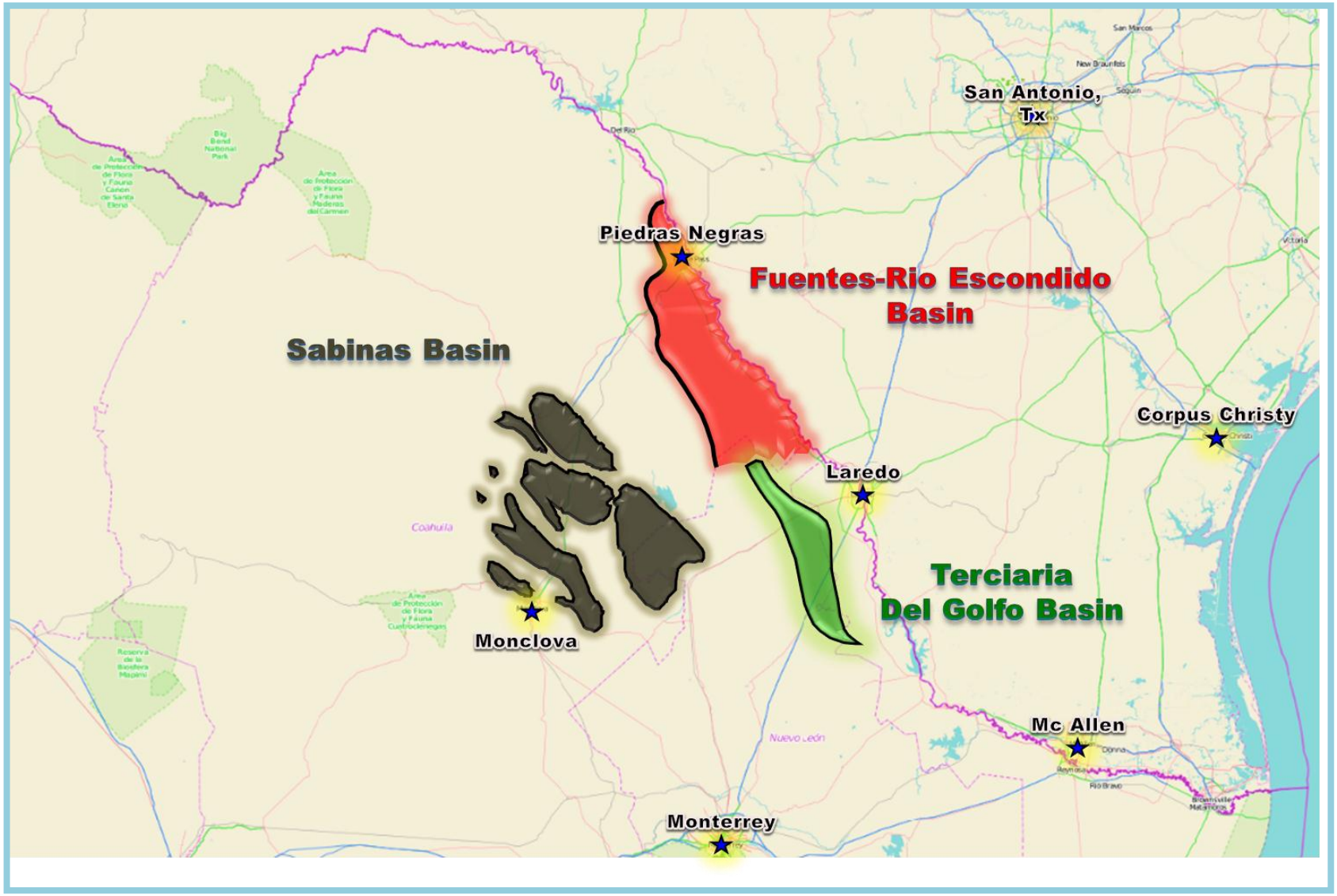
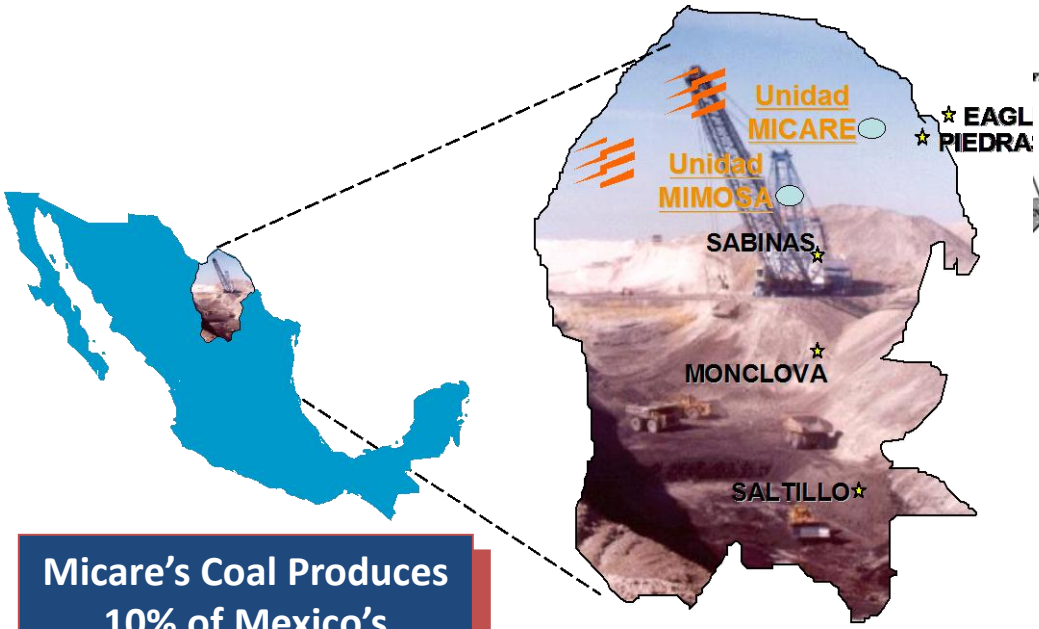
Mine VII Micare Unit
Minera del Norte S.A de C.v

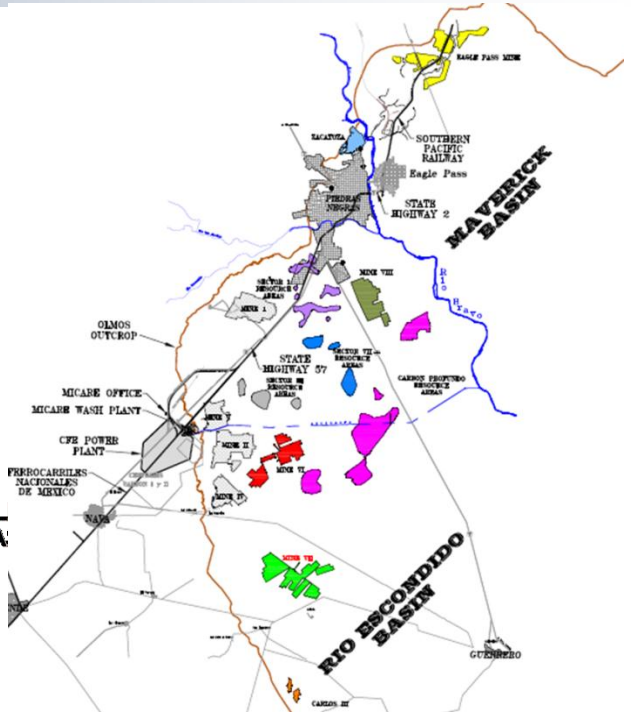
Coahuila -Mexico Coal Basins



Mine Location

Micare was established in 1977





Micare's Coal Produces 10% of Mexico's Electricity

We Operate:

