

Code of Federal Regulations 30

Part 57 – Safety and Health Standards – Underground Metal and Nonmetal Mines

Subpart J – Travelways and Escapeways

57.11050 Escapeways and refuges

57.11052 Refuge areas

57.11050 Escapeways and Refuges

- a. Every mine shall have two or more separate, properly maintained escapeways to the surface from the lowest levels which are so positioned that damage to one shall not lessen the effectiveness of the others. A method of refuge shall be provided while a second opening to the surface is being developed. A second escapeway is recommended, but not required, during the exploration or development of an ore body.**

57.11050 Escapeways and Refuges

b. In addition to separate escapeways, a method of refuge shall be provided for every employee who can not reach the surface from his working place through at least two separate escapeways within a time limit of one hour when using the normal exit method. These refuges must be positioned so that the employee can reach one of them within 30 minutes from the time he leaves his workplace.

57.11052 Refuge areas

Refuge areas shall be-

- a. of fire-resistant construction, preferably in untimbered areas of the mine;
- b. large enough to accommodate readily the normal number of persons in the particular area of the mine;
- c. constructed so they can be made gastight;
- d. provided with compressed air lines, waterlines, suitable hand tools, and stopping materials.

Metal Nonmetal Refuge Areas

- **Underground Platinum mine, Montana**
- **Decline entries provide access by vehicle to various levels where mining takes place**
- **The Refuge Areas have not been used in any emergency to date**

Refuge Areas are located to allow miners to reach them in 30 minutes

Each Refuge Area is provided with water lines, air lines, telephone communication, tools and materials

Carbon Dioxide scrubbers and food are not provided

CHARACTERISTICS

There are three permanent and one portable Refuge Areas

- **1 at 500 feet depth**
- **1 at 800 feet depth**
- **1 at 1,300 feet depth**
- **1 at 2,200 feet depth**

**Air and Water supply lines;
easily disconnected for re-location.**

**Size: approximately 6 feet wide
by 10 feet long by 6.5 feet high**



**Mounted on skids
for easy re-location.**

Exterior Air and Water Connections



Air and Water connections and valves inside the chamber,
and 5 gallon potable water supply cooler
(additional 5 gallon bottles of water are in the chamber)





Mine phone communications system inside the refuge area, with external speaker provides communications to the surface.

(A Leaky Feeder Wireless Radio Communications system is also installed and functional in the underground and can be used from inside the refuge chamber to surface)

Refuge Area

- **Underground Limestone mine, Kentucky**
- **Decline entries provide access by vehicle to various mining levels**
- **The refuge area has not been used in any emergencies**

- This is an underground Limestone mine with mining on three levels
- Multiple decline entries provide access by vehicle
- Refuge Area located at the 550 feet mining level

