METHANE EXPO 2013

THE RESULT OF GAS DRAINAGE AT KHE CHAM COAL MINE AND FORECAST OF DEVELOPING POTENTIAL GAS DRAINAGE AT UNDERGROUND COAL MINES IN QUANG NINH COAL BASIN, VIETNAM

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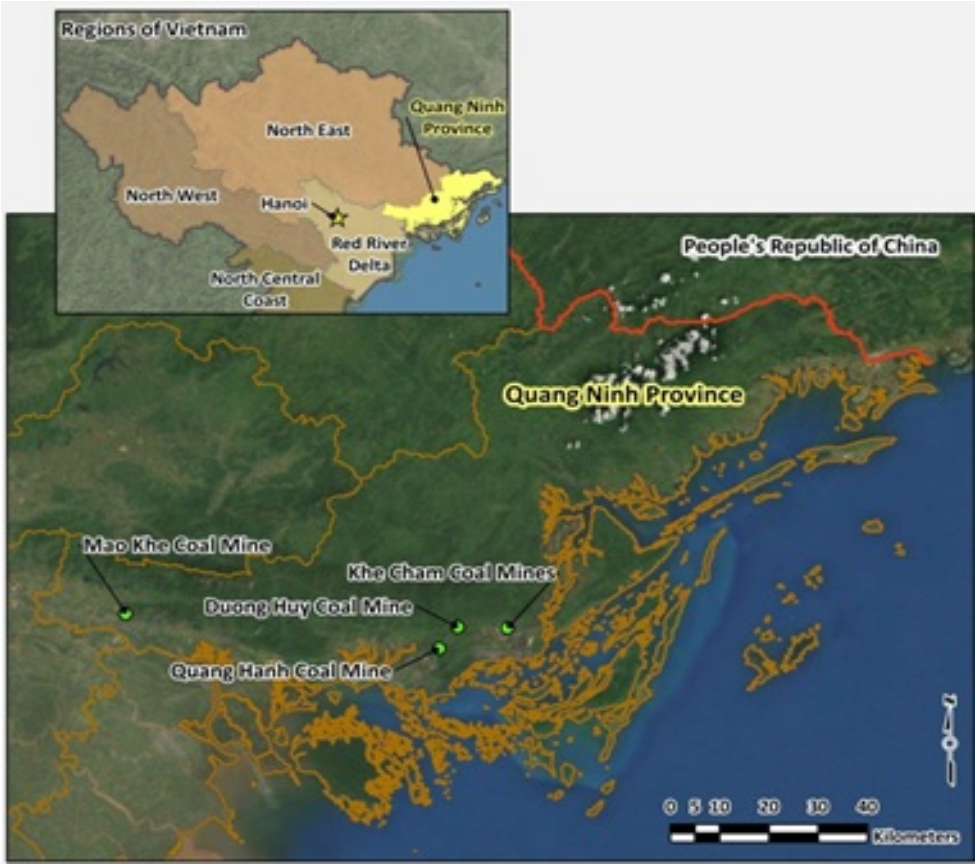
1. INTRODUCTION

- **83 million cubic meters of methane** was flared to the atmosphere during extraction of 32.4 million metric tons of coal in Viet Nam in 2005.



1. Introduction

- Four gassy mines (Mao Khe, Khe Cham, Quang Hanh and Duong Huy) were identified.
- The expected coal production in **2015 is 10 million tons of coal which would liberate 99 Million m3 of methane to the atmosphere**.

Gas Hazards Categories Used to Classify Vietnamese Coal Mines Using Relative Emissions								
Class	Gas Liberated expressed in m^3 CH_4/tonne of coal mined				Classification of Underground Coal Mines of Quang Ninh Province Showing Forecasted Coal Production and Gas Liberation			
	Minimum	Maximum	Mean Value of Lognormal Distribution Used	Mining Complex Name	Forecast Coal Production 2015	Forecast Coal Production 2012 through 2015	Forecast Gas Liberated 2015	**Forecast Gas Liberated 2012 through 2015**
I	0	5	2.12	Duong Huy	2,596,250	8,055,347	5,511,318	**17,099,885**
II	5	10	7.07	Quang Hanh	1,870,000	6,470,000	13,221,191	**45,743,908**
III	10	15	12.1	Khe Cham	3,070,000	8,800,000	37,139,183	**106,457,594**
Super Class		>15	17.07	Mao Khe	2,550,000	8,900,000	43,528,897	**151,924,387**