- 2 Underground Mines
- 1 Open Pit Mine
- 2 Wash Plants

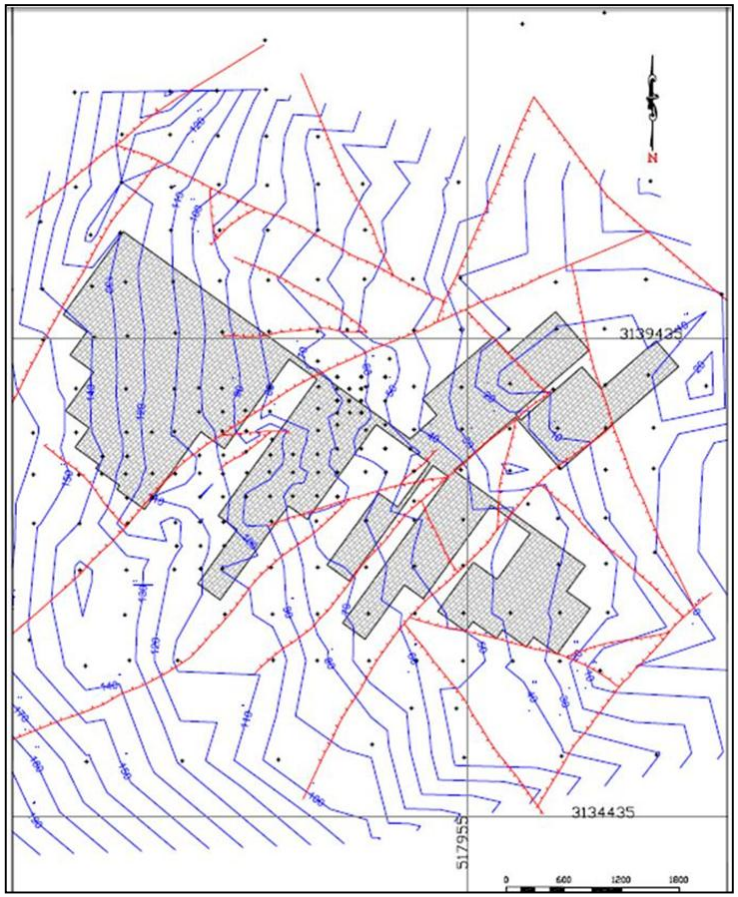
Our Thermal Coal Client:

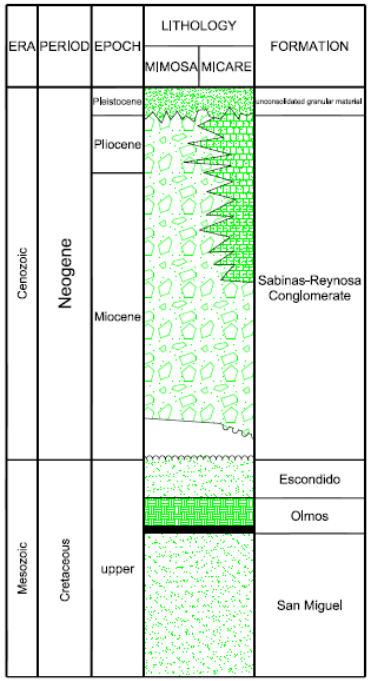
"Comision Federal de Electricidad" Mexican Goverment Entity

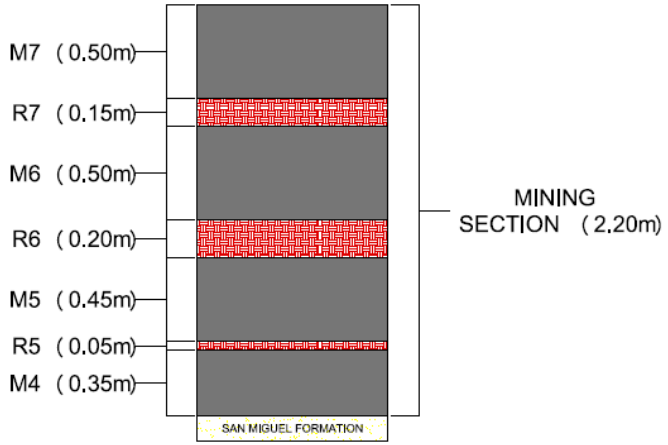
Micare's Production:

7 millions tonnes of thermal coal annually.