Characteristics

Refuge Area is portable and located 100 feet from work area

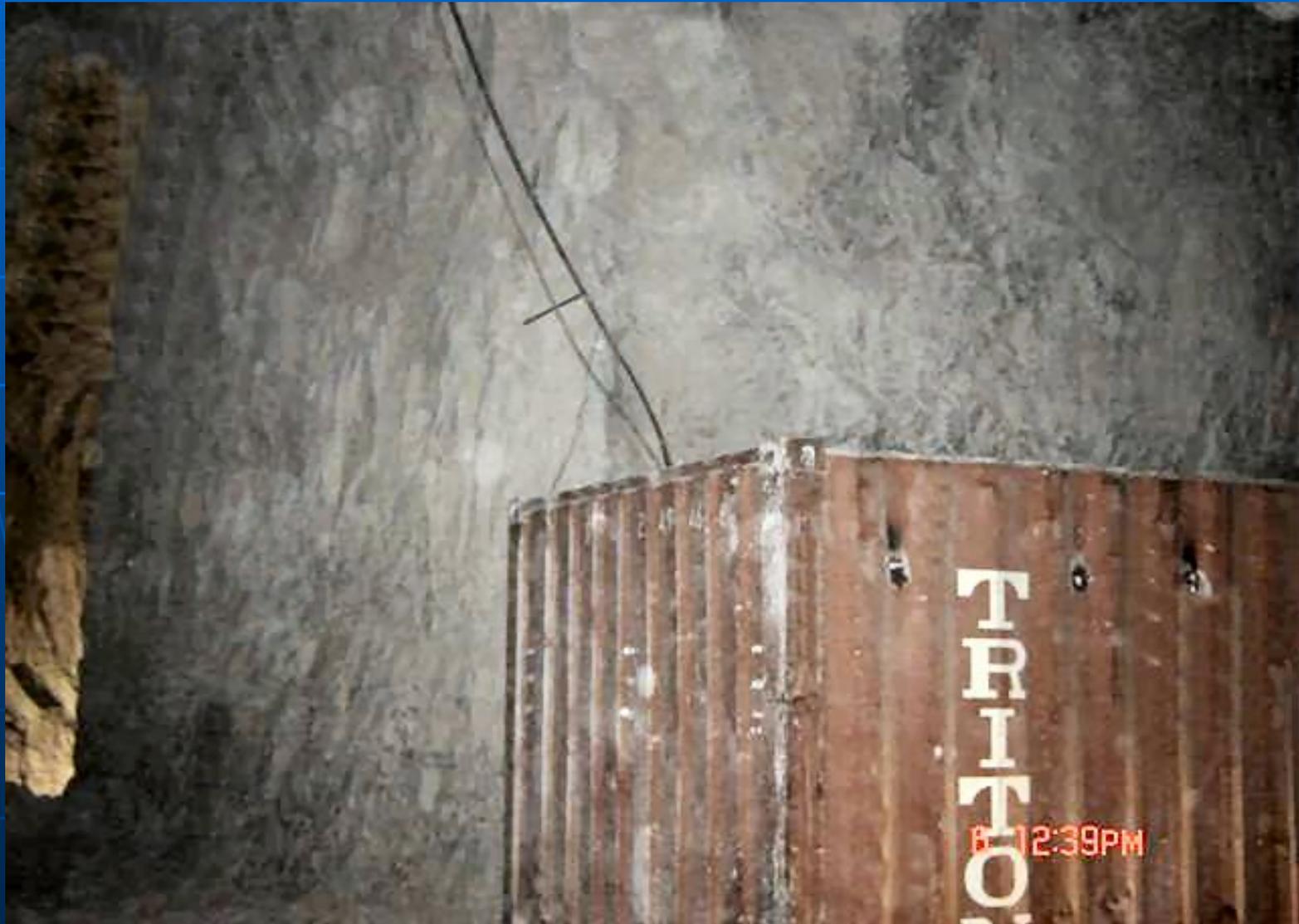
Contains water and air lines, telephone to surface, tools and materials

Carbon Dioxide scrubber and food are not provided

Outside view



Outside showing water and air lines



Inside View



Material provided to seal openings



REFUGE AREAS

Underground Zinc mine, New York

Access provided by two vertical shafts

The refuge areas have not been used in any emergencies

Mining occurs on different levels and there are five permanent and two portable Refuge Areas