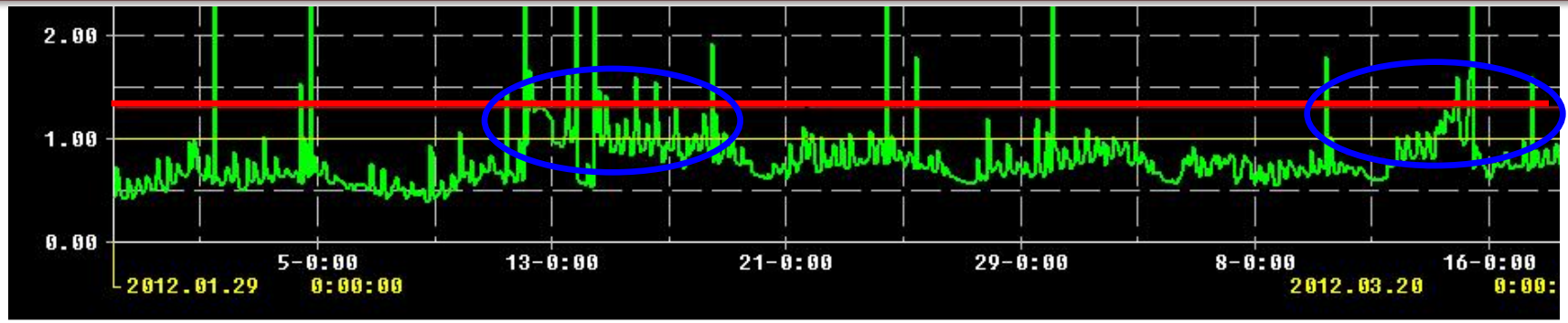
Sources: Raven Ridge Resources Incorporated

1. Introduction

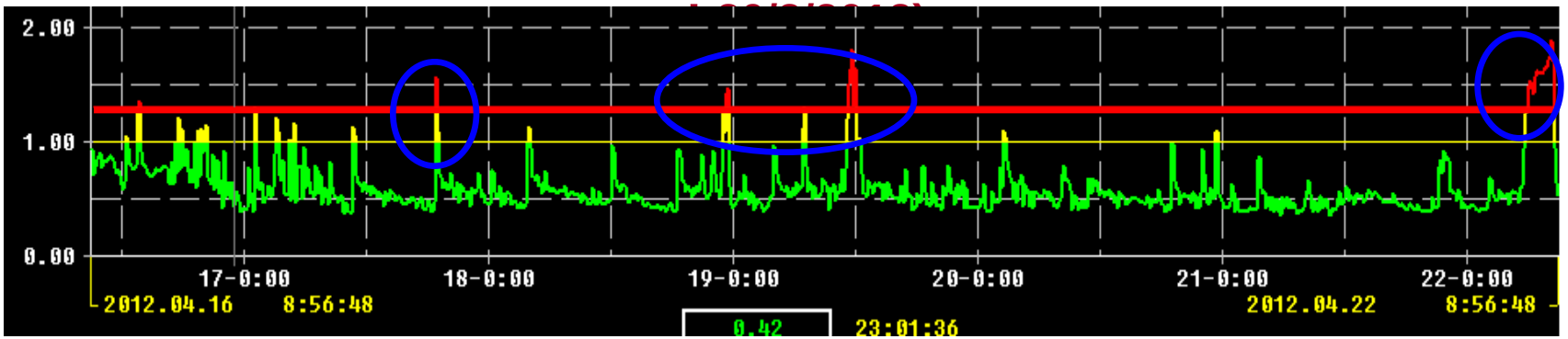
Methane recovery and potential utilization in Khe Cham coal mine and other mines in the future

- The Vietnam National Coal - Mineral Industries Holding Corporation Limited (Vinacomin) considers installation of gas turbine generator or gas combustion engine using the mine's own gas as fuel.
- The methane degasification system was installed at Khe Cham I coal mine.
- The success of methane drainage and utilization in Khe Cham mine will encourage expansion of similar systems in other coal mines.

