened after the traffic lights changed?" What can you tell me about the other vehicle?"

Active listening

Active listening involves not just listening, but attending, understanding and remembering. Active listening includes both verbal and non-verbal indications which encourage the witness to continue talking.

- Eye contact
- Leaning forward
- Nodding head
- Not interrupting
- Display interest in facial expression
- Verbal feedback (e.g. "I see", "Okay" etc)

Paraphrasing

This is a technique where the Interviewer considers what has been stated by the witness and restates it in his / her own words. This is an extremely useful technique as a great deal of detail can be offered by a witness and the Interviewer must ensure their understanding is correct.

"So what you're saying is that the red car turned into the intersection from your left and did not appear to reduce speed prior to the incident? Is that right?"

"Let me make sure I have this right – the blue car appeared to be on fire before the impact?"

Closed questions (includes multiple choice questions)

These are questions that are designed to limit the responses available to the interviewee. These questions are best for following up on a response to an open question and can usually be answered with a single word or short answer. They are used when limited or specific / more precise information is required.

“You say you did explain the Permit to Work?”

“Who else was with you at the time you saw the incident?”

“Was colour was the car that was at the front of the queue?”

Leading questions

Leading questions tend to lead the witness (intentionally or not) to respond with certain answers that appear desirable or acceptable to the interviewer. They anticipate the answer that may be provided and usually ask the witness to agree with a position or information already held. They should be used with caution as they can distort the interviewee's perception or memory, however, are useful to test the witnesses reaction to information.

For Example, **Avoid:**

“To me, the only way the vehicle could have left the road was if it was speeding. Do you agree?”

“Don’t you agree that the procedures were inadequate for the operation?”

Loaded questions

These are questions which use loaded words which may result in an emotional reaction or response. Neutral questions and words should always be used.

Incorrect:

“So how careless do you think the other driver was?”

“Was the light vehicle racing down the ramp?”

Correct:

“Tell me about the procedures for driving on the ramp.”

“What did you notice about the light vehicle travelling down the ramp?”

• When interviewing, concentrate on gathering factual evidence and avoid opinion evidence where possible. Where a witness opinion is recorded, make clear that it is an opinion:

Incorrect:

“He saw the light vehicle racing down the ramp.”

Correct:

“Witness A saw the light vehicle moving down the ramp. He believed that it was going faster than it should have been.”

3. Examples of questions in a typical interview

Start by asking the witness to explain what happened in chronological order in their own words.

• If they get "stuck", ask them questions about what happened, using non-leading questions of the 'who',' what', 'when', 'where', 'why' variety. Start with general questions and move toward the specific.

• Ask them to explain:

o What they were doing there

o What they were doing right before the incident

o What did they do to try and prevent the incident

o If they had received training on the job they were doing

o Who trained them

o When the training took place

o What their understanding of the risks associated with the job were

o Whether they assessed the risks for this particular job, and whether it was documented

o What procedures are in place to reduce or eliminate risks of this job

o What controls there are for this job

o Whether they employed the controls for this job

o Whether there were any unusual factors present (urgency, fatigue etc)

o Whether they had ever been told not to follow the established procedures

o Whether they had ever been told not to wear the prescribed PPE for the job

o Whether they knew of any previous incidents or near misses involving this task or similar tasks

o How experienced they are at the task

o Whether the task had been performed without any negative impact (HSEC) in the past

o Whether they felt the task could have been performed without any negative impact (HSEC) by them

o Whether there were any factors affecting their ability to do the task (ask about fatigue, stresses, home affairs, medical issues, directions form supervisors etc)

o Their understanding of Zero Harm

o Whether they understand their right to refuse to perform work they deem unsafe or to stop other people from working unsafe

Appendix 3 Data Organisation

1. Timeline Chart

1.1 Introduction

A Timeline Chart is a concise and accurate description of an incident. The timeline describes an event sequence, which may go back into history many years.

The value of the timeline also should not be underestimated. A timeline must be completed for all investigations. Properly constructed it is the centrepiece of an effective investigation from which critical information is identified and corrective actions developed.

