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Department of Mines and Energy

Safety & Health Division

INVESTIGATION INTO THE FATAL ACCIDENT

TO

JOHN ANTHONY MAHER

AT

COOK COLLIERY

ON

30th AUGUST 2000

ACCIDENT SUMMARY

- Prior to the accident the continuous miner was immobilised in a sump when the left rib fell against the side mounted emergency stop button
- Mr Maher was attempting to reset the stop button when a second rib fall occurred
- The rib coal struck Mr Maher on the back, arm and legs - pinning him against the miner
- Mr Maher was recovered and CPR and EAR applied by the crew and ambulance
- Mr Maher was pronounced deceased by the doctor on arrival at the surface

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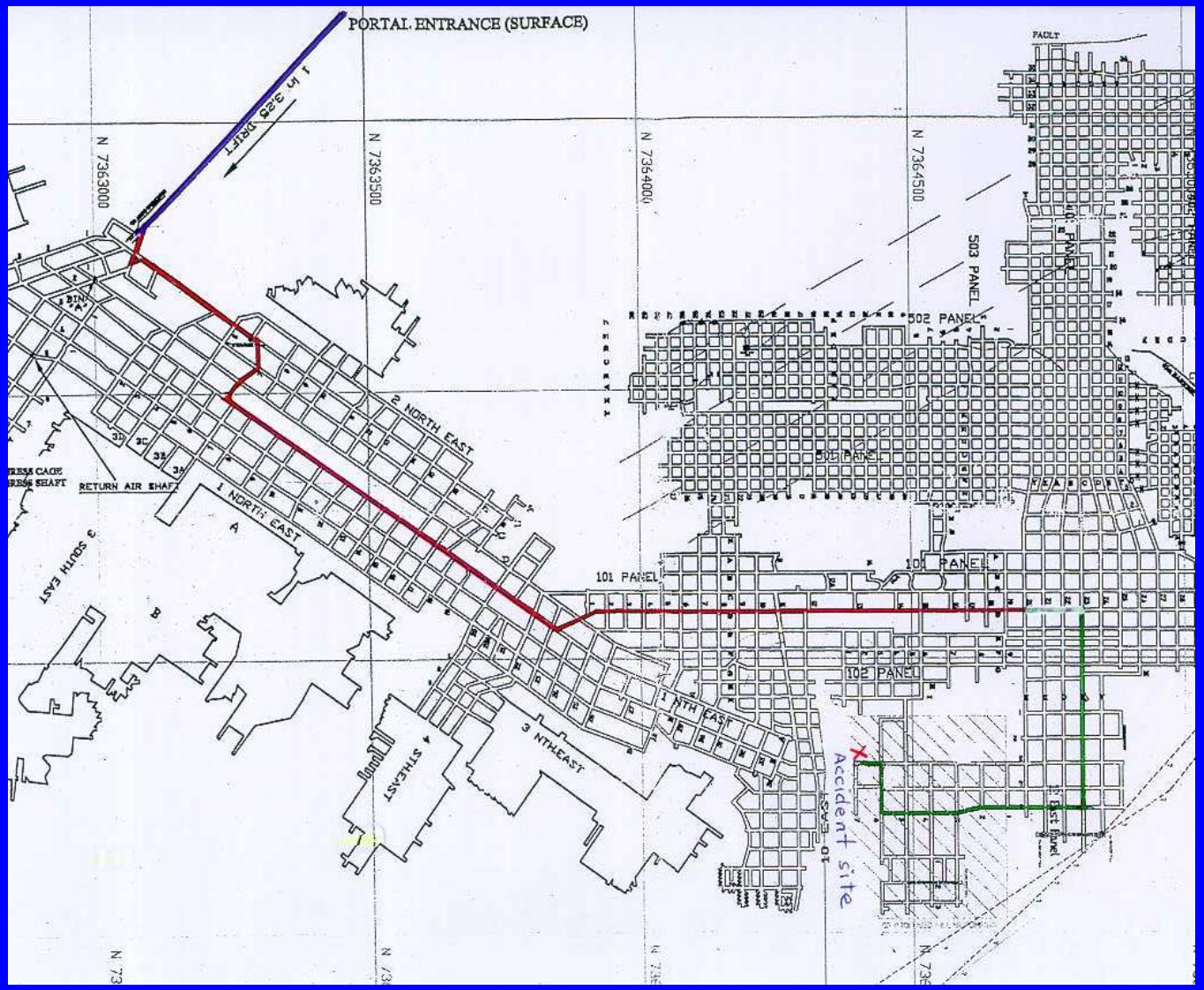

Plan of Cook Colliery showing site of accident and access from surface

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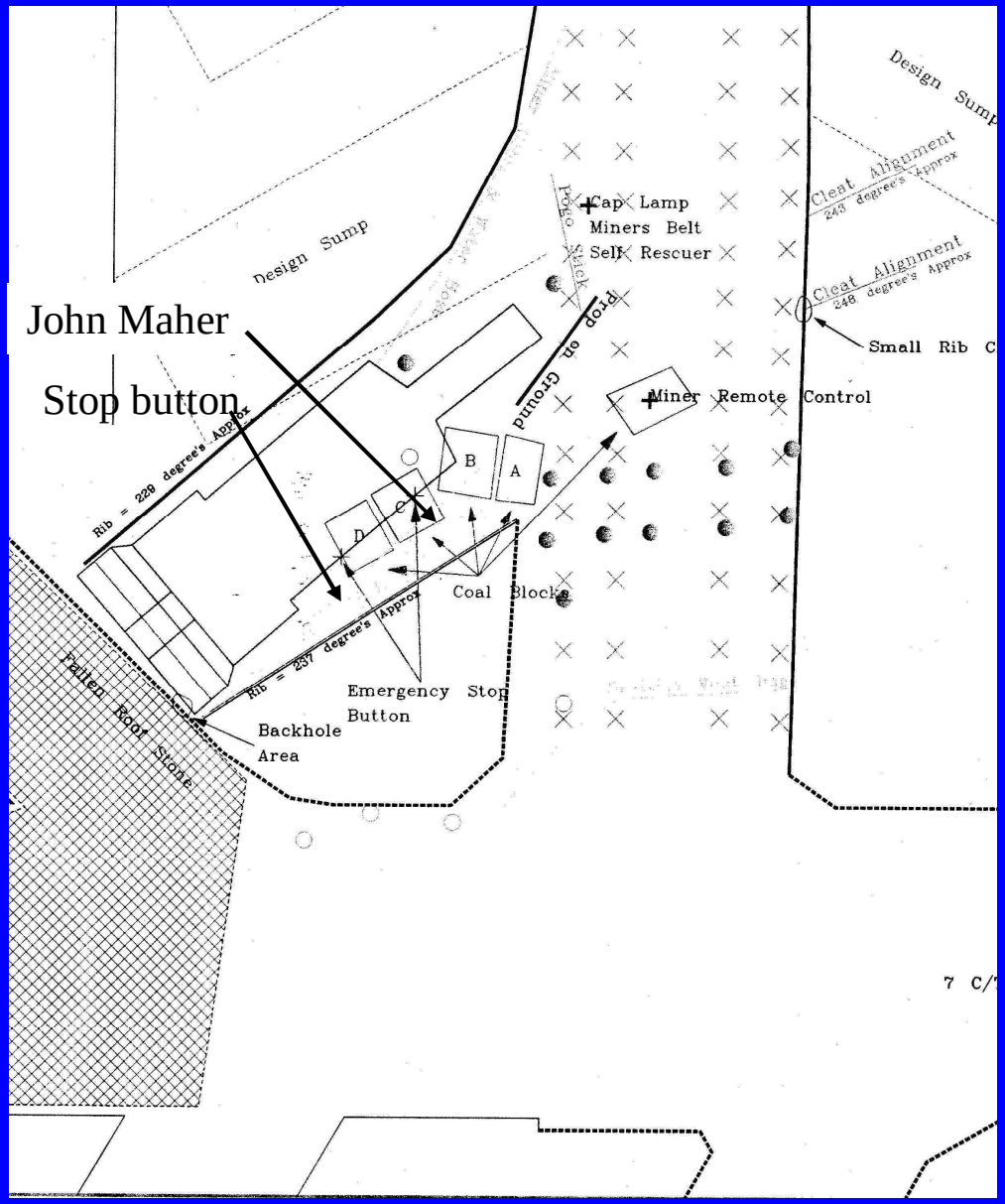

Plan of accident site

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NOTIFICATION AND EMERGENCY RESPONSE

- 0945 hrs - Surface notified of man trapped between miner and rib
- 0945 hrs - Mr Maher recovered from rib fall
- 1000 hrs - Surface was alerted that injuries more serious
- 1000 hrs - Ambulance called to mine
- 1020 hrs - Surface notified that Mr Maher had stopped breathing with apparent crushed ribs
- 1035 hrs - Ambulance arrived underground at track end
- 1051 hrs - Doctor called to mine
- 1057 hrs - Patient brought to surface
- 1100 hrs - Doctor attended to Patient and pronounced deceased

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CORRECTIVE ACTIONS

Matters arising from Inspection after accident

- **Review Strata Control HMP**
- **Review Design for Second Workings**
- **Apply controls for Method of Working**
- **Implementation of procedures to recover machines**
- **Review location and operation of stop buttons**
- **Provide reinforcement of 'on the job hazard management' re strata hazards**

Manager advised on 13 September that all corrective actions had been addressed

ACCIDENT INVESTIGATION STEPS

Investigated in accordance with DME procedures.