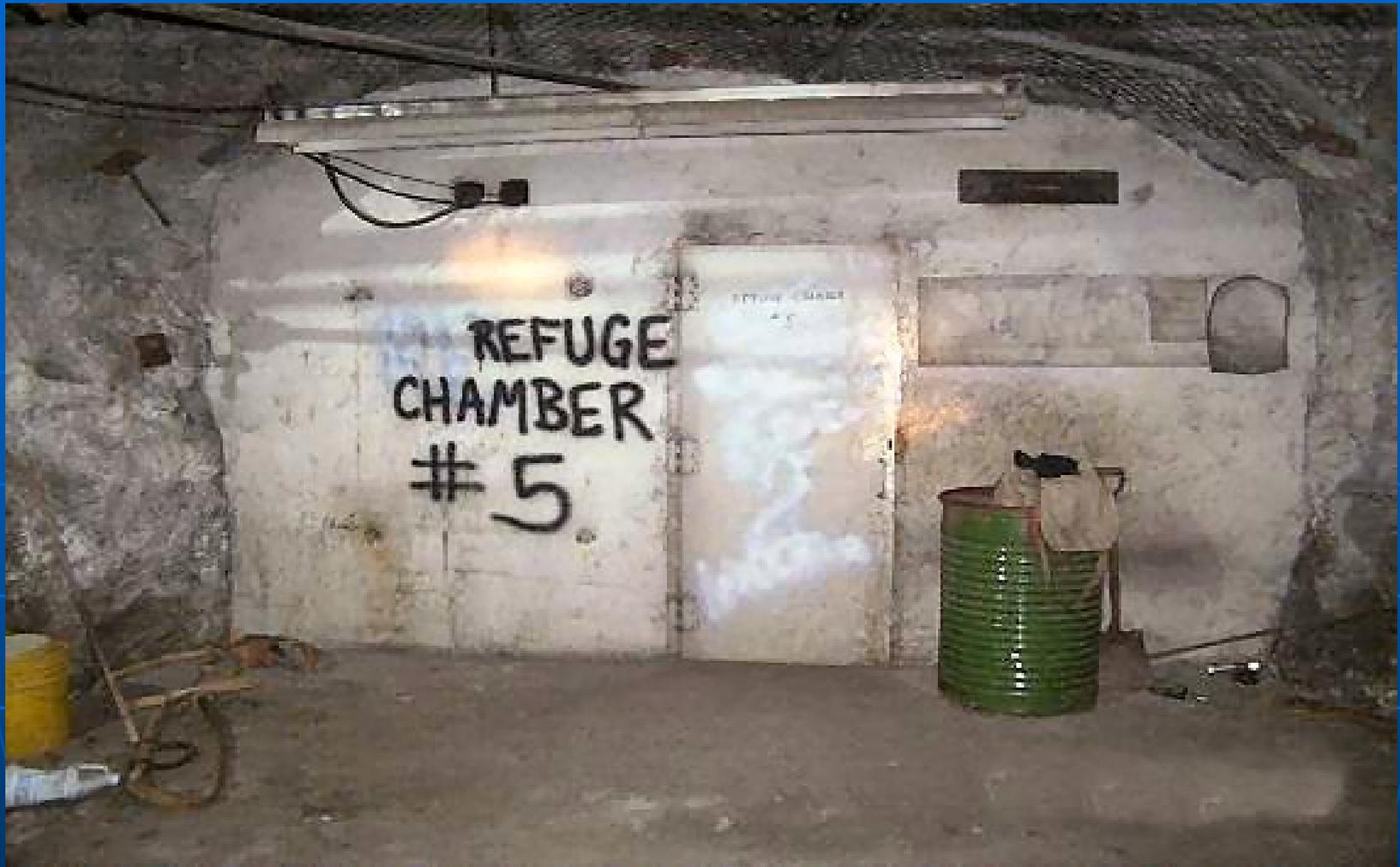
- 2 at 2500 feet level – 1 permanent, 1 portable**
- 2 at 3100 feet level – permanent**
- 1 at 3500 feet level – permanent**
- 1 at 3700 feet level – permanent**
- 1 at 3900 feet level – portable**

Distance from the work areas to the Refuge Areas vary from 700 to 1000 feet

Each Refuge Area is provided with water lines, air lines and pager telephones.

Toilet facilities, first aid supplies, additional bottled water, tools and materials for sealing are also provided

Carbon Dioxide scrubbers and food are not provided



Permanent Refuge Area at the 2500 level



Inside view of refuge area



Additional emergency supplies stored in Refuge Area



Portable Refuge Area



Inside view of portable Refuge Area

Recent Emergencies at Metal and Nonmetal Mines

- February 2, 2006
- Multi-level lead mine, 700-1000 feet
- Mobile scaling unit caught fire
- Stench with ventilation air
- 14 miners evacuated in 42 minutes
- Miners did not need to use their filter self rescuers

- **February 3, 2006**
- **Multi-level gold mine, 500 - 650 feet**
- **Jumbo drill unit caught fire**
- **Stench with ventilation air**
- **6 miners evacuated in 12 minutes**
- **2 miners utilized filter self rescuers**