The complexity and size of the timeline will depend on the incident. A relatively straightforward timeline may take a few hours to compile, whereas some timelines can take more than a day.

1.2 Constructing a Timeline

The timeline is constructed by detailing each event on a system or file card and placing these on a wall in order of the event sequence. The Terms of Reference determine the boundary of the timeline. Each event card should have an associated date and time.

Step 1 Identify the main event/incident. This should be a single line statement usually describing the point in time when the incident occurred. The incident card would not normally have associated conditions.

Step 2 Progressing backward in time identify the pre-incident sequence of events from the information collected through interviews and document reviews. Branches can be constructed where a parallel event sequence occurred. The branches should join the main time sequence at the appropriate point.

Step 3 Progress forward in time from the event and identify the post event sequence.

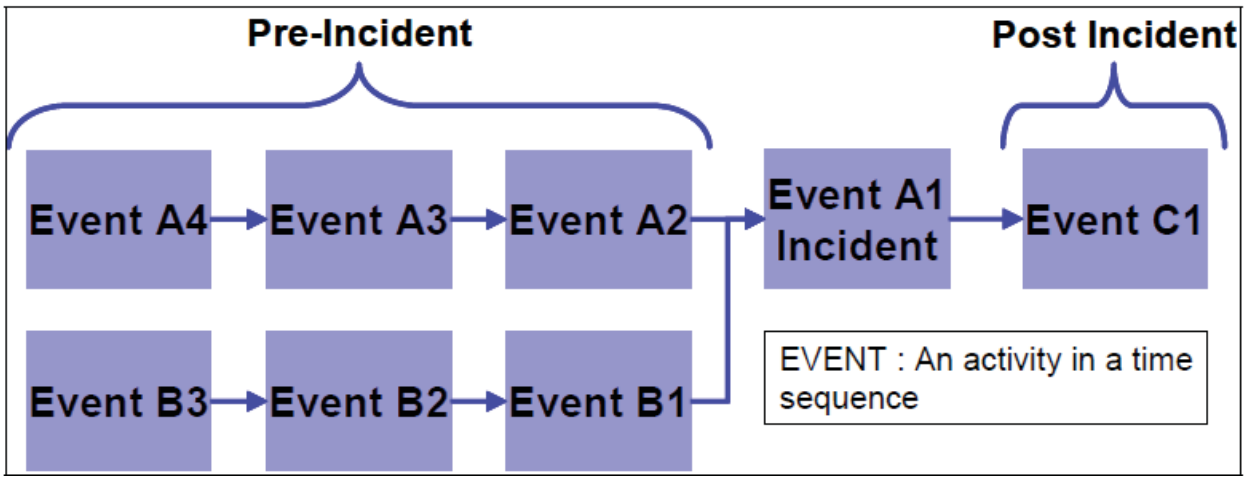
Step 4 Once the Investigation Team has agreed upon the Timeline Chart those personnel directly involved with the incident, including contractors and temporary staff, should be consulted to verify that the Timeline Chart is correct. This step is extremely important to ensure the team's findings are accurate and credible.

Example Timeline Chart

This example details a hypothetical incident to demonstrate how a Timeline Chart is constructed.

As the purpose of the example is to demonstrate the process for constructing a Timeline Chart, the amount of available data has been deliberately and artificially limited.

Pre-Incident Post Incident Event



2. The 5 Whys Process

The 5 Whys methodology uses a structured discussion to identify contributing factors and underlying causes.

Key events or conditions from the Timeline Chart are examined and the 5 Whys methodology applied. Base the process on factual information and ask the question of what is causing this event or condition to contribute to the incident.

Develop a 5 Whys diagram and label the final answer of each branch as 'Y' or 'N' where 'Y' indicates that the item is a Contributing Factor and 'N' indicates a non Contributing Factor.

Step 1 For each event identified pre-incident the 5 Whys process should be commenced by asking 'Why?". Continue to ask "Why?" from the preceding response until the question cannot be answered.