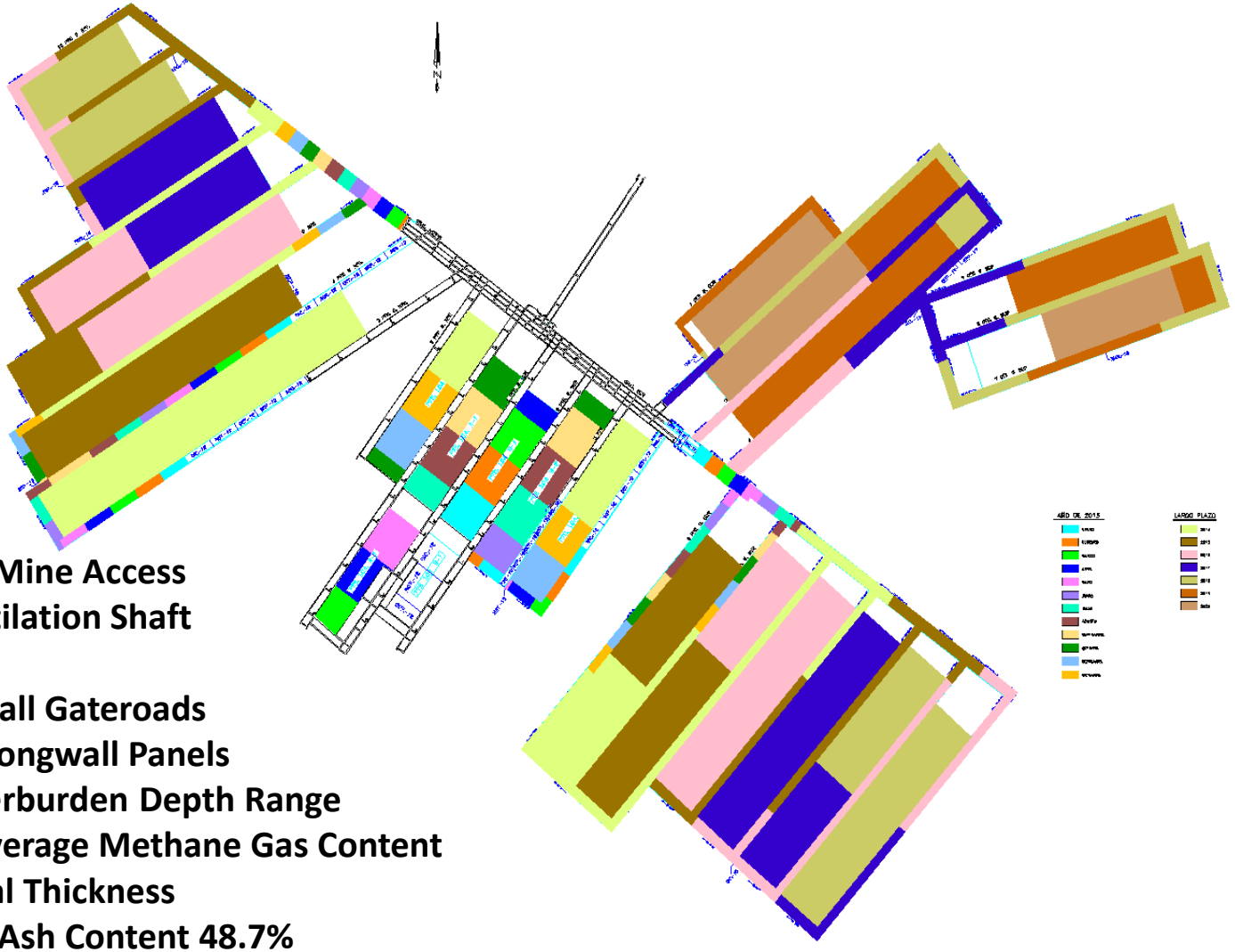
Geology-Column Type







Mine VII Description

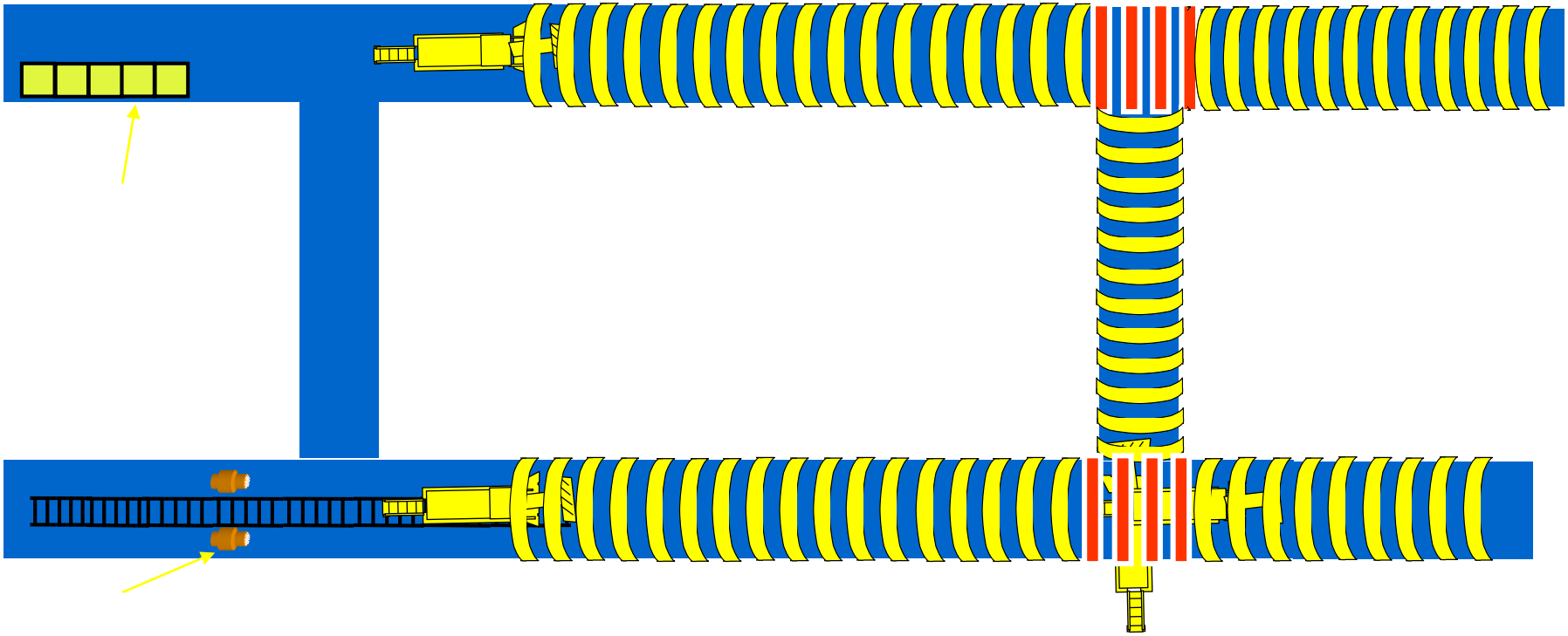


- 2-Entry Slope Mine Access
- 1 Vertical Ventilation Shaft
- 4-Entry Mains
- 2-Entry Longwall Gateroads
- 24 Projected Longwall Panels
- 180-340m Overburden Depth Range
- 7 m^3/tonne Average Methane Gas Content
- 1.7 – 3.0m Coal Thickness
- Average ROM Ash Content 48.7%

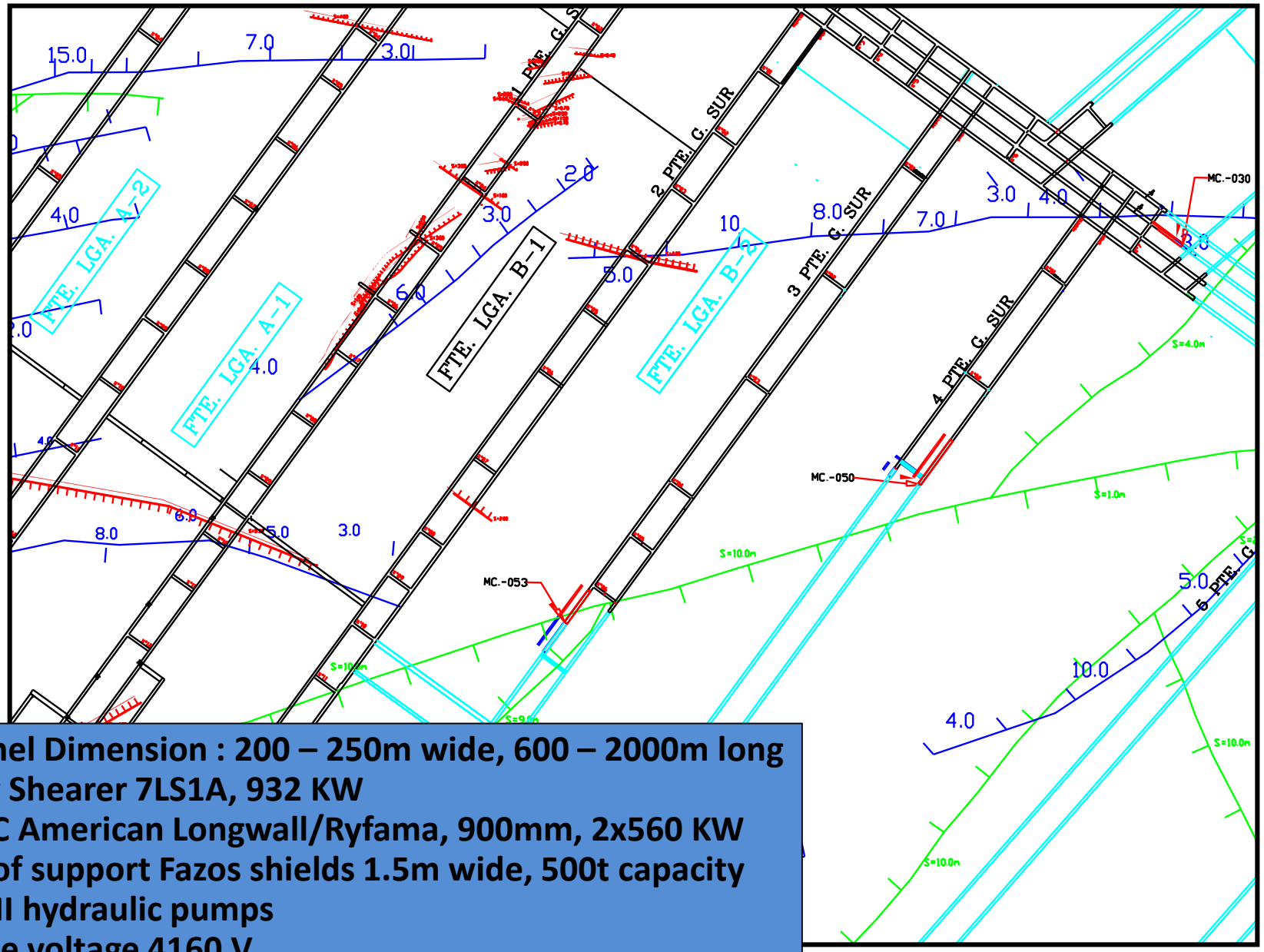
CONCEPTO	UNIDAD	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL
Produccion	TONS	636,143.3	3,805,062	4,019,901	4,064,306	4,067,479	3,887,154.0	3,732,210	2,350,469	2,224,051	28,786,774.4
ceniza	%	62.3	50.2	49.0	48.5	47.3	49.0	47.1	48.1	47.9	48.7
F. Larga	m	12,472.5	20,806.6	20,865.6	20,476.8	17,273.6	12,297.6	12,412.8	4,959.2		121,564.6
Desarrollos	m	437.6	4,275.9	3,453.4	3,712.8	3,819.2	3,570.4	3,557.2	3,157.2	2,728.9	28,712.6