Steps as set out in the report as follows:

1. **Outline the evidence including :- Site, witnesses and other persons, mine records, systems, procedures, expert evidence & Manager's report**
2. **Construct sequence of events up to the accident**
3. **Collate the evidence in systematic manner**
4. **Conduct a causal analysis of collated evidence**
5. **Document findings into the cause of the accident**
6. **Document recommendations**

ACCIDENT INVESTIGATION

STEP 1

UNDERGROUND OBSERVATIONS

Section 6.1

Photo P/p30 -view near breakaway into right sump with miner in background

Photo P/p32 - General view of left hand side of sump showing props, tail of miner and lumps of coal

Photo P/p18 - View looking along left rib rib and side of miner showing coal lumps against miner

Photo P/p15 - View of left rear corner of miner where Mr Maher was positioned. Also showing cracks running through coal from roof towards floor.

Photo P/p23 - close view of left rear side of miner where Mr Maher was struck by rib. The coal lump that struck Mr Maher has been moved to right.

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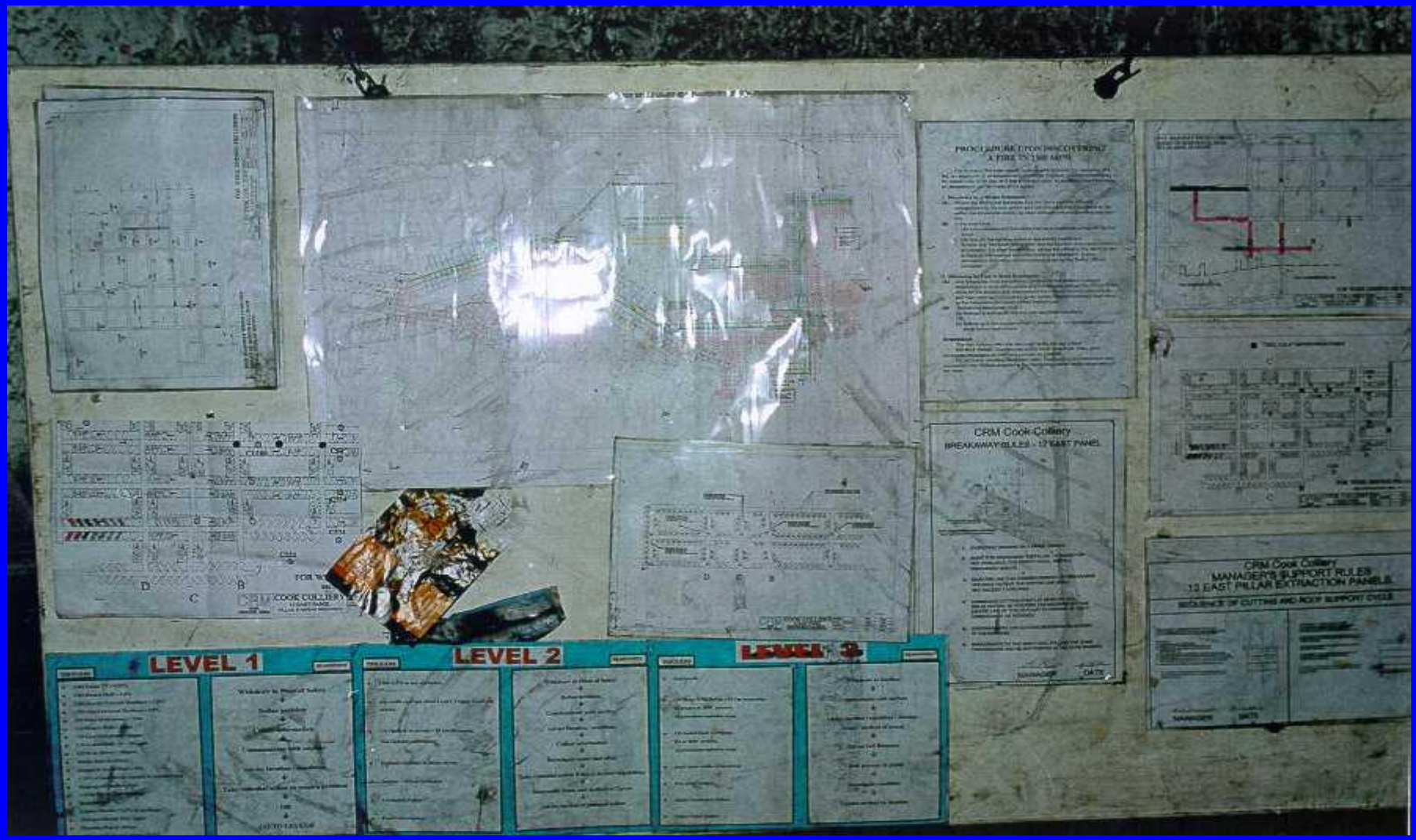


Photo P/p3 - Notice board located in crib room of 12 East panel showing mine plan and 12 East sumping sequence plan

Photo P6 - View of left hand rear of HM9 after recovery from sump indicating position of front stop button

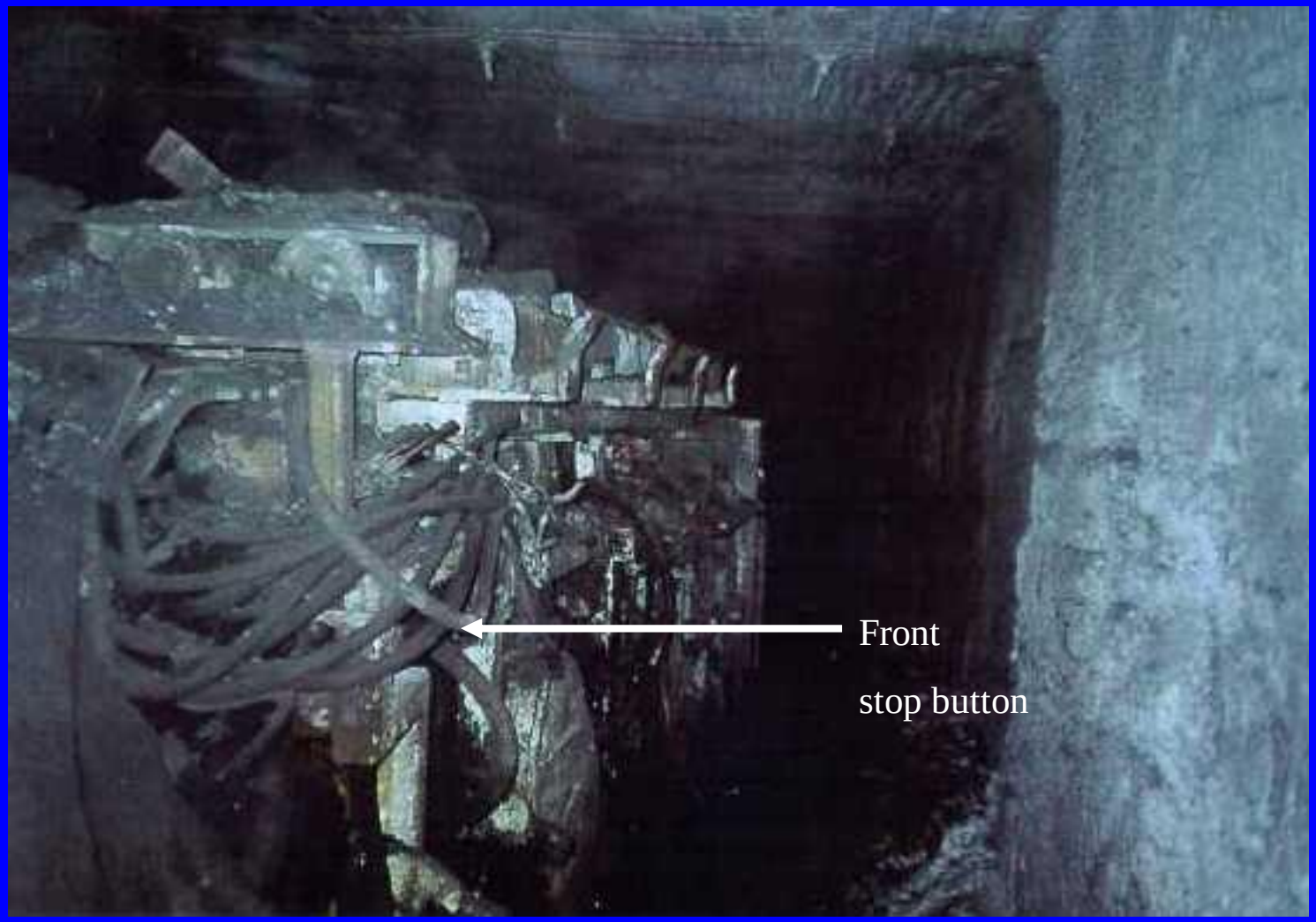


Photo P1 - View looking from front along left side of HM9 after recovery from sump and indicating position of stop button