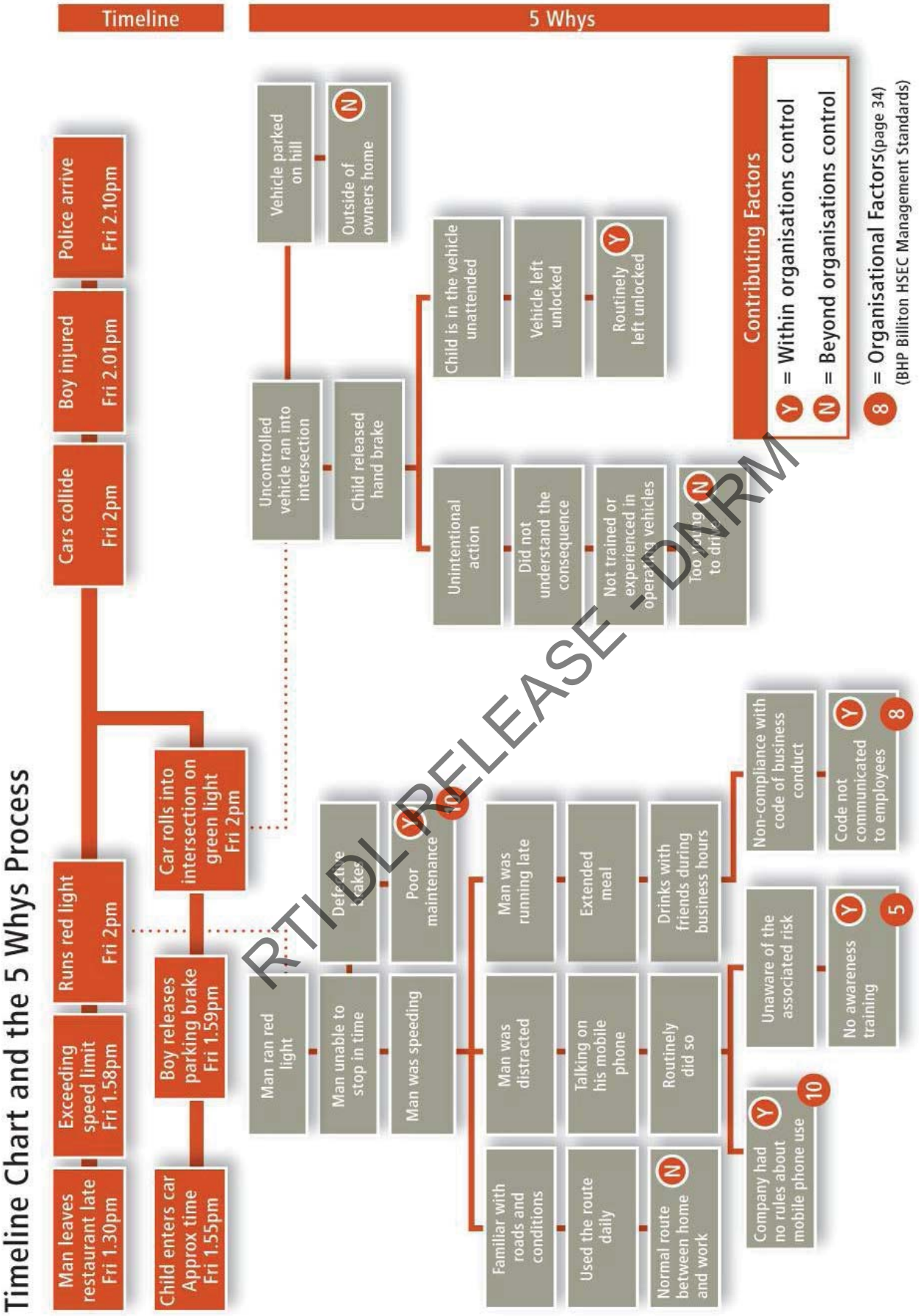
Step 2 Label the final answer of each branch as 'Y' or 'N' where 'Y' indicates that the item is a Contributing Factor and 'N' indicates a Non Contributing Factor.

Step 3 Ensure each card is discretely numbered so that the Timeline Chart and 5 Whys process can be reconstructed. An Excel spreadsheet can be used to record data..