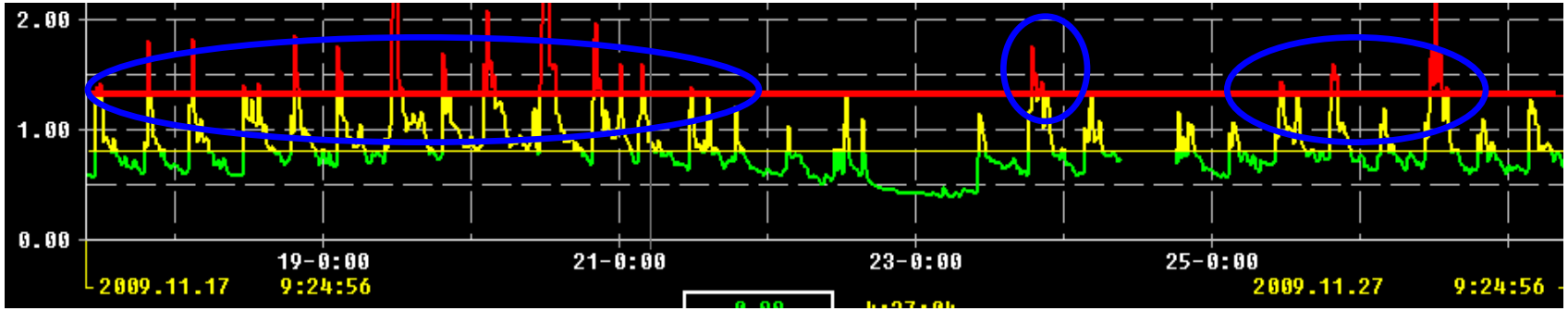
1. Introduction



V13.1 seam, Khe Cham coal mine (29/1/2012)