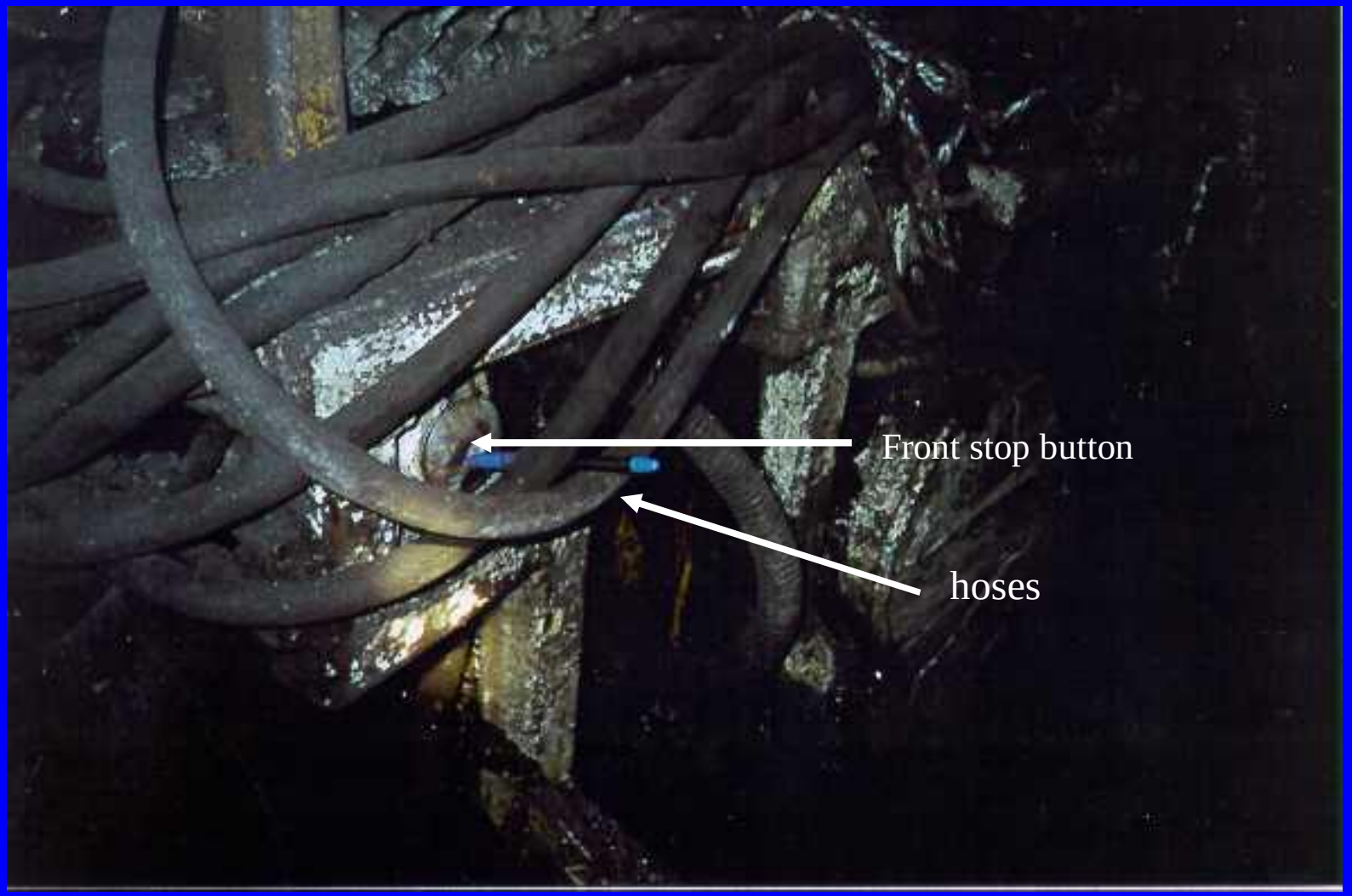
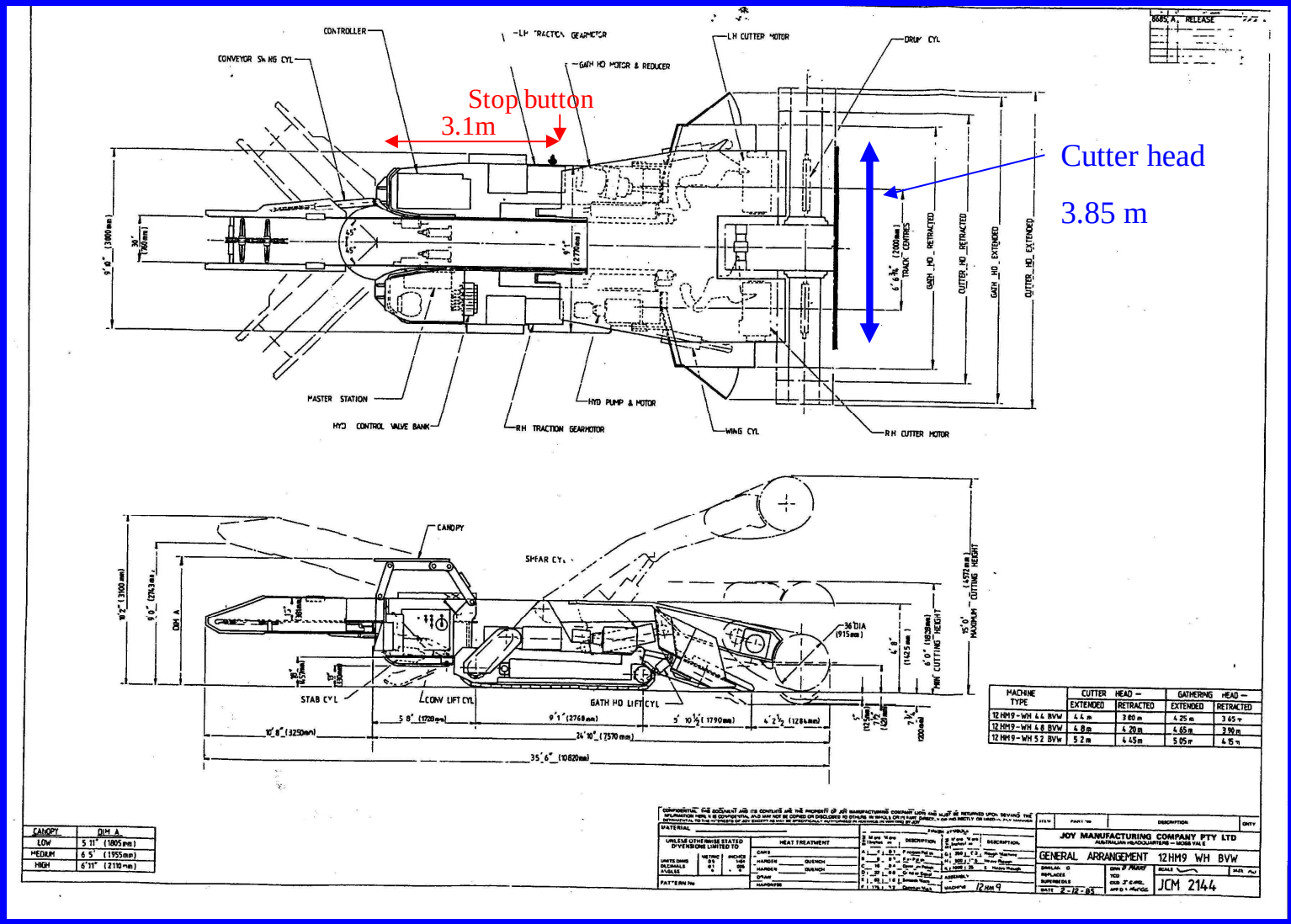


Photo P4 - View of front left stop button taken after recovery of HM9. View shows hoses passing in front as stated by witnesses to be the condition at the time of accident.



From App 12 general arrangement of HM9 showing dimensions of machine including width of cutter head. Also shown is position of left front stop button.

Step 1 cont'd - Systems, procedures and training

Section 6.3

- Hazard Management Plan for strata control
- Part 60 showing design and proposed scheme of work
- Previous risk assessments pertaining to 12 East
- Geological environment in 12 East
- Training provided
- Work plans and instructions for 12 East
- Inspection, monitoring and reporting functions
- Emergency response procedures

STEP 2 - SEQUENCE OF EVENTS

Section 6.6

1. Night shift crew completed mining in 6 cut-through and prepared D heading for mining
2. Dayshift crew commenced first sump in D hdg
3. About X cars mined from this sump when two roof bumps were heard
4. A lump of rib fell off near left front side of miner
5. Operator started withdrawing miner when the machine stopped tramming
6. Crew realised emergency stop button was held in by a lump of coal

SEQUENCE OF EVENTS cont'd

7. A number of roof props were stood by crew
8. Several of crew attempted to clear coal to access the button
9. Mr Maher then tried in a similar manner and the rib suddenly failed trapping Mr Maher against the left rear side of miner
10. Crew struggled to clear the lump of coal off Mr Maher
11. Mr Maher was freed and taken on stretcher by the crew to meet the ambulance at track end