Step 4 Any events or conditions that are assumed or that require further investigation should be clearly marked so this information can be acquired.

Sample Timeline Chart and the 5 Whys Process.

The below figure is illustrative only of the Timeline Chart and the 5 Whys process and is not an exhaustive analysis of the theoretical incident.



Appendix 4 ANGLO CAUSAL ANALYSIS
Noumea Electrocution Case Study

A truck operated by contracting company Roadhaul, left the depot, at 0700 on 23 March 2001, to deliver a number of parcels of steel building materials. The first drop was a load of steel purlins for a domestic (owner-builder) house refurbishment project in a village some 30 minutes by road from the depot. The incident took place in the driveway of the property, where the truck-mounted crane came close to overhead power lines, resulting in damage to the truck and the death of the operator. A telephone call advising the incident was received at the depot about 0815.

It is understood that electric current arced across an air gap, from overhead distribution wires (33,000V), to the jib-head of the truck-mounted crane. The crane-arm was found later to be oriented vertically, with its end estimated to have been some 15cm from the wires. Power was lost to the area.

The truck drive axle was cleanly sheared right through, and one rear tyre exploded at the time of the incident. Marks on the ground included carbon-black at each tyre location, and a patch of oil at the RH Rear wheel location (said to be from the oil-filled driveshaft which sheared). The crane was operable, but the truck was not driveable after the incident.

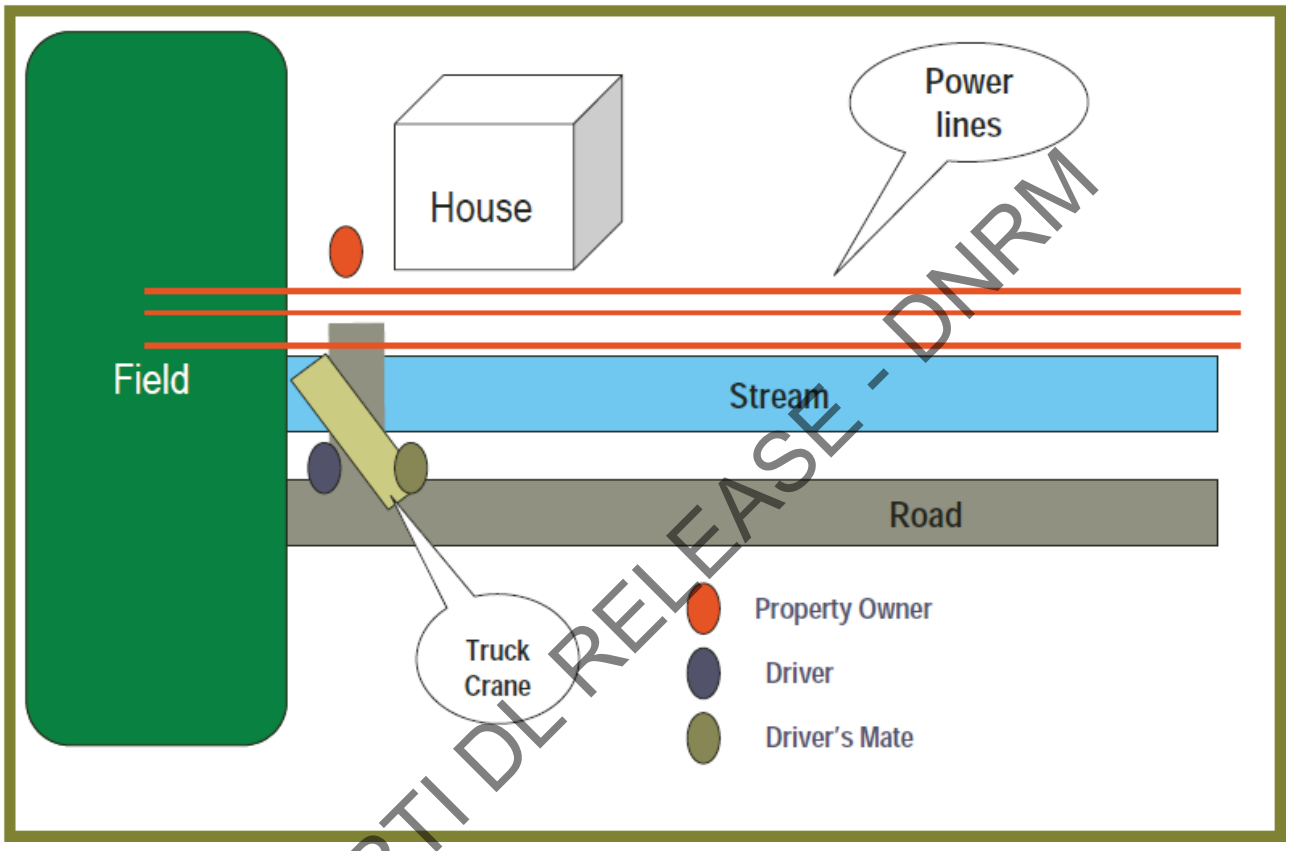
A visible patch of molten metal at the crane extremity supports the fact that electric current passed through the truck, and “blowholes” in the RHR tyre, where current destroyed the rubber as it passed to ground.