Gateroad Development

- 8 to 9 Alpine AM-50 or IBS-130 road headers for mains and gateroad development
- 2-entry gateroad, horseshoe shaped entries having dimensions 4m wide x 3m high
- Steel arches 33 kg/m installed on 1m spacing with steel mesh between the arches
- Pillars dimensions 40m x 150m
- 2 face fans/section, 75/150 HP, blowing or exhausting
- 914 x 3000 mm (36”x10´) fiberglass ventilation tube
- Advance Rates: 20,000m/year, 190m/month/unit

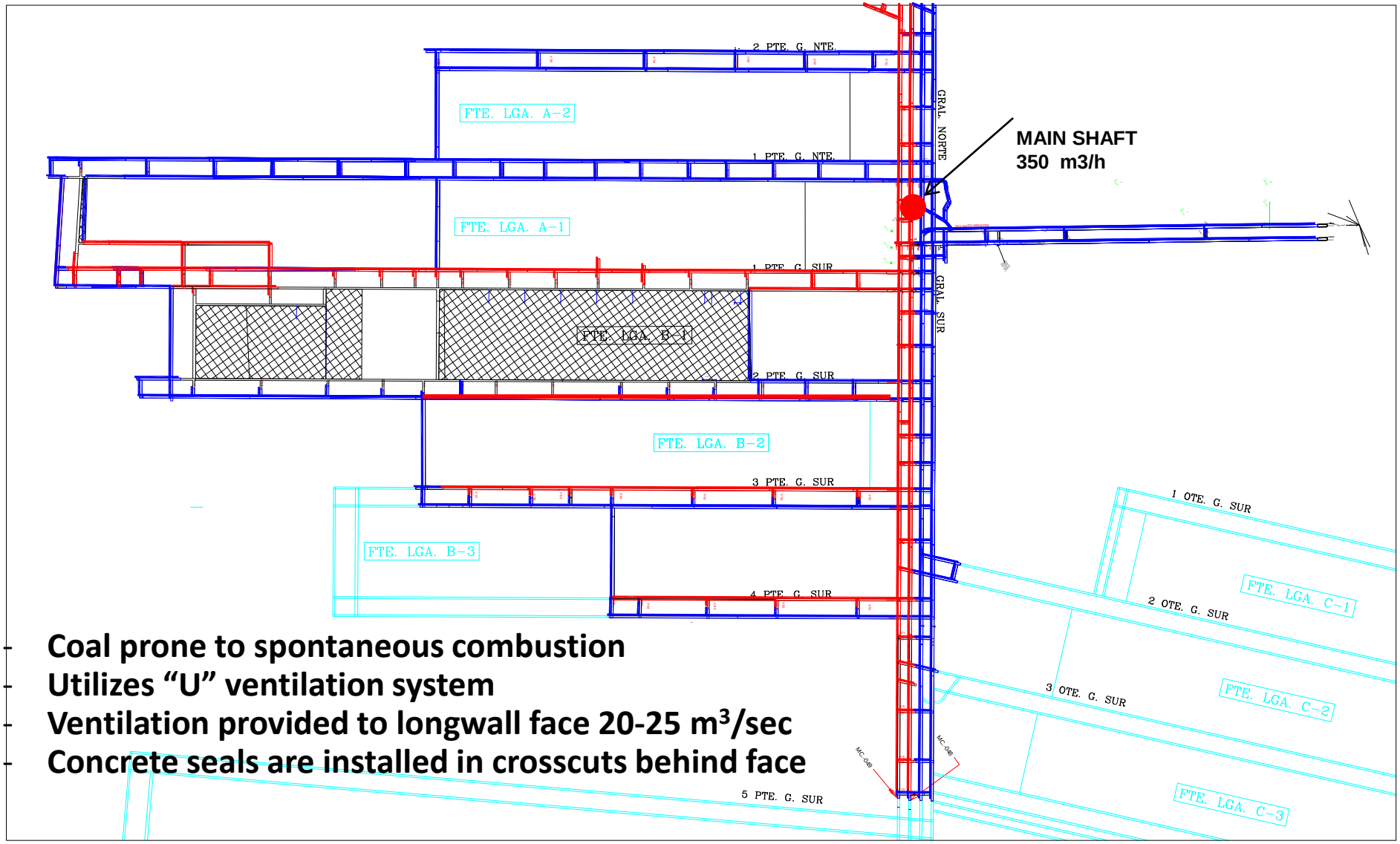


Longwall Characteristics



- Panel Dimension : 200 – 250m wide, 600 – 2000m long
- Joy Shearer 7LS1A, 932 KW
- AFC American Longwall/Ryfama, 900mm, 2x560 KW
- Roof support Fazos shields 1.5m wide, 500t capacity
- RMI hydraulic pumps
- Face voltage 4160 V

Longwall Ventilation System



- Coal prone to spontaneous combustion
- Utilizes “U” ventilation system
- Ventilation provided to longwall face 20-25 m^3/sec
- Concrete seals are installed in crosscuts behind face

Longwall Gas Control

* Gob gas wells
* 90m spacing along panel, 30m off TG
* 450lps gas well pump capacity
* Gas wells completed 5m above coal seam
* Slotted steel pipe casing

MINERA DEL NORTE

Automated Monitoring System (AMS)

Infrastructure

Automated Monitoring System (AMS) – The main objective of the AMS is to monitor in real time the gas concentration in the working faces and other mine areas such as conveyor belts and returns, safe guarding the personnel's integrity and mine infrastructure.

The most common measured gases in coal mining are: Methane (Ch4), Carbon Monoxide (CO), CO-Smoke for conveyor belts, among several others.

The system can shut down electrical power to a mine section once the concentration goes above the configured value; the same applies to conveyor belts. This is accomplished by programming the system with the maximum allowed values.

Mine evacuation alarms are also controlled via the Automated Monitoring System.