ACCIDENT INVESTIGATION

STEP 3

COLLATION OF EVIDENCE

Section 6.7

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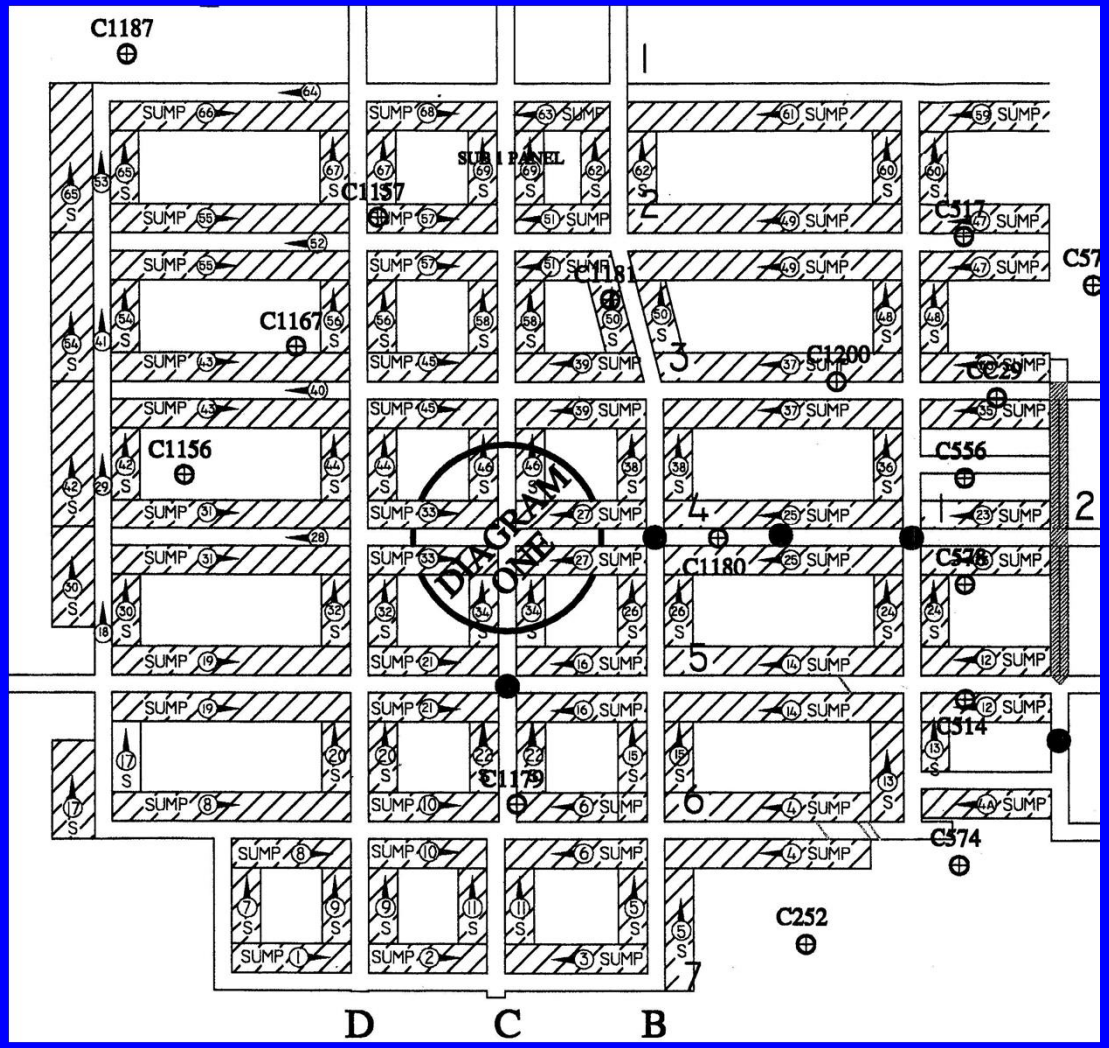
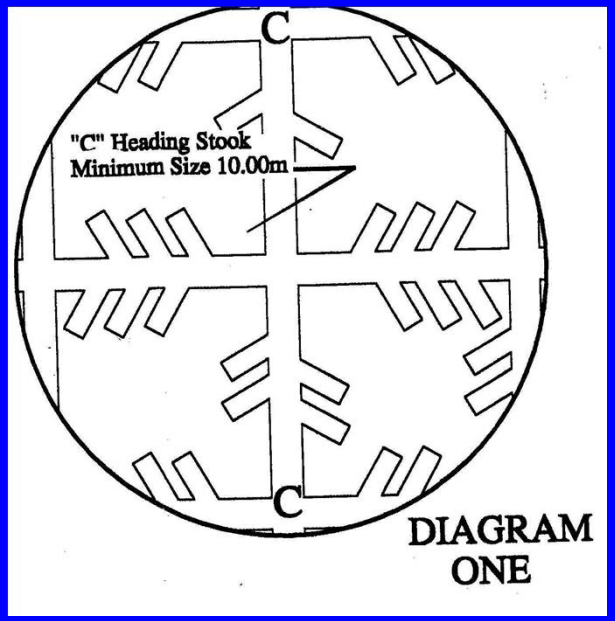
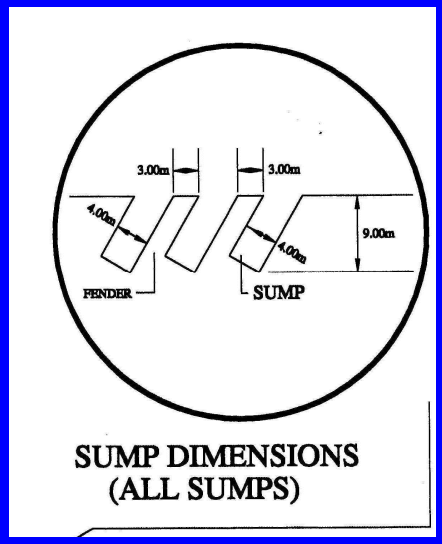
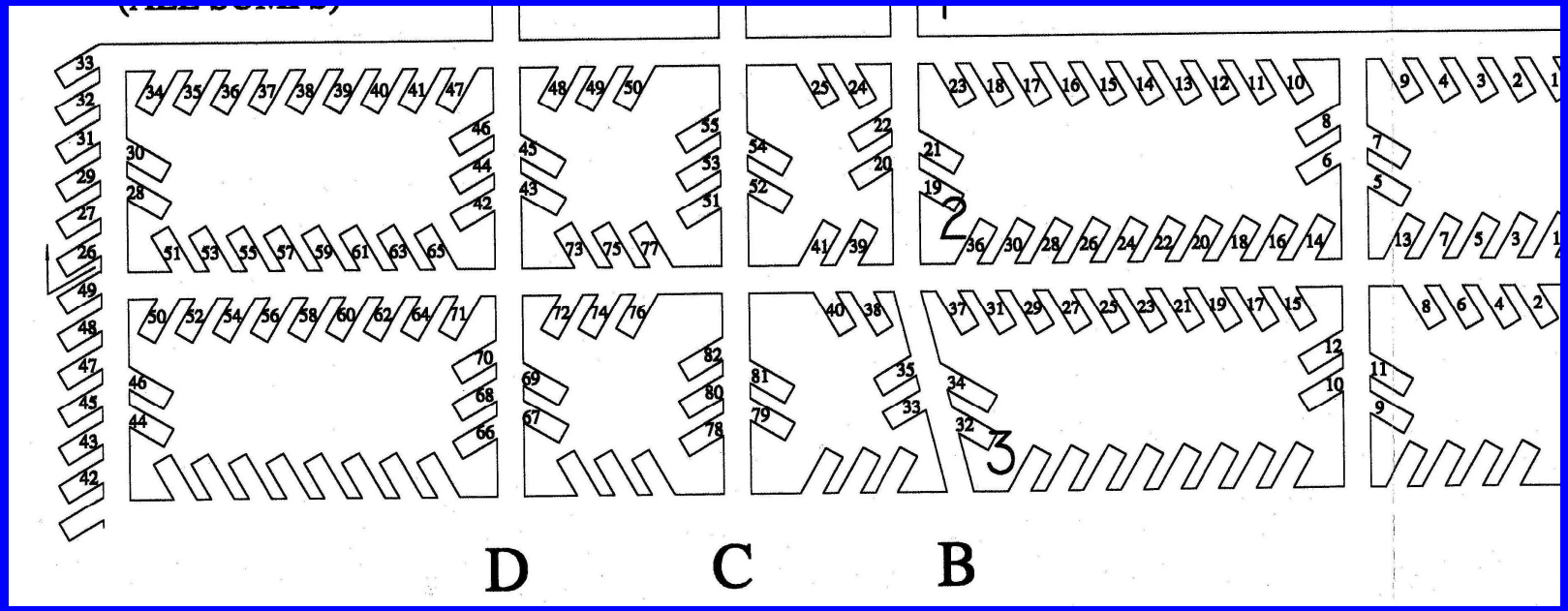