The picture below shows a truck mounted crane similar to the one involved in the incident.

Findings
The site

• The sketch shows the customer’s site to be the last house, on the RH side, in a dead-end street.

- The roadway finishes only a few metres past the property driveway, where thickly vegetated bush begins. Road surface is bitumen, and edges are grassed, with drainage ditches on both sides of the road.
- Property access driveways are by concrete culverts on which a grassed and gravel driveway extends to a steel-gated entrance.
- The front property boundary is lined with bushes, typically 2m, and up to 4m in height in places. There is no made curb-and-guttering at the roadway edge.



The truck

The truck is a typical tray-back, non -articulated delivery vehicle, left hand drive, with a hydraulic crane of the folding/telescoping type mounted directly to the rear of the cab between the cab and the tray.

The events

- The property owner was not at the delivery site when the truck arrived, so the delivery team called in by radio to the depot for instructions.
- The dispatcher called the owner, who advised the truck should wait until he arrived. When the owner arrived at the site, he requested the steel purlins be unloaded to a position close to his property. Normal practice, described by other operators, is landing goods by the side of the road.

- After stopping the truck at the entrance to the property, the driver and his assistant started preparing for the unloading operation, first securing the truck by actioning the stabilising jacks, and then unstrapping the goods. The assistant was on the truck platform, standing on timber "dunnage" preparing the goods for lifting. The driver was beside the truck (LHS) operating the crane controls.
- At some stage before the goods were unloaded, the assistant recalls hearing a warning shout from the owner, who had apparently noticed the crane approaching the overhead power lines.

The assistant jumped from the truck to the ground.

- Recollection of events is somewhat confused at this stage. The driver was found some metres from the crane operating position, lying on the ground.

Weather

The morning was overcast and dry, with the possibility of background glare from the driver's position considered unlikely.

Equipment

- The truck-crane operated through a range of cycles in the Roadhaul yard four days after the incident.
- A manufacturer's manual (nor any other operating manual) was not available, nor was its existence confirmed.
- There was no direct evidence of equipment defect, and this was confirmed by a function - repetition test.
- The condition of truck and crane equipment was apparently subject to strict regulation and inspection by Government Authority.

Procedures

- Roadhaul staff were knowledgeable about truck unloading procedures, but not in a documented form apart from high-level site procedures.
- Driver competency for operation of the truck was apparently subject to strict regulation and testing by Government Authority at time of issue of licence, with re-test after incident, and regular health/fitness testing.
- There was no evidence of competency-based training or re-assessment at a company level.

Training, experience and work-schedule

- The people involved as operators and supervisors had a sound understanding of the steel distribution operation and its risks, with visible commitment to health and safety precautions at the loading stage.
- Delivery schedules take into account hours of work.

Experience of operators was the main quality attribute, with induction at initial employment.

- There appeared no reason to suggest fatigue or other impairment was a factor in this incident.
- Time available for the work, and the rest of the day's schedule, was not unduly constrained.