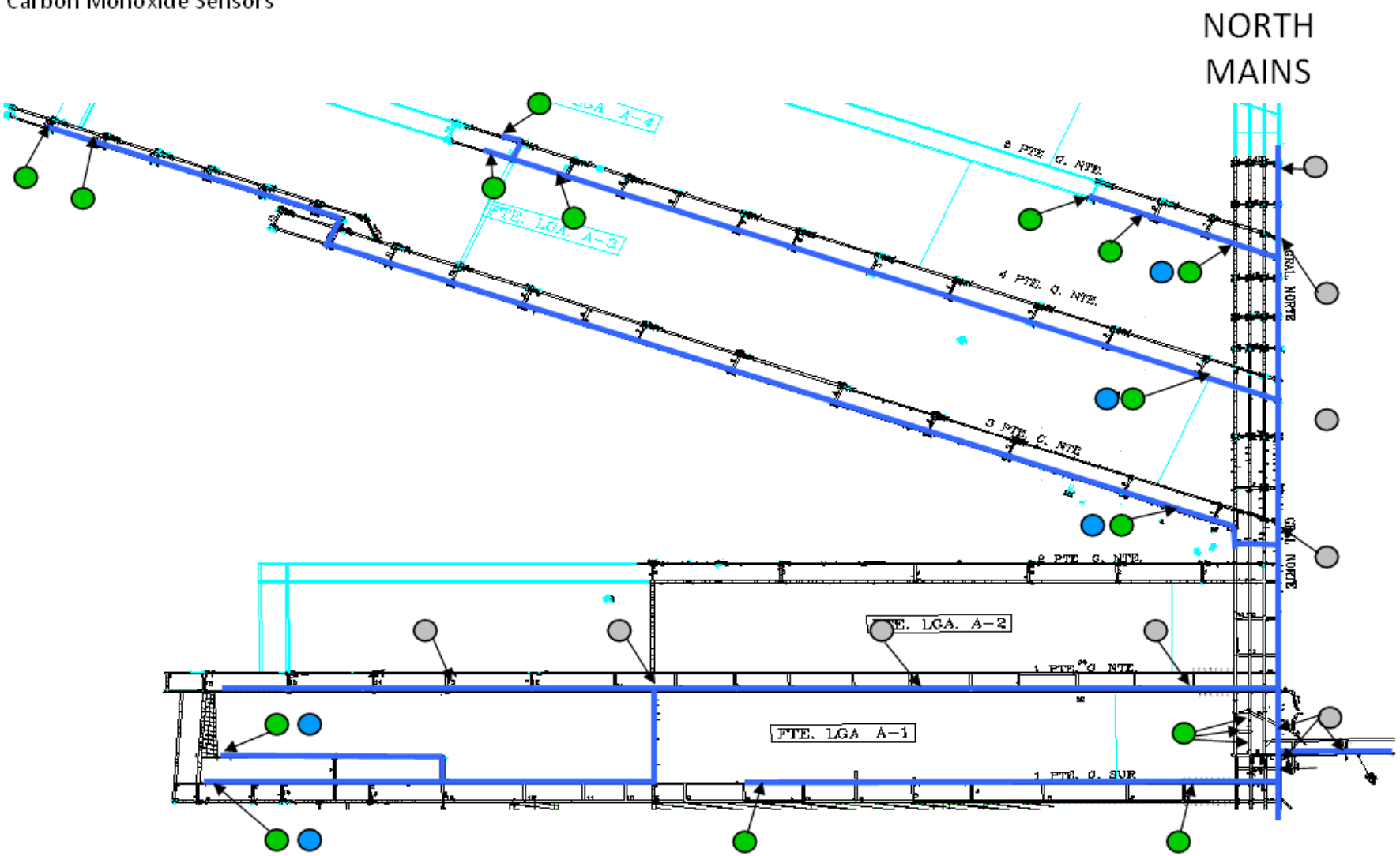
Mine Control Room – Personnel are available all shifts to monitor the gas measurements in the mine. Feedback is given to supervisors about the mine gases concentrations and actions are taken accordingly.

MINERA DEL NORTE

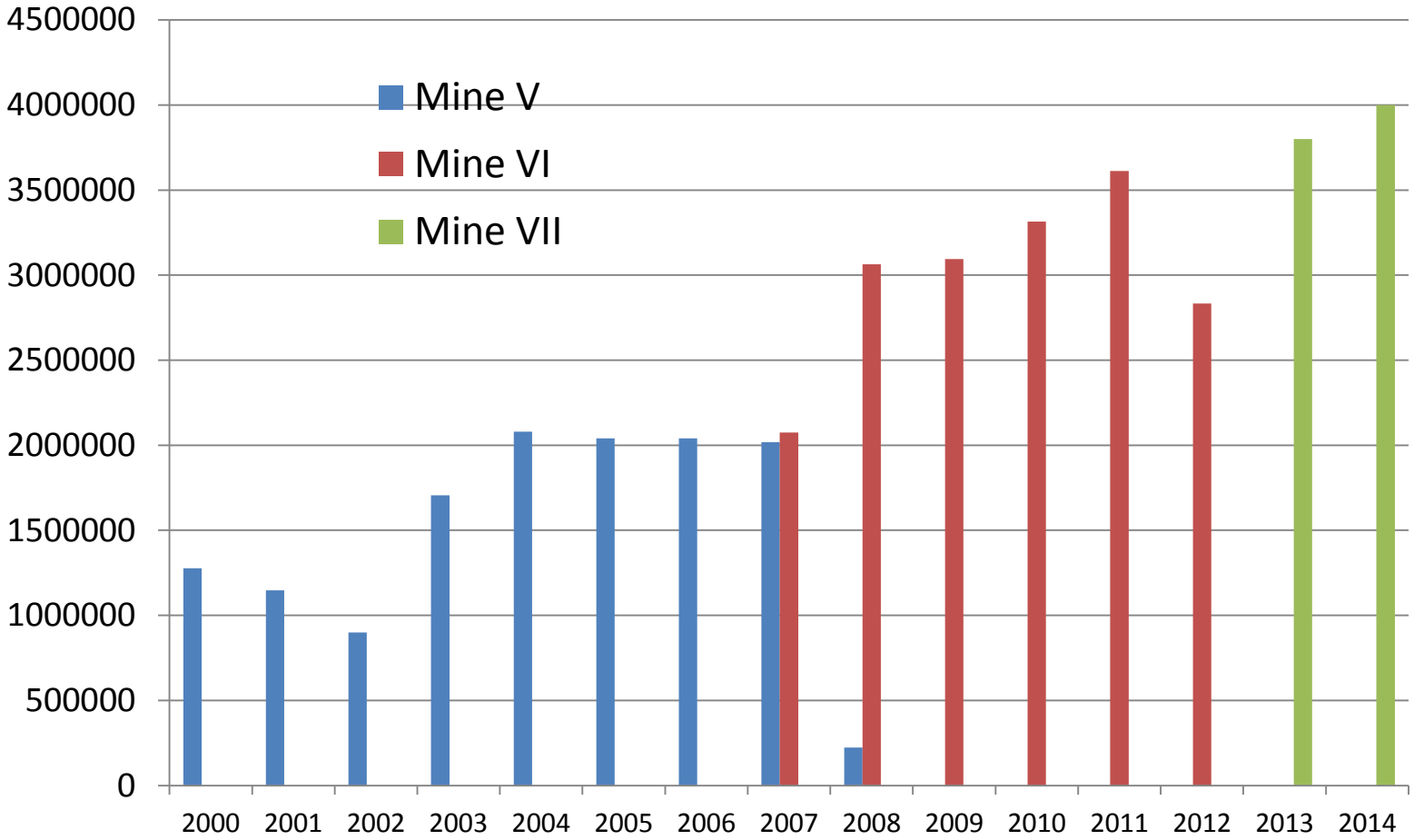
Automated Monitoring System (AMS)