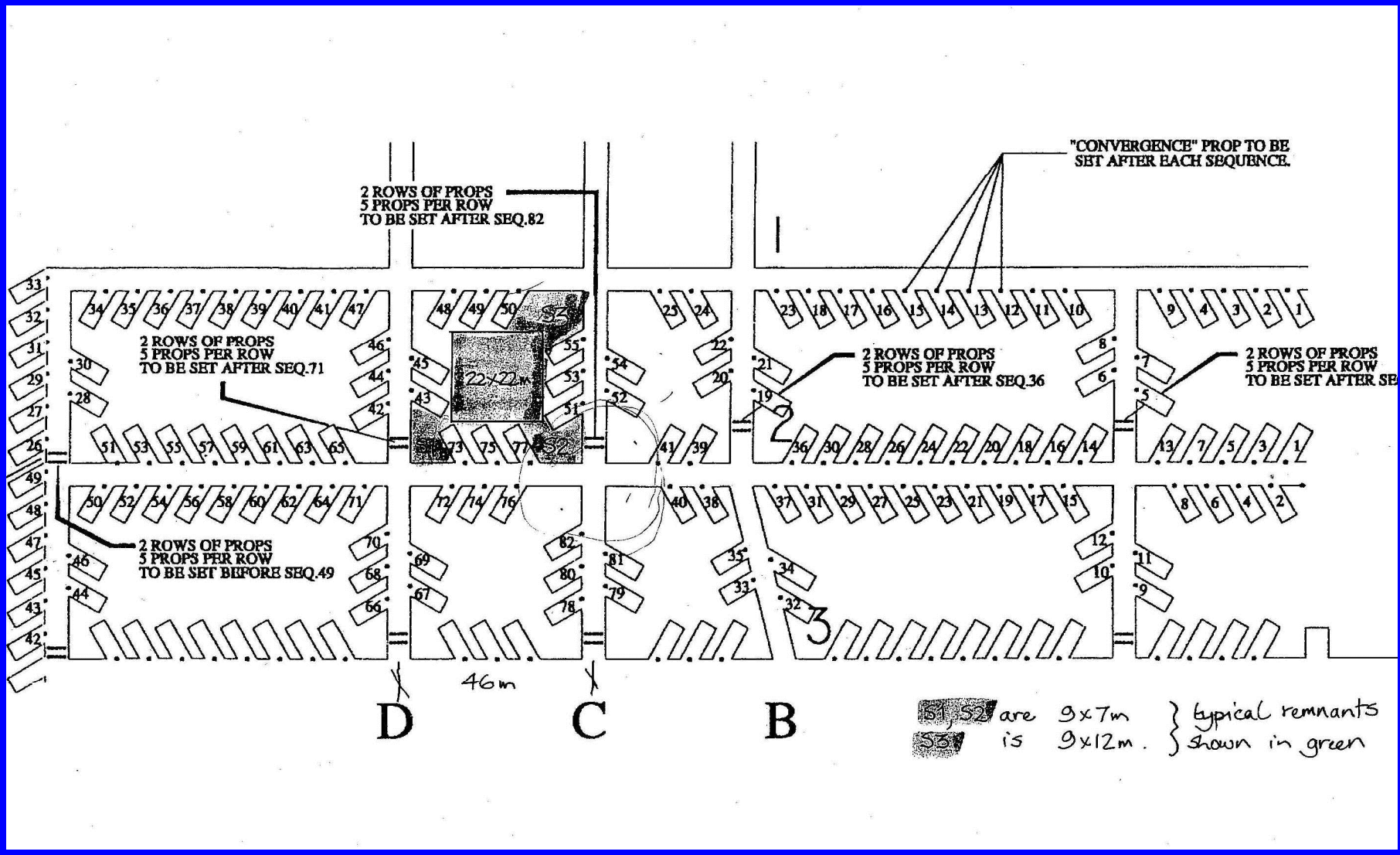


From Part 60 Drg No 12ES-4: Showing sumping layout and sequence and detail of Diagram One

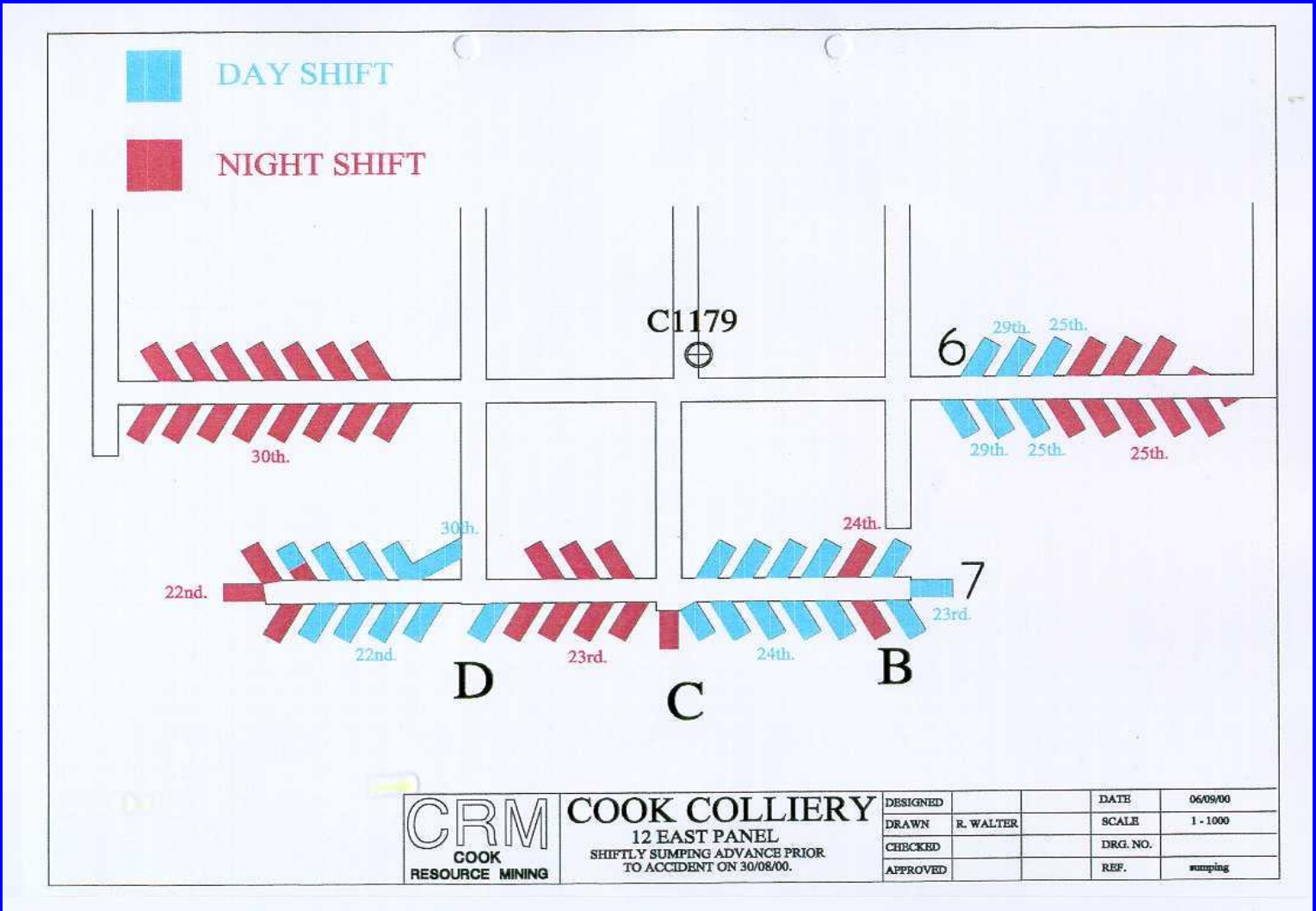


From Part 60 Plan showing proposed sumps for 1 to 2 cut-through and sump dimensions





From Part 60 - Figure 2 (from Shepherd) shows detail of sumps and stooks for 1 to 3 ct