Instructions and communication

- Delivery instructions appear limited to the location of the drop-off address.
- A toolbox meeting was described as normal for parts of the business locally, but reliance on the experience of the delivery personnel is the normal means of managing the hazards involved.

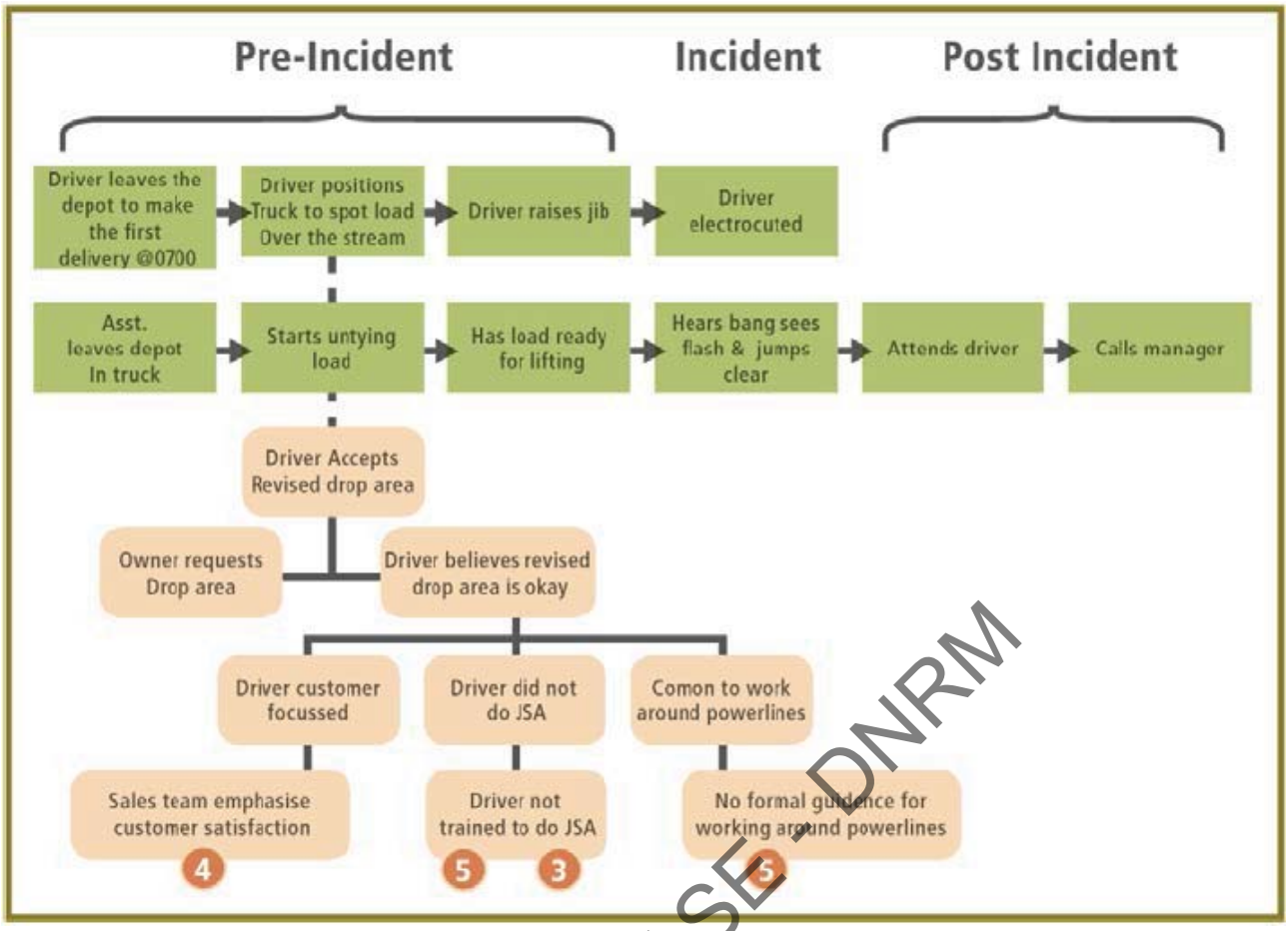
Records and Documentation

Evidence available was limited to the delivery docket and map showing the address.