Sensor Type and Location

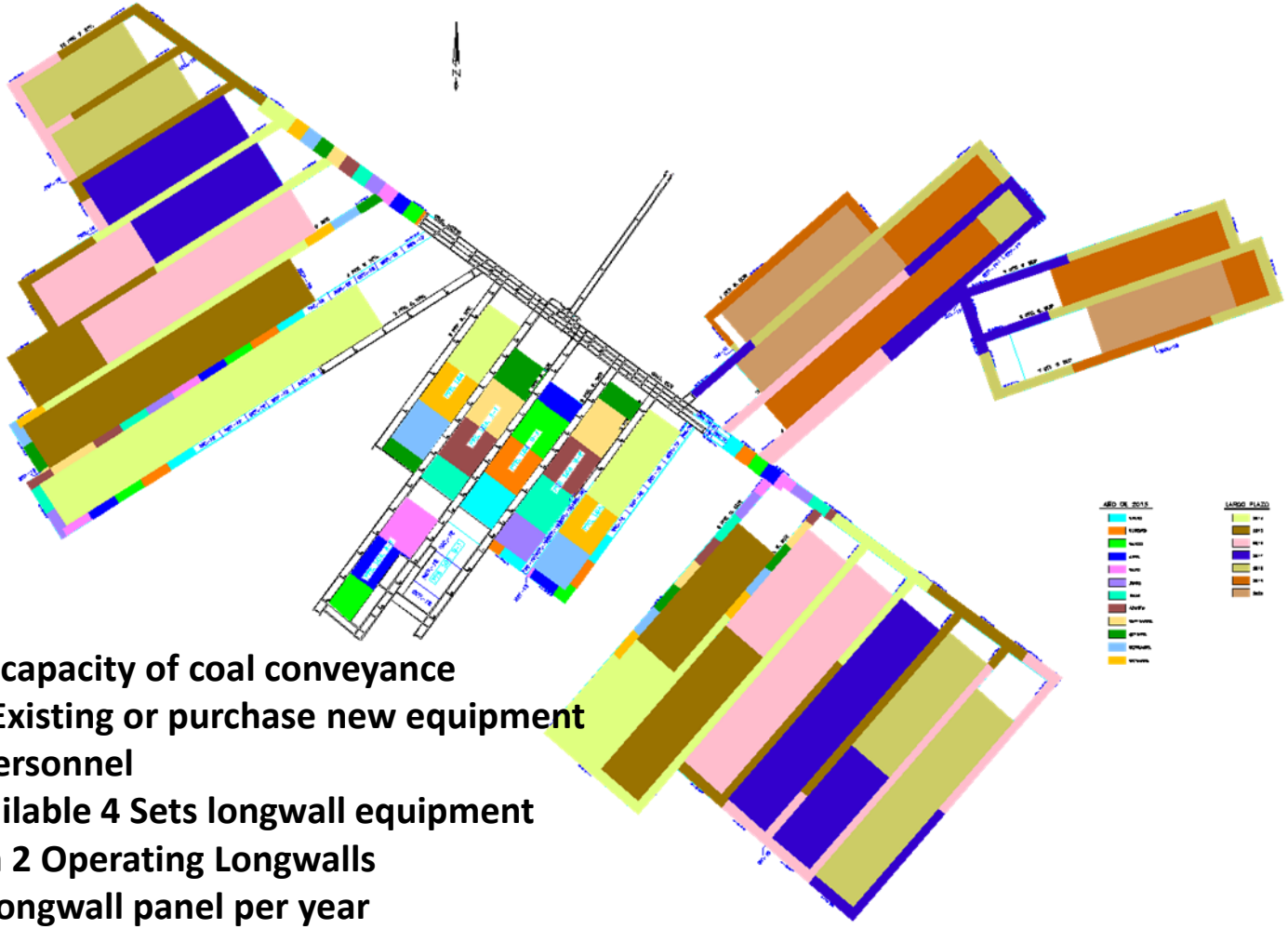
- Methane Sensors
- Carbon Monoxide Sensors
- Carbon Monoxide Sensors



Historical Underground Mine Production Micare Unit



4M Tonne Annual Production Strategy



- Increase capacity of coal conveyance
- Rebuild Existing or purchase new equipment
- Skilled Personnel
- Have available 4 Sets longwall equipment