- **February 20, 2006**
- **Single level salt mine-2,300 feet**
- **Mobile scoop unit caught fire**
- **Leaky feeder and mine phones**
- **40 miners evacuated in less than an hour**
- **Miners did not need to use their filter self rescuers**

Pasta de Conchos coal mine explosion

- February 19, 2006 – 65 miners trapped following a methane explosion
- Eight miners were able to escape
- Explosion caused 17 ground falls in both intake and return entries
- Eleven of the falls were impassable

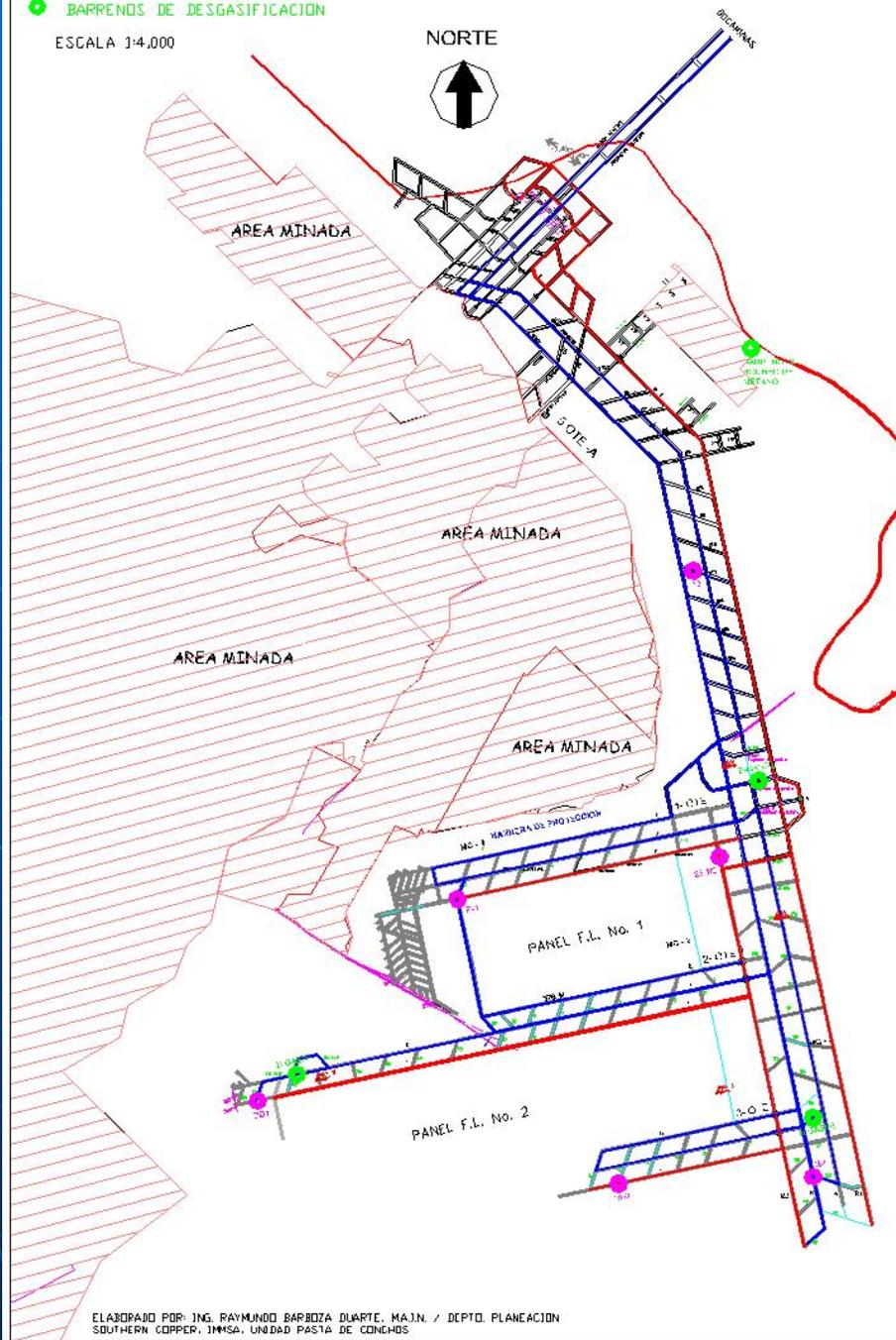
- **February 22nd - Request to provide MSHA personnel for technical assistance in the rescue efforts**
- **Assist with establishing constant gas sampling**
- **Provide advice regarding the efforts to rescue the trapped miners**