Site and equipment

- Inspection of the truck showed local point-damage consistent with the passage of an electric current through the crane-arm and one tyre.
- The truck was undergoing repair of the rear axle assembly when inspected four days after the incident.
- The site showed clearly the truck location, as in the sketch, partially front-in to the property driveway and with the cab under the overhead power lines.
- The overhead powerlines are in two separate runs of cable - a lower single sheathed cable, apparently carrying local supply, 220 V. The upper run is in three wires on a spreader bar and carries 33,000 V.
- If the crane arm was close to these upper wires (said to be about 15 cm), then the crane must have been many metres higher that 220V wire, and horizontally separated by little more than half the width of the upper spread of cables.

From the data collected and the findings of the investigation, a Time Line as detailed below, can be produced outlining the sequence of events.



Conclusions of the Investigation Team

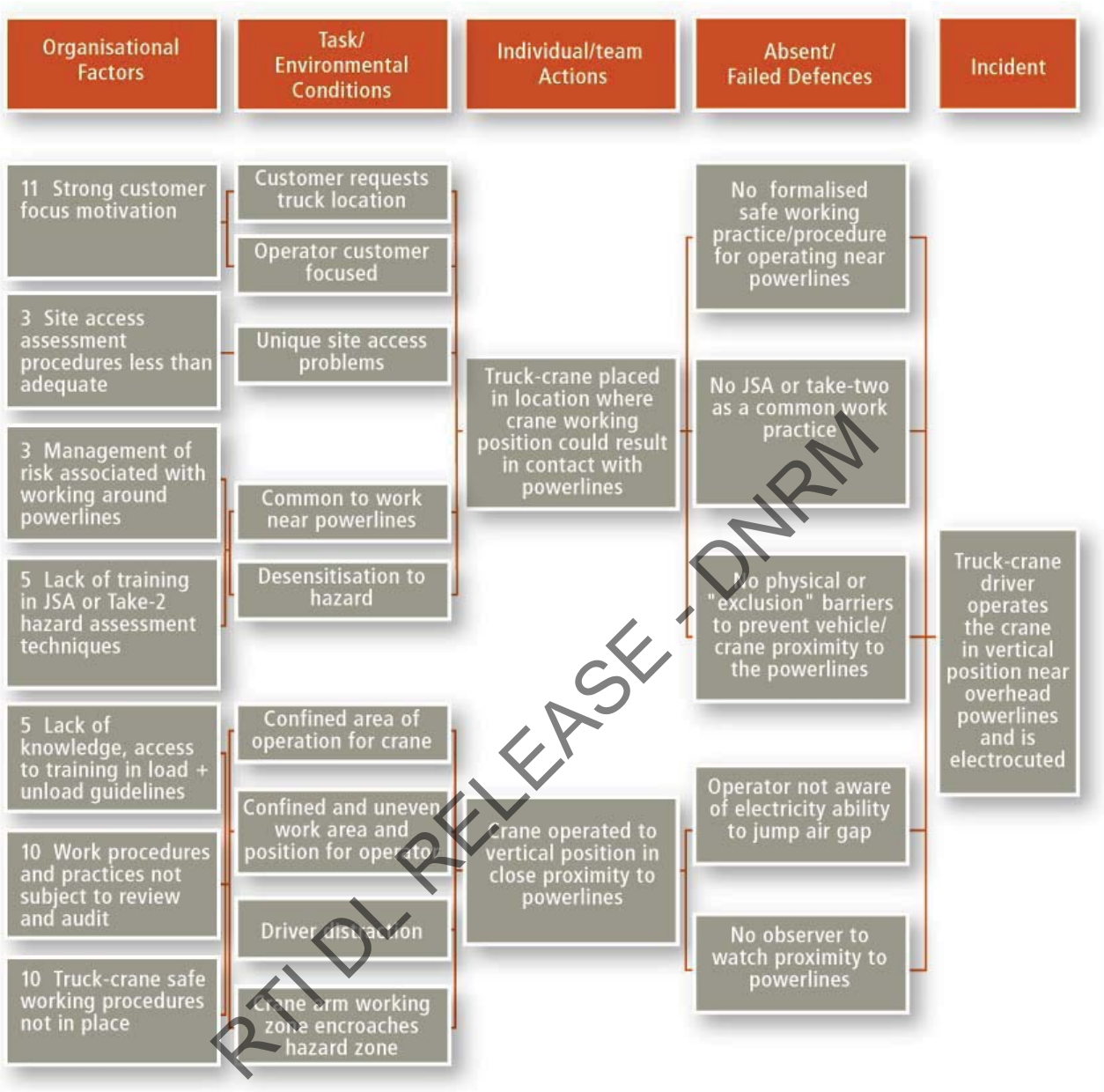
- It is evident that procedures ensuring separation of crane-trucks from overhead power lines are inadequate in their documentation, awareness retraining, and practice.
- The fact overhead powerlines commonly occur at unloading sites would be motivation to formalise procedures.
- The fact delivery operators can be de-sensitised to the hazard by its common occurrence in their work area has not been sufficiently recognised as a motivation for robust and effective "attention grabbing" focus on the hazards.
- This could be in the form of regular and formalised refresher training, and "difficult site" simulation in non-hazardous controlled circumstances.
- Processes for local site hazard assessment, such as JSA, and "take-two" (TAKE 5, SLAM) are not commonly available to, or used by the delivery operators.
- There is no commonly used method for identifying hazards such as proximity of overhead power lines where a "tight" property access is involved.
- Tools such as JSA and "take-two" could provide this check and extra precautions (such as a dedicated person acting as a sentinel) could be taken.
- It is not sufficiently recognised that electric current can jump across an air-gap. As a result, hazards in the delivery work areas are not adequately understood, even if identified.