Plan showing the sumps mined in previous week in order by day and shift

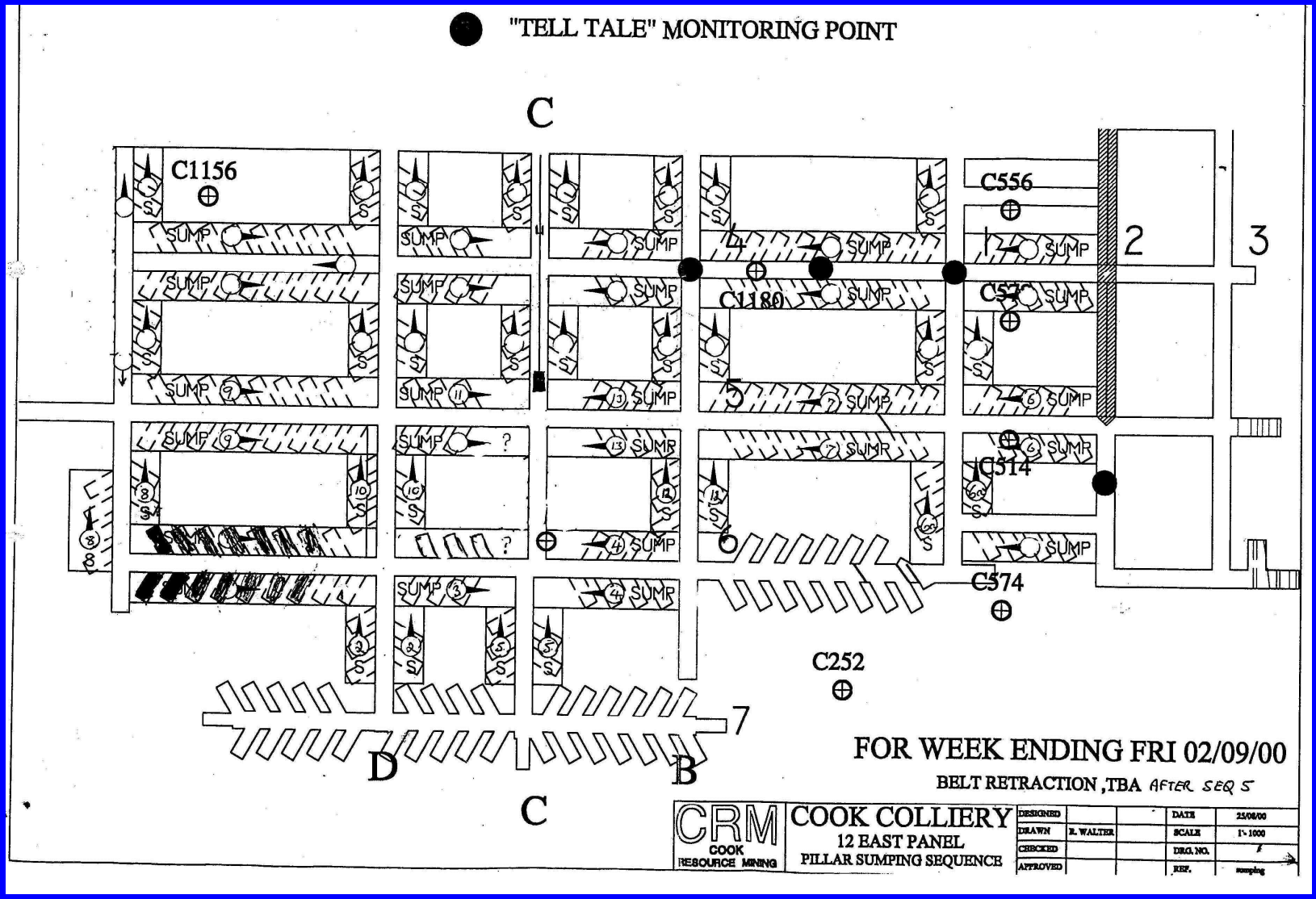
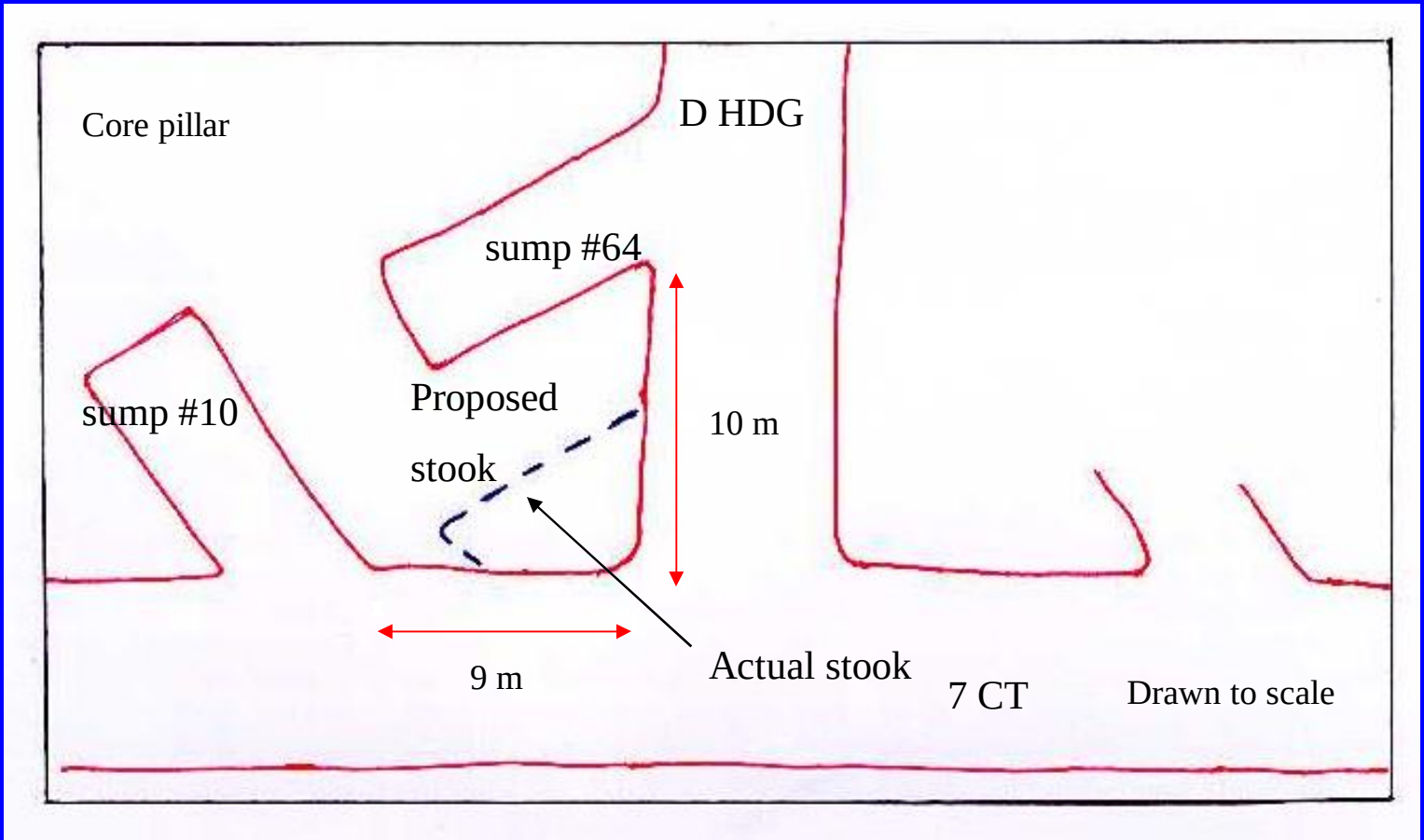
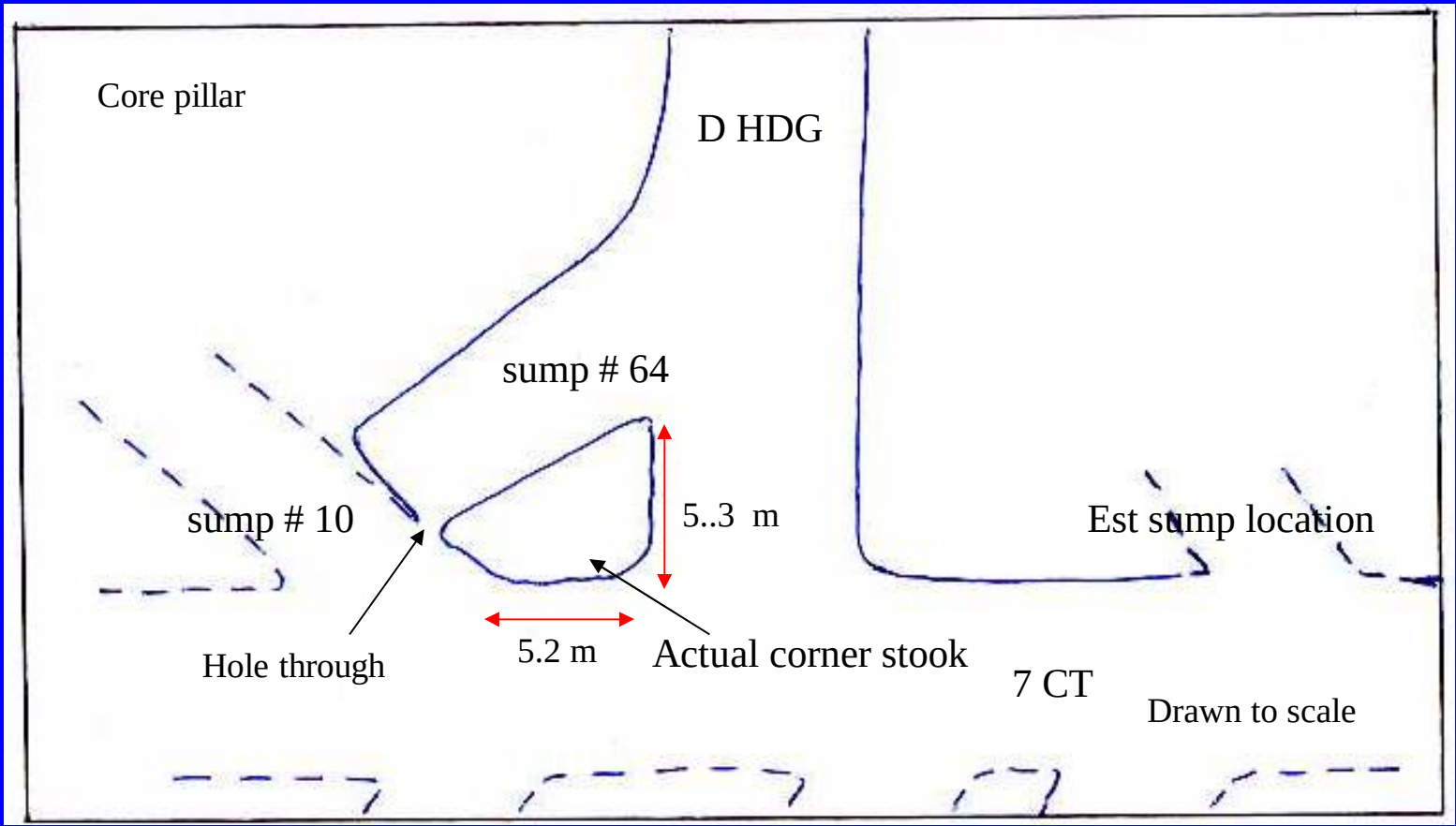


Photo P/p7 - plan of the sumping sequence for week ending Fri 2nd September



From 12 East sumping sequence plan for week ending 2/9/00 a representation of the design sump locations showing proposed corner stook



From survey plan of accident site a representation showing actual sump locations and corner stook