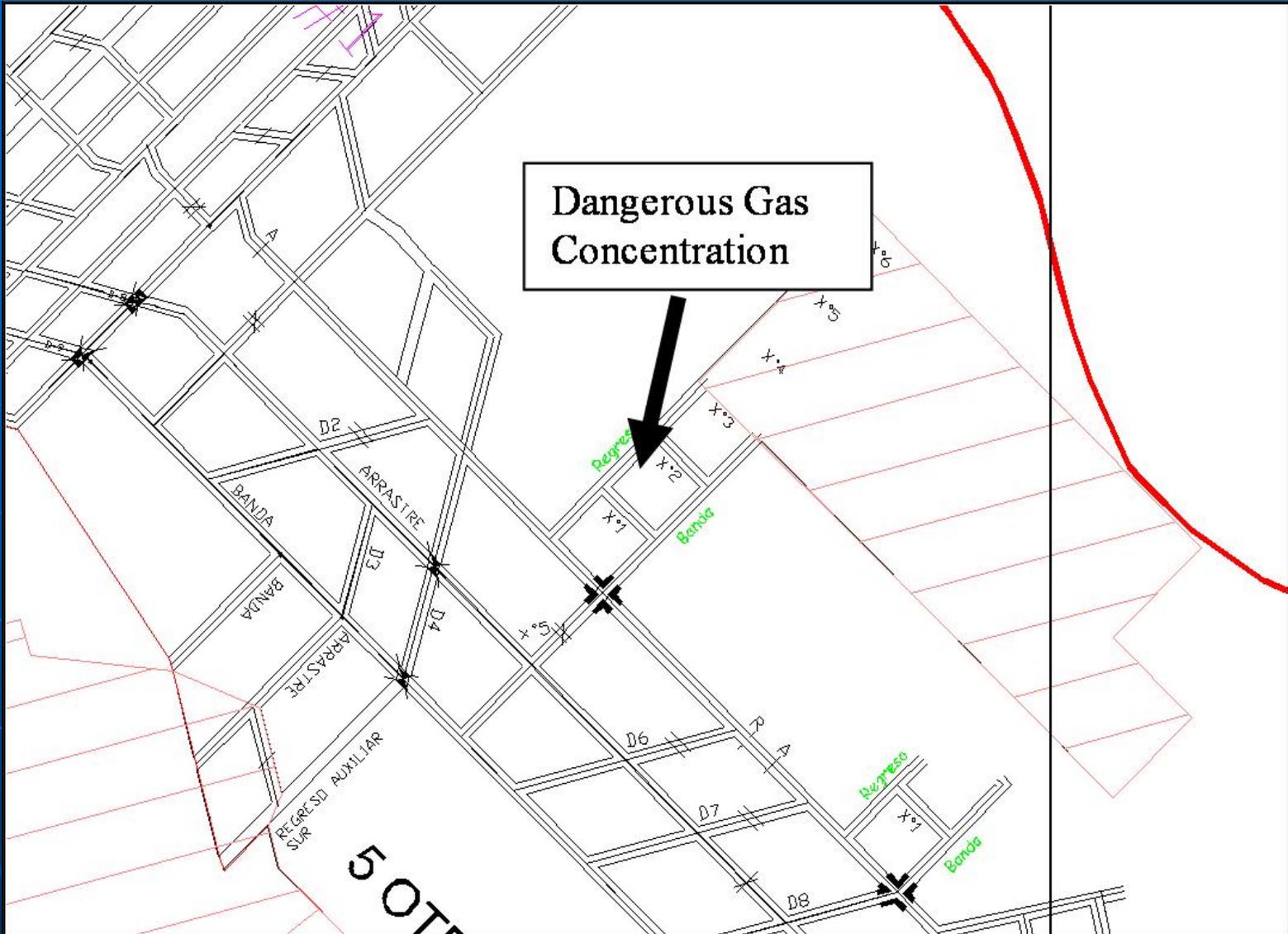
● BARRENDOS DE MEDICION DE GASES