• The positive culture of customer focus, and desire to meet customer needs can reduce the margin of safety and could also be a distraction in the process of hazard identification and safe work practice.

Recommendations

• Issue a Safety Alert across the organisation.
• Establish a Safety Management Standard within the organisation, incorporating NSW Workcover standards (best practice) for separation from powerlines.
• Communicate these new Standards across the organisation, and the industry.
• Redevelop Truck Loading and Unloading, and Load Restraint procedures incorporating the new Standards, and monitor implementation.
• Develop a general information and education kit on free air arcing for distribution across organisational divisions, relevant industries and all employees and contractors.
• Investigate the possibility of fitting crane arm limit stops or development of operating exclusion zones.
• Establish JSA as a formal process for common tasks such as unloading at delivery sites.
• Introduce Take-Two (TAKE 5, SLAM) training for all employees and contractors.
• Introduce a “simulated” non-hazardous overhead obstruction exercise in standard driver training and induction. (E.g. a catenary rope on poles at the depot, where drivers can operate the crane and get a feel for how close is 3metres, 6 metres, 8 metres etc?).
• Review policy and practice for dissemination of safety critical information and sharing of best practice procedures across organisational divisions and within the industry.
• Review adequacy of existing audit procedures and practice.

The ANGLO CAUSAL ANALYSIS CHART for this event is shown below.



Appendix 5 Typical Incident Investigation Kit Contents

Need to have

- Anglo American LFI Incident Investigation Handbook (complete with Investigation Forms)
- Clip board, graph paper, notepad and pencils
- Digital Camera
- Incident Report Form
- Sunscreen and safety sunglasses
- Gloves
- Insect repellent
- Barrier tape
- Tape measure (8m, and 30m)
- Identification labels / tags
- Specimen jars
- Zip lock bags (small and medium)
- Compass
- Danger Tag and padlock
- Out of Service Tags
- Magnifying Glass
- Permanent pens, pens
- Road marking fluorescent spray cans
- Torch and batteries
- Rag on a roll

Nice to have

- Inclinometer
- Portable GPS
- Noise meter
- Digital camera with large zoom function
- Spring balance (small, to measure forces)
- Amount of numbered markers to place around key scene locations and take reference photographs
- Digital recorder and batteries
- Adverse weather PPE
- Additional high visibility PPE for visitors

Acknowledgements

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