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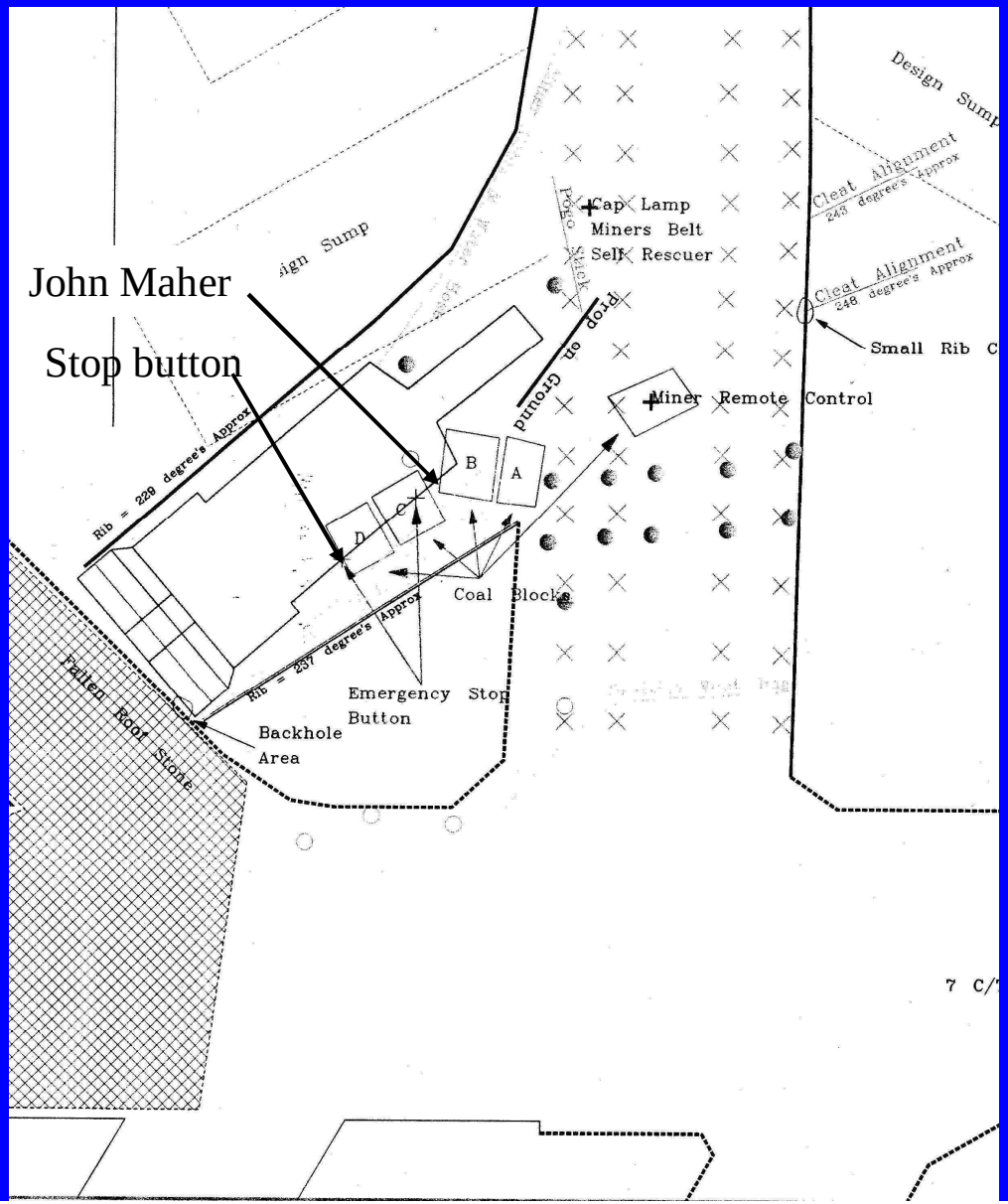

Plan of accident site

STEP 4 - CAUSAL ANALYSIS
Section 6.8

- Incident Causal Analysis Method (ICAM) was used in the investigation
- ICAM is based on research into accident causation by Prof James Reason of Manchester University
- Reason researched the causes of accidents where systems and procedures are an integral part of activities
- A model of accident causation was developed which examines the human error and error shaping influences of failures in organizational systems
- ICAM is one of several models based on Reason's work and is suitable for the causal analysis of mining accident

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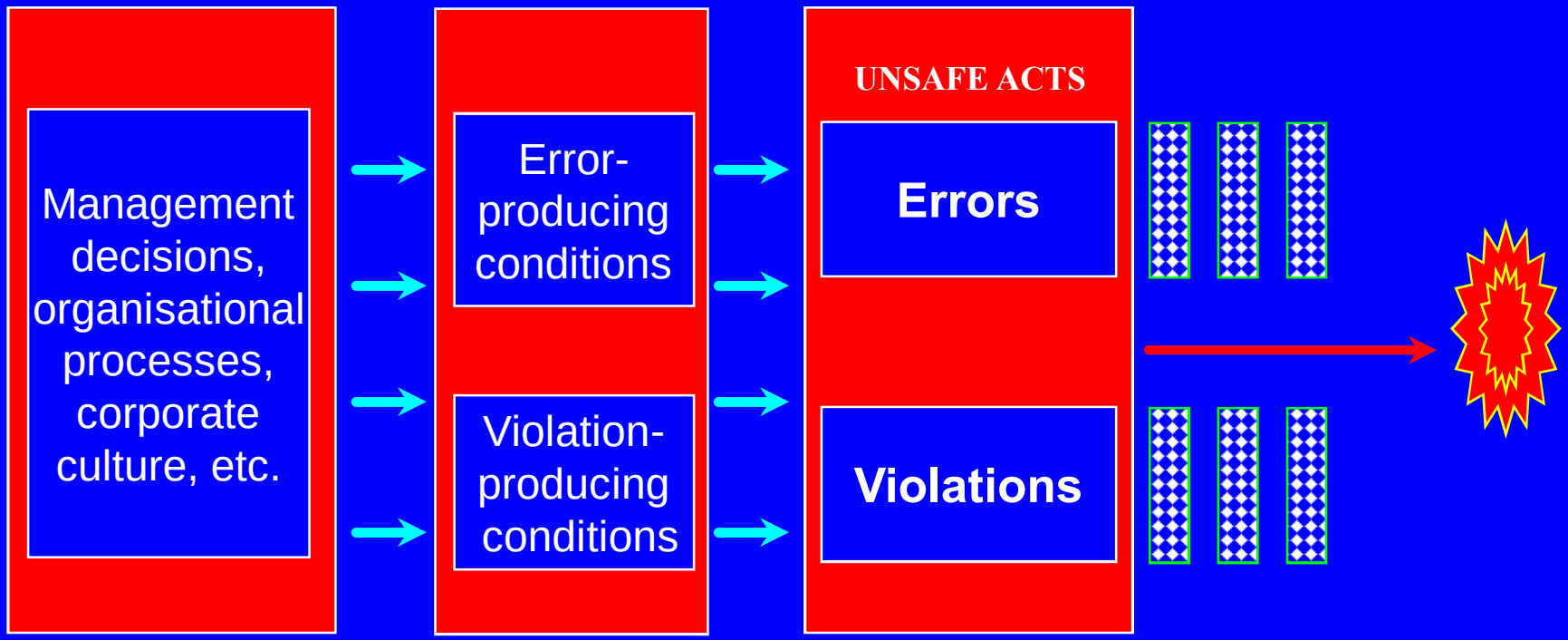
CAUSAL ANALYSIS
JAMES REASON ACCIDENT CAUSATION MODEL

Organisation factors | **Task/Environmental factors** | **Individual/ Team actions** | **Defences** | **Adverse outcome**



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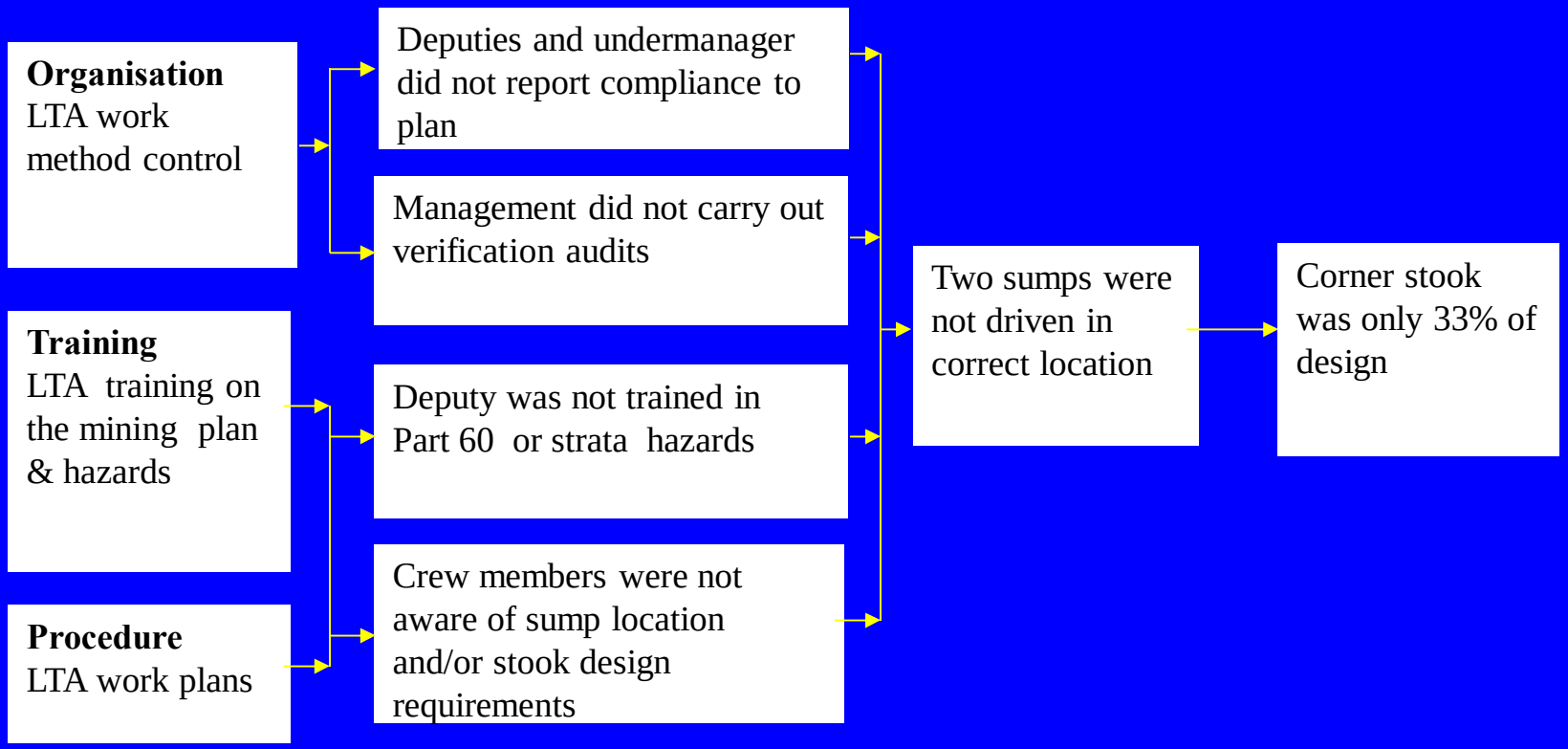
ICAM CHART part A



