****  **Fume Investigation**

**Fume Investigation**

**Contents**

**Executive summary**

1. ***Introduction and Background***
2. ***Findings***
3. ***Conclusions***
4. ***Recommendations***
5. ***Responsibility and accountability***

* **Blast Designer**
* **Shotfirer**
* **Driller**
* **Blast Controller**
* **Shotfirer Supervisor**
* **Drill and Blast Supervisor**
* **Team members**

***2. Blast location***

* **Description**
* **History of blasts from site location**

***3. Geology***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Material Type** | **Density** | **UCS**  **(MPa)** | **Youngs**  **Mudulus**  **MPa**  **(usually GPa)** | **Poissons**  **ratio** | **Tensile**  **strength**  **(MPa)** |
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***4. Moisture content before and after blast***

* **Presence of water**

***5. Blast design***

***Summary Table***

|  |  |
| --- | --- |
| **Shot number** |  |
| **Shot type** |  |
| **Hole diameter** |  |
| **Hole depth** |  |
| **Stemming** |  |
| **Burden and spacing** |  |
| **Drill angles** |  |
| **Total volume** |  |
| **Number of holes** |  |
| **Explosives used** |  |
| **Design Quantities** |  |
| **Emulsion** |  |
| **Stemming** |  |
| **Initiation** |  |
| **Timing** |  |
| **Priming** |  |
| **Primer location** |  |
| **Water** |  |

**6. Blast plan**

***7. Hole depth measurements***

***8. Charging plan***

* **Actuals**

***9. Timing plan***

***10. Stemming Type***

***11. Dewatering***

* **Which holes**
* **Gas bags**
* **Recharge rates**
* **Redipped**

***12. Blast charging***

|  |  |
| --- | --- |
| **Charging problems** |  |
| **Charging accuracy** |  |
| **Final stemming height** |  |
| **Dip sheets** |  |
| **Load sheets** |  |
| **Air bag use**  **verses**  **Planned** |  |

***13. Procedures***

* **Blast**
* **Variations**
* **JSRA**
* **Priming position**

***14. Blast monitoring***

|  |  |
| --- | --- |
| **Video** | **Number** |
| **Log** |  |
| **Records from blast guards** |  |
| **Observations** |  |
| **Personal monitors** |  |
| **Field monitors** |  |

***15. Quality control***

* **Emulsion and AN certificates**
* **AN bulk density**
* **EP temperature**
* **MMU Calibration**
* **Product density**
* **Raw material fumes or crystallisation**
* **Fuel Specification**
* **Charges to MMU settings**
* **Issues with deliveries**
* **Storage period**

***16. Training***

* **MMU**
* **Shotfirers**
* **Blast Designer**

***17. Weather***

|  |  |
| --- | --- |
| **Wind direction and speed** |  |
| **Cloud cover and height** |  |
| **Signs of inversion** |  |
| **Temperature** |  |
| **Rain / storms in the area** |  |
| **Fume modelling** |  |
| **Weather observations (before/during/after)** |  |
| **Firing** |  |

***18. Fume risk management plan***

**Discussion**

**Water attack on AN**

**Groundwater level**

**Fume generation mechanism**

**Initiation design**

**Explosives selection**

**QA checks**

**Procedures**

1. **Personal statements**
2. **Photos and videos of blast**
3. **Extracts**