● BARRENDOS DE DESGASIFICACION

ESCALA 1:4.000

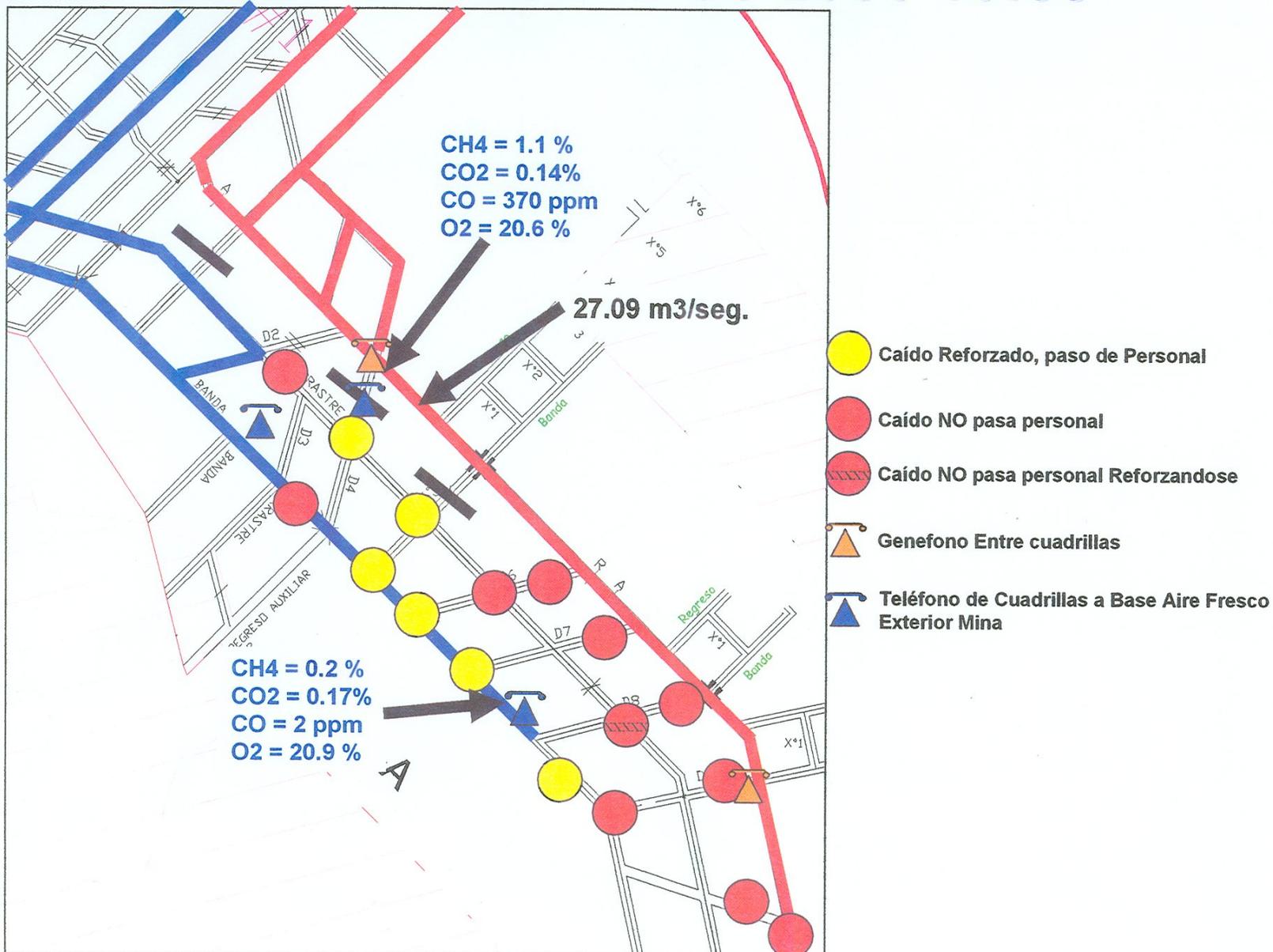