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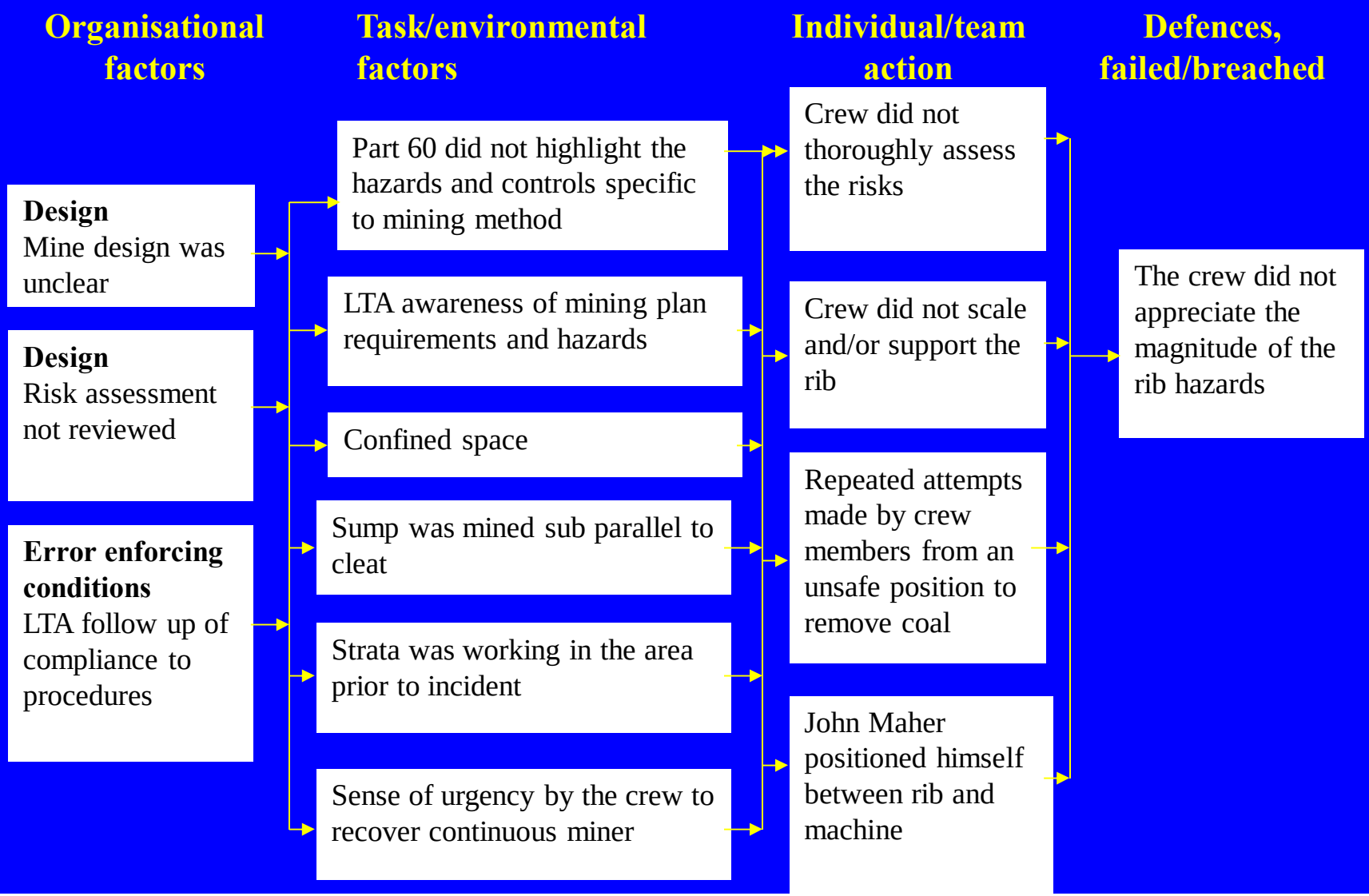
ICAM CHART part B



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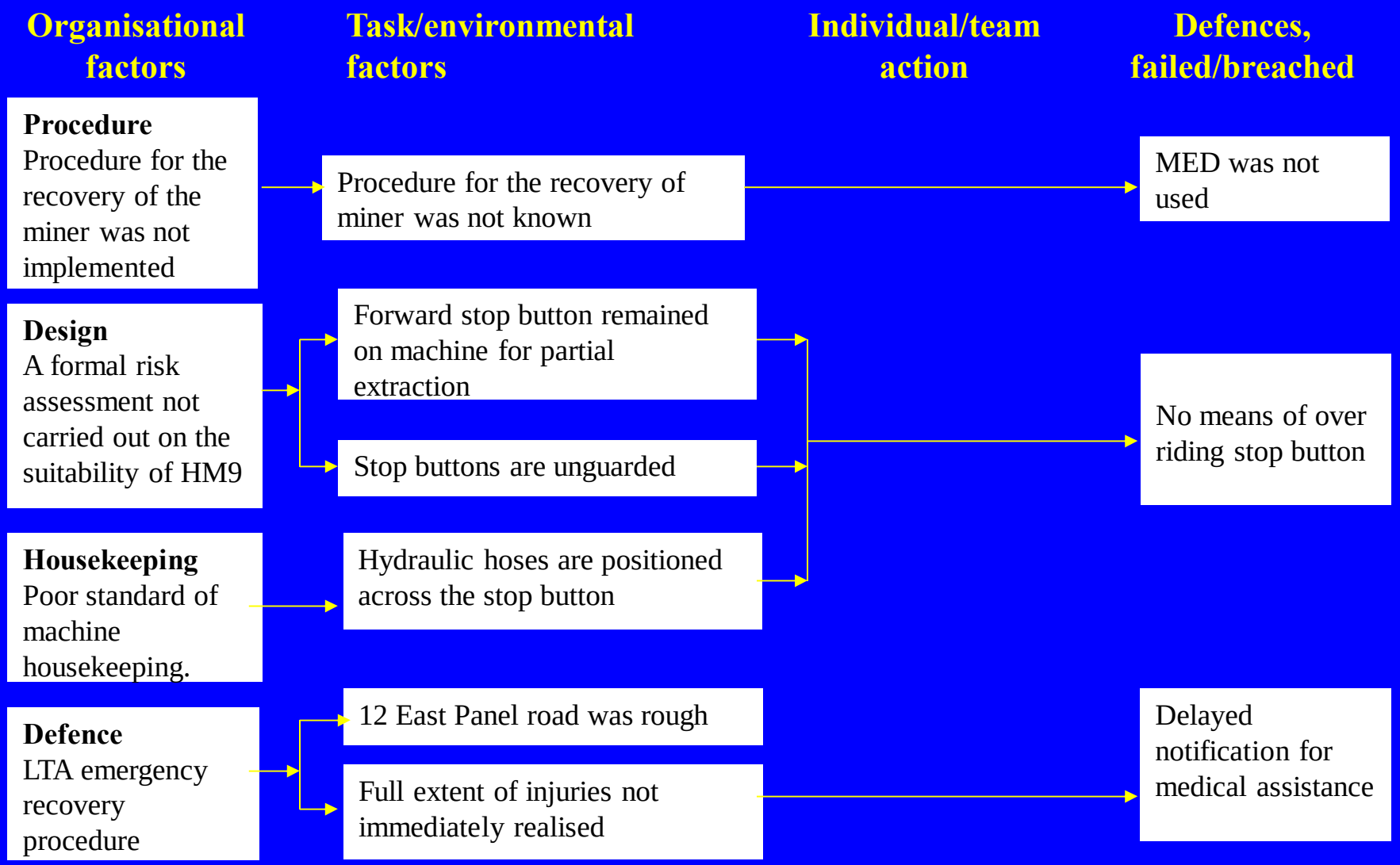
ICAM CHART part C



STEP 5 - FINDINGS
Section 7

- Two sumps were not mined in accordance with the intent of the design.
- The crew failed to assess the magnitude of the rib hazard
- Mr Maher as well as three of the crew placed themselves in an unsupported area to reset stop button
- A MED was not used to recover miner

STEP 5 - FINDINGS cont'd
Section 7

- Crew members and deputy were not aware of the requirements for sump location and minimum stook size
- Part 60 and design plans did not specify minimum stook sizes for all pillars
- Procedure for recovery of miner was not known
- Forward stop button was in exposed position

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FINDINGS cont'd

Organisational system failures include

- Inadequate standard of training provided to the deputy and crew on the mining method and hazards
- Inadequate monitoring to ensure compliance to plan
- Mine design did not clearly communicate requirements for minimum stook sizes
- Inadequate standard of work plans to locate sump positions
- Inadequate risk assessment of the partial extraction method
- Lack of a risk assessment of the suitability of the HM9
- Inadequate implementation of miner recovery procedures
- Delays in the request for emergency medical assistance

STEP 6 - RECOMMENDATIONS

Section 8 - for Cook Colliery and Mining Industry

- Work method control
- Risk assessment of changed mining activities
- Suitability of machines
- Training
- Management of risk taking behaviour
- Recovery of machines from unsupported areas
- Recovery of injured personnel
- Mine design and safety and health matters