- Maintain 2 Operating Longwalls
- Mine 4 Longwall panel per year

CONCEPTO	UNIDAD	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL
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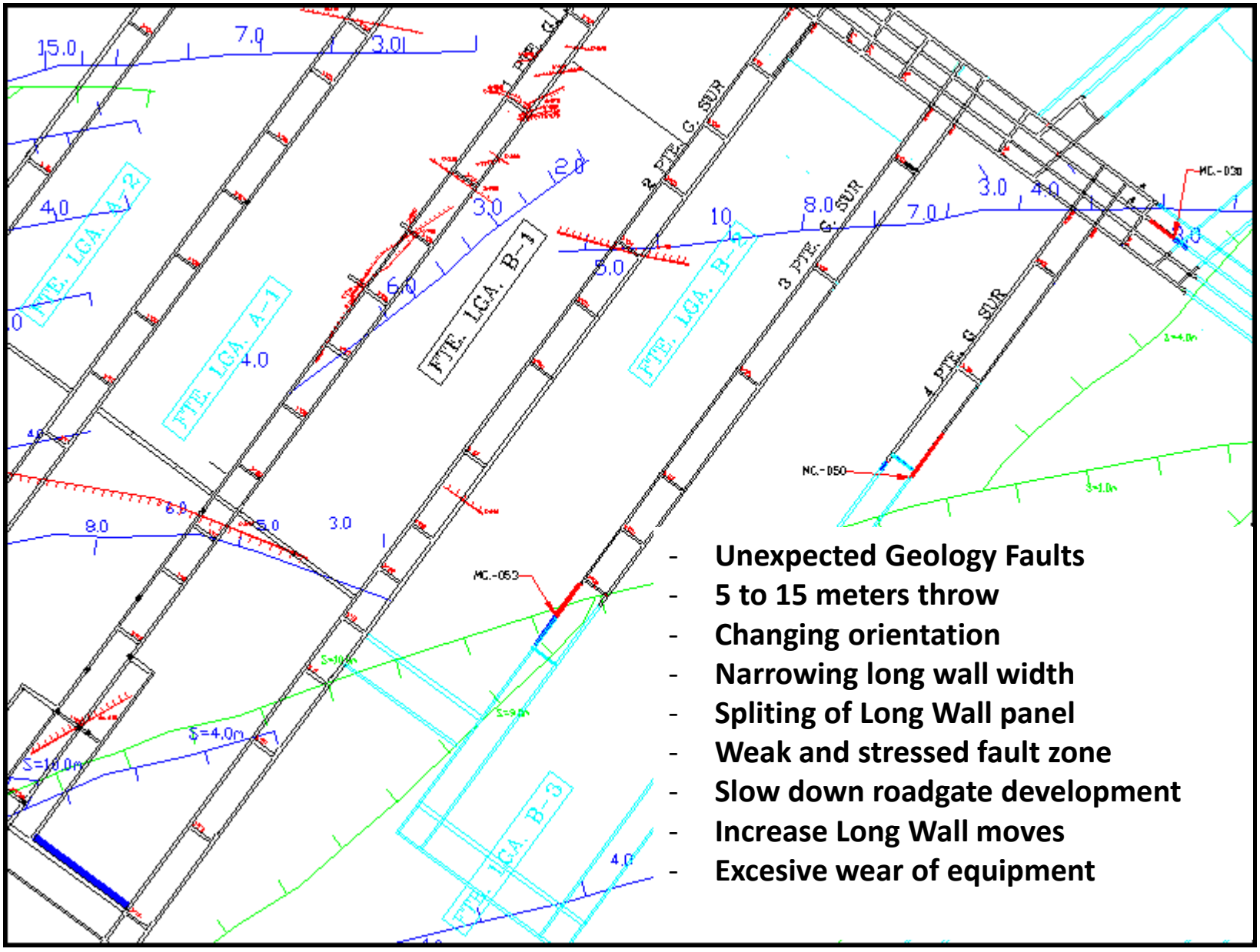
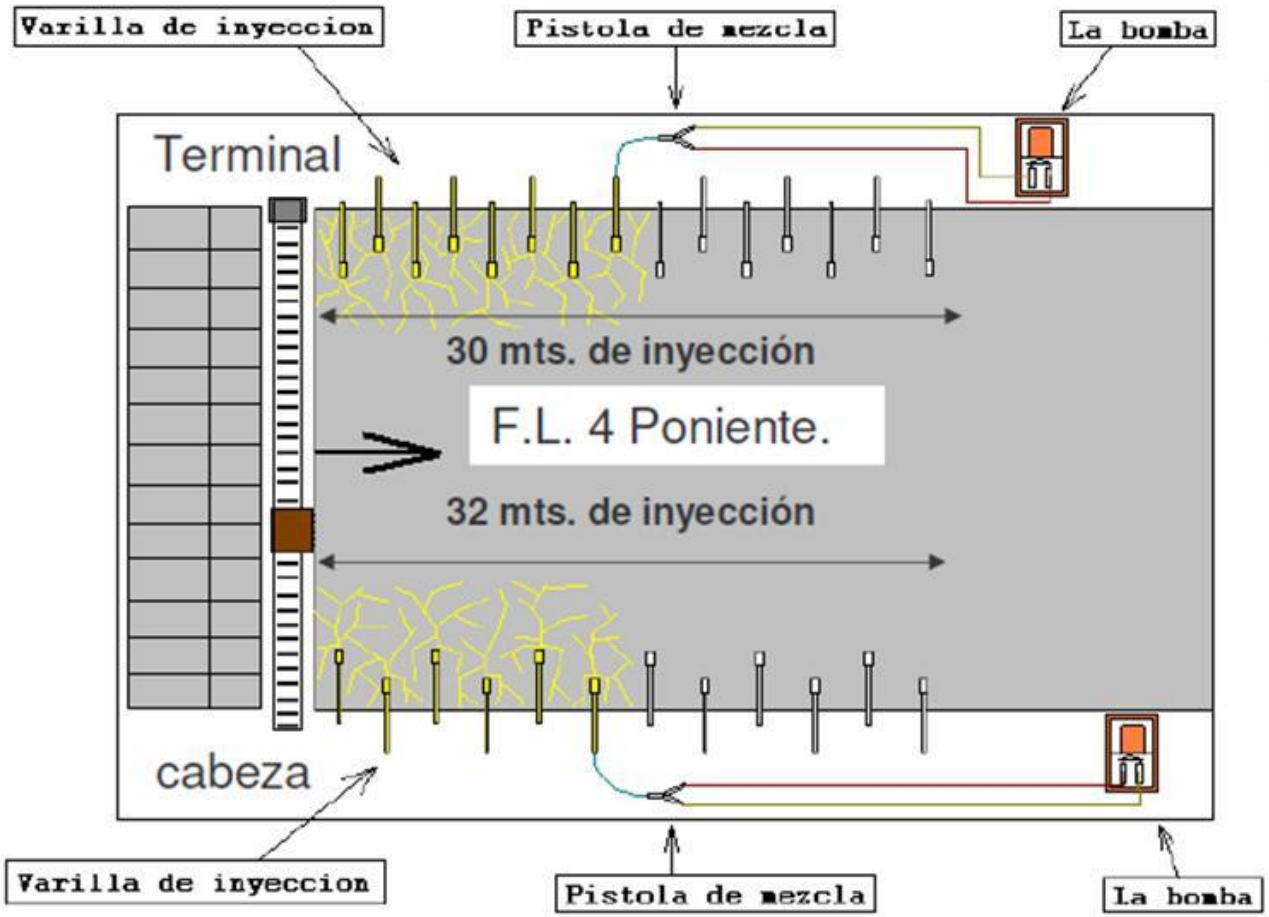
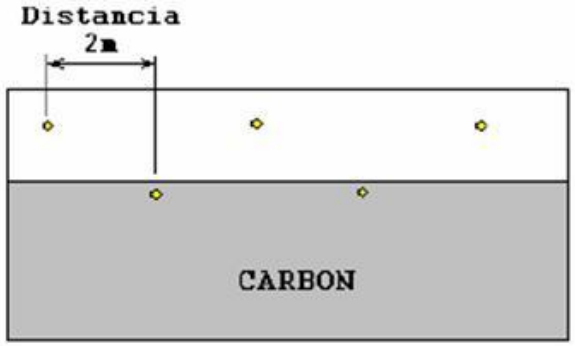
4 MM T Production Constraints