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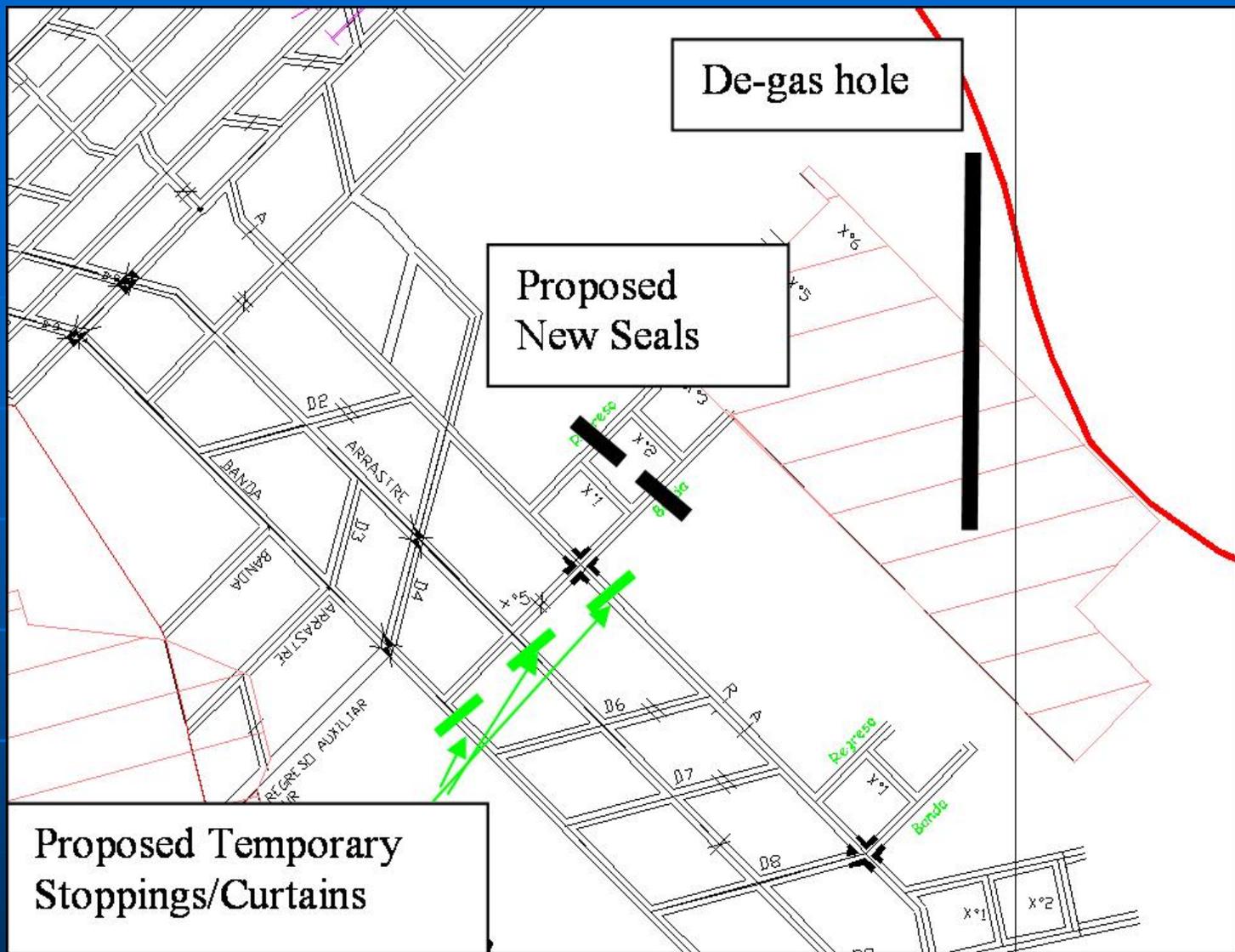




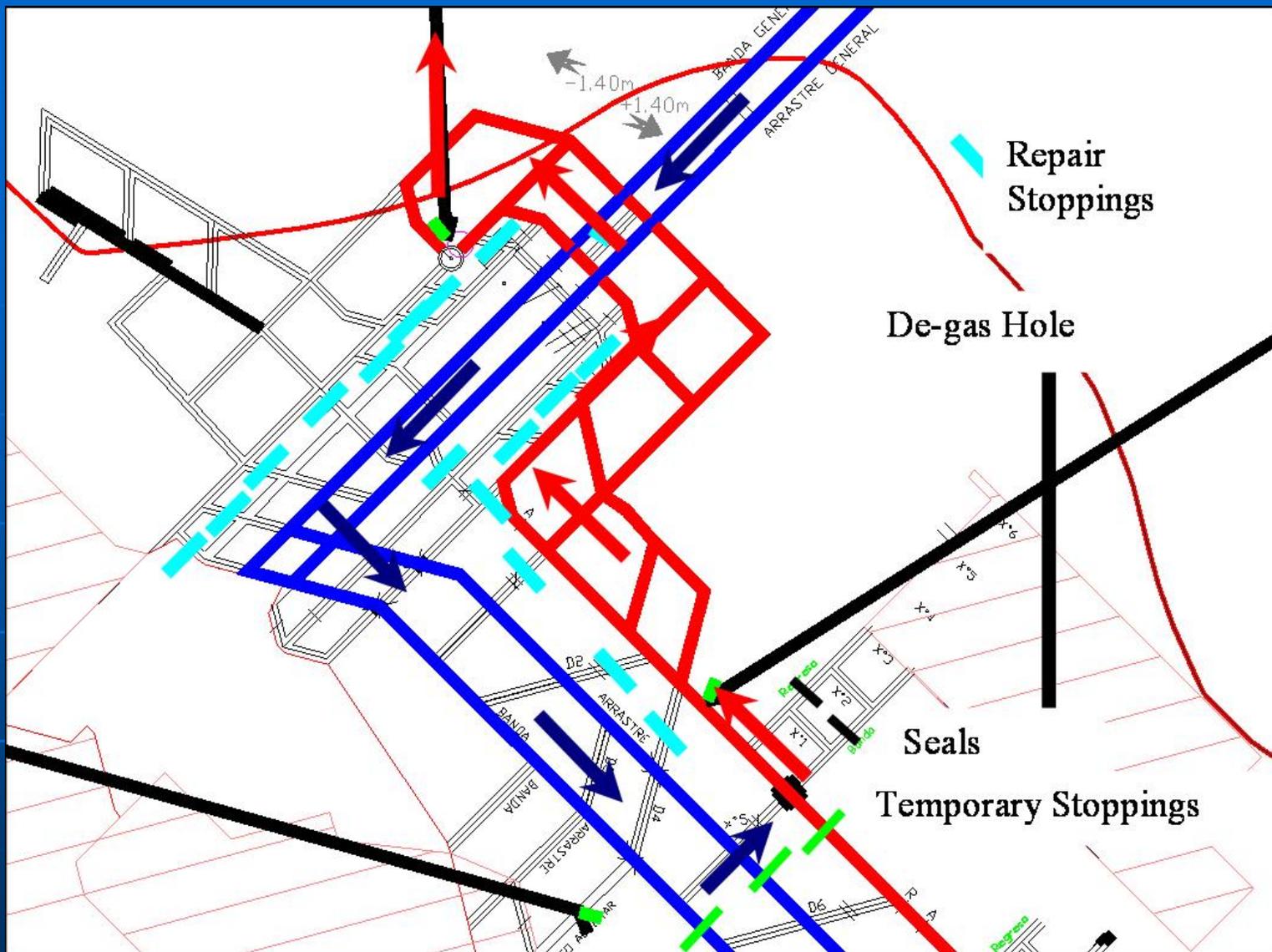
Current Conditions

Avance día 22 de Febrero de 2006 19:00





Map 2: Build temporary and permanent seals to block Regreso 1 North and Banda 1 North.



Map 3: Repair Stoppings to Cross-Cut #5.