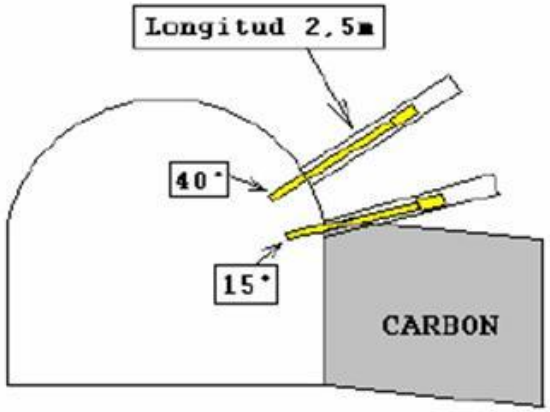


- Unexpected Geology Faults
- 5 to 15 meters throw
- Changing orientation
- Narrowing long wall width
- Spliting of Long Wall panel
- Weak and stressed fault zone
- Slow down roadgate development
- Increase Long Wall moves
- Excesive wear of equipment

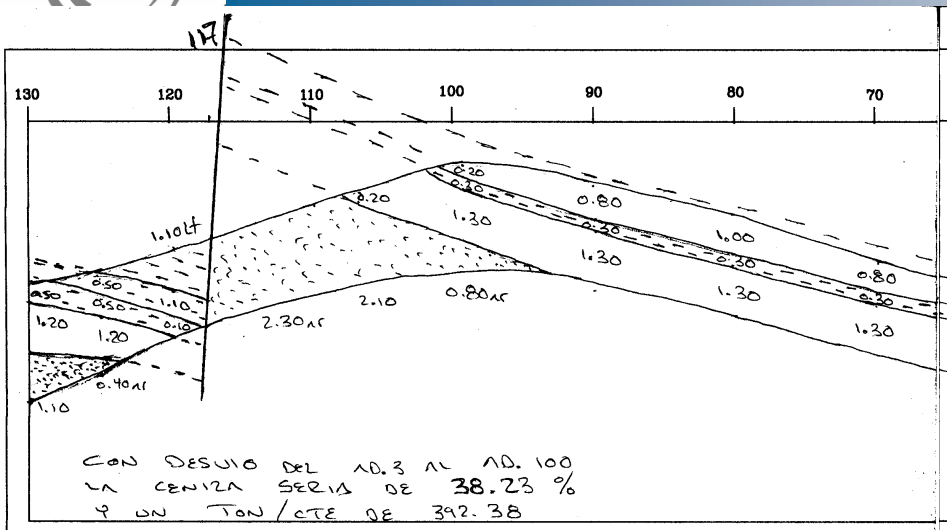
Longwall polyurethane injection system

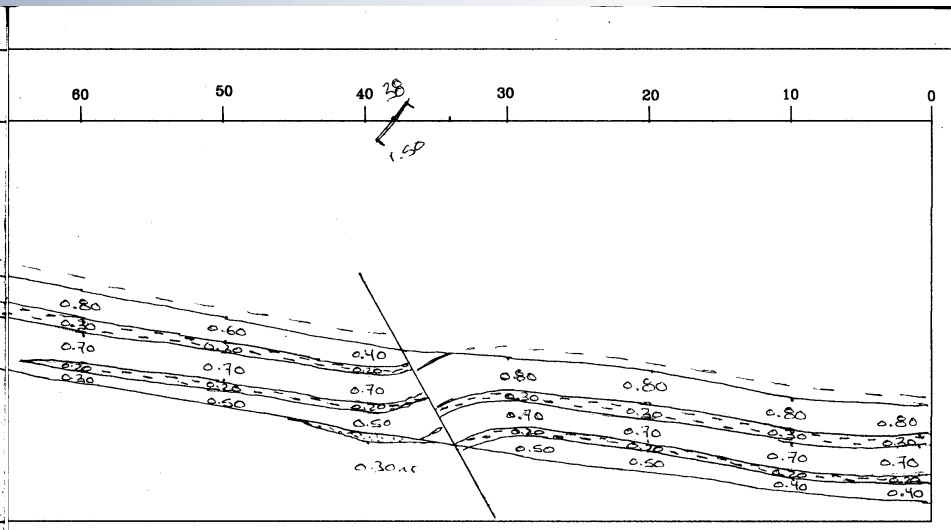


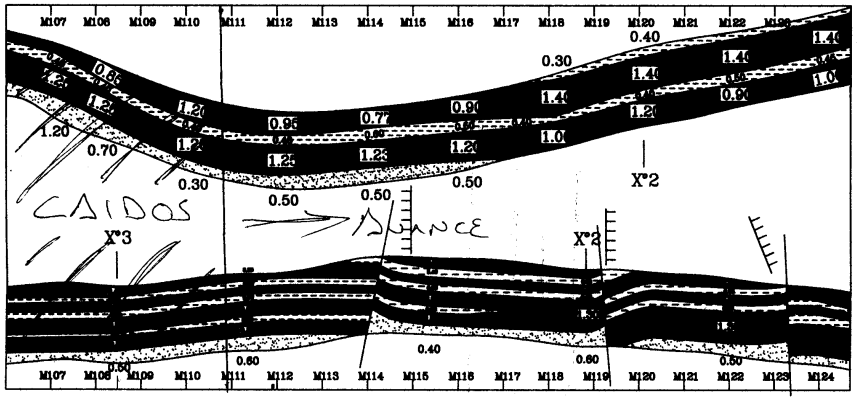


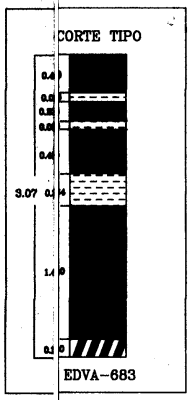


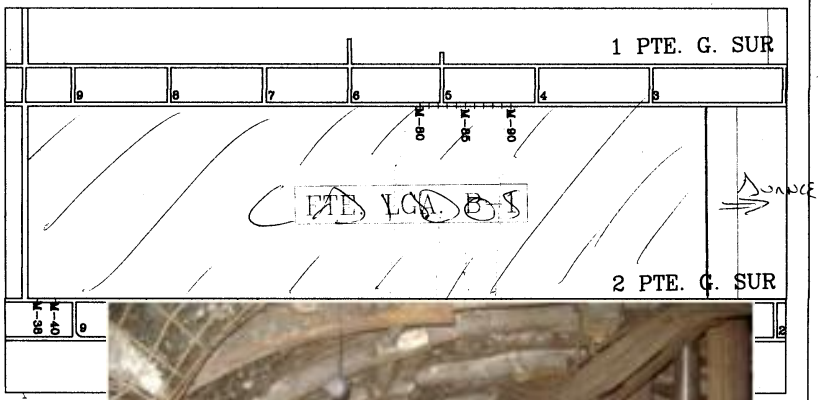
Negotiating Faults in Longwall Panels











RESULTADOS POR CORTE	
ESPESOR DE CARBON	1.84
ESPESOR DE ESTERIL	0.54
ESPESOR DE CORTE	2.38
DENSIDAD ACUMULADA	1.72
% CENIZA ACUMULADA	51.70
% AZUFRE ACUMULADO	0.66
TONELADAS POR CORTE	530.74

AVANCE	
BANDA:	0.40 P/M 111
RGSO:	1.70 P/M 111

OBSERVACIONES GENERALES

GEOLOGÍA

CONTAMINACIÓN POR PATA: LLANTENER CORTE EN TODA LA FRENTE LARGA POR LA FALLA GEOLOGICA DEL NO. 117

CONTAMINACIÓN POR CIELO:

OK

CONTAMINACIÓN POR FALLA: LA FALLA GEOL. SE ENCUENTRA EN NO. 117

Action Plan to Manage Mining Constraints

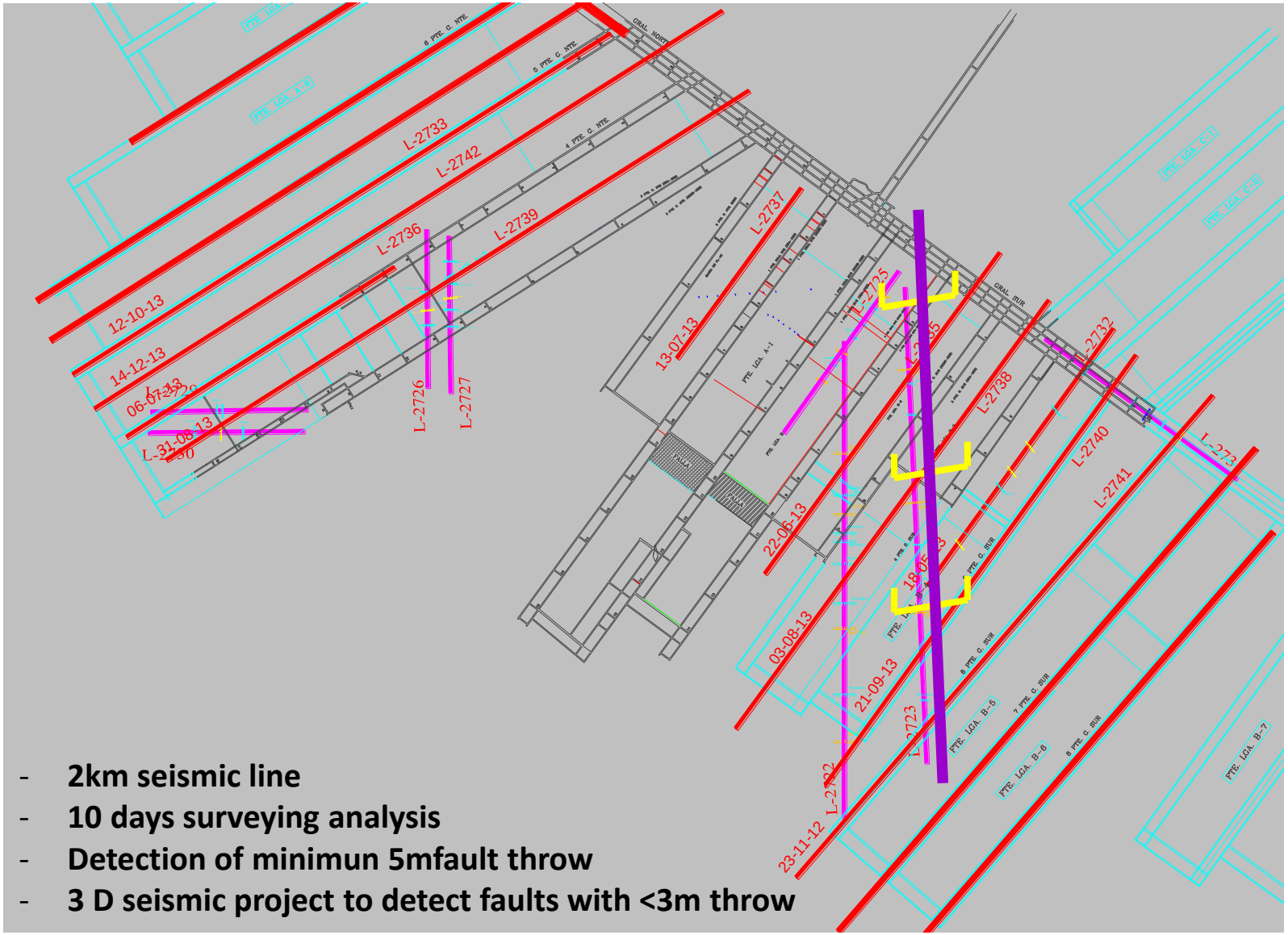
Timely Fault Detection for Mine Planning

- Reduce the size of the exploration grid (increased drilling)
- Utilize seismic detection methods

Decrease Longwall Move Duration Times

- Acquire spare components/parts in advance
- Increase gateroad development rates
- Increase productivity
- Increase number of roadheader units
- Reduce roof support cost
- Rebuild equipment in-house

Geologic Fault Detection - Reflection Seismic Method



Geological Fault Detection - Reflection Seismic Method