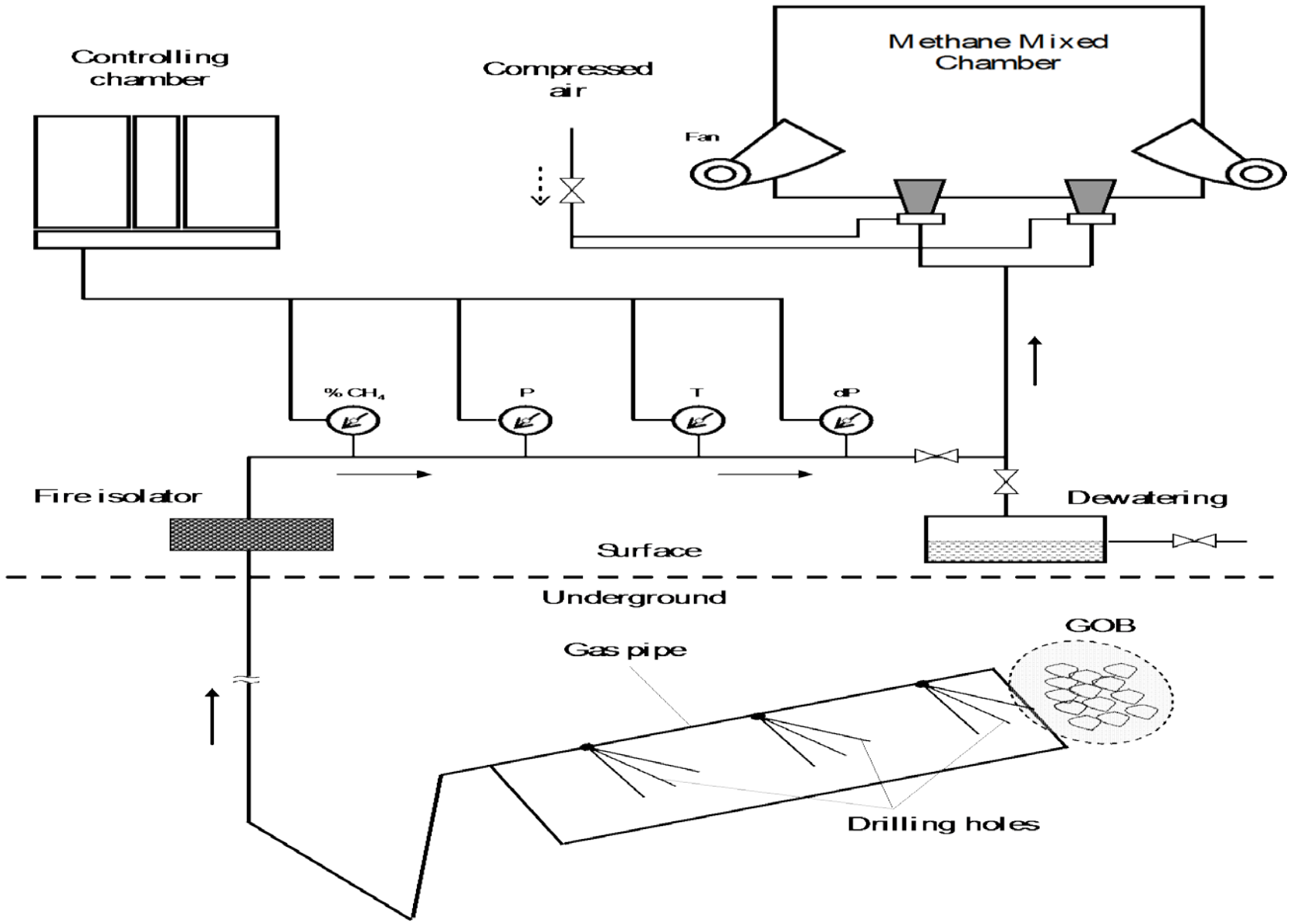


V5 seam, Quang Hanh coal mine(16/4/2012

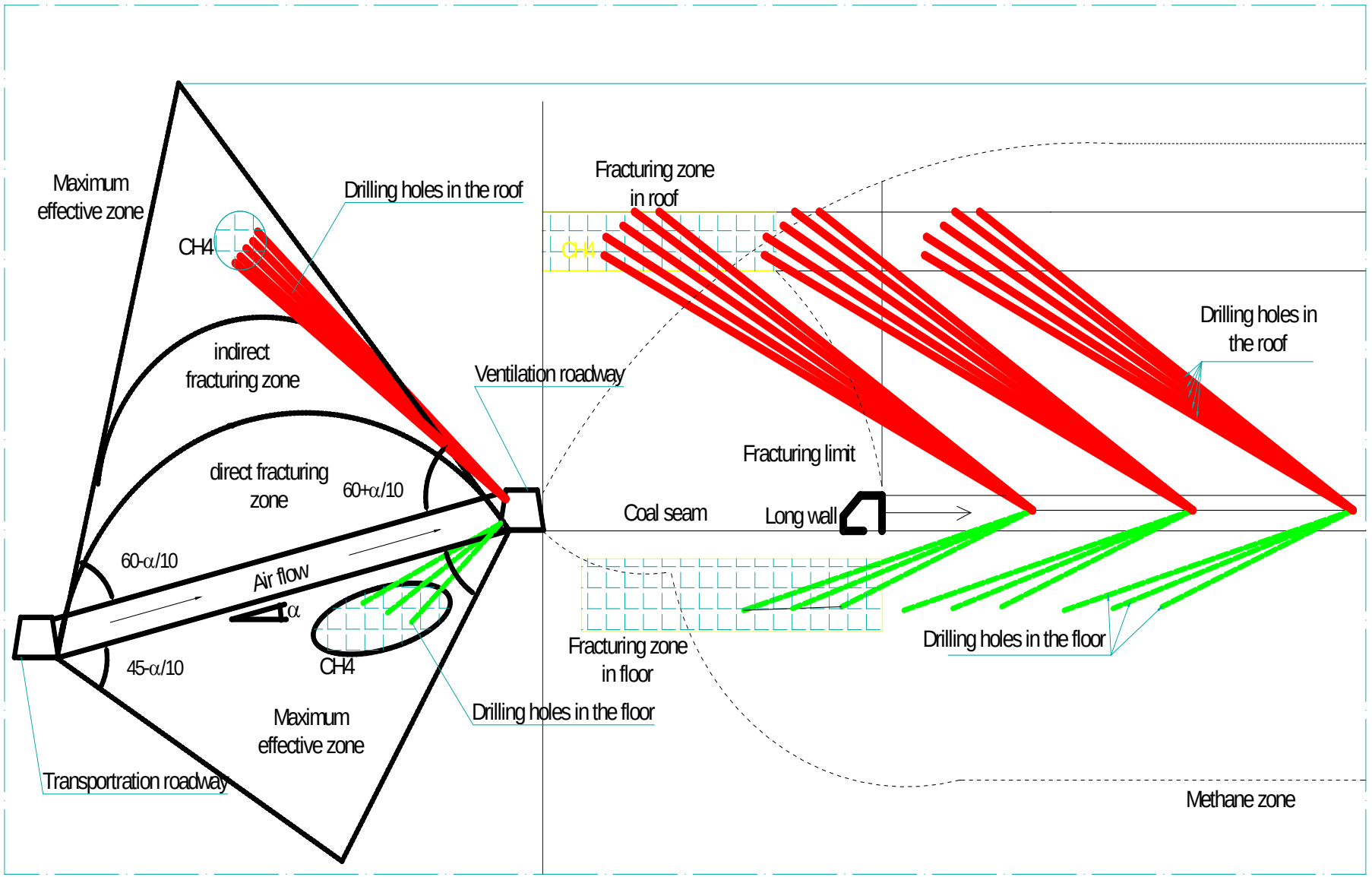


V7 seam, Duong Huy coal mine(17/11/2009 ÷27/11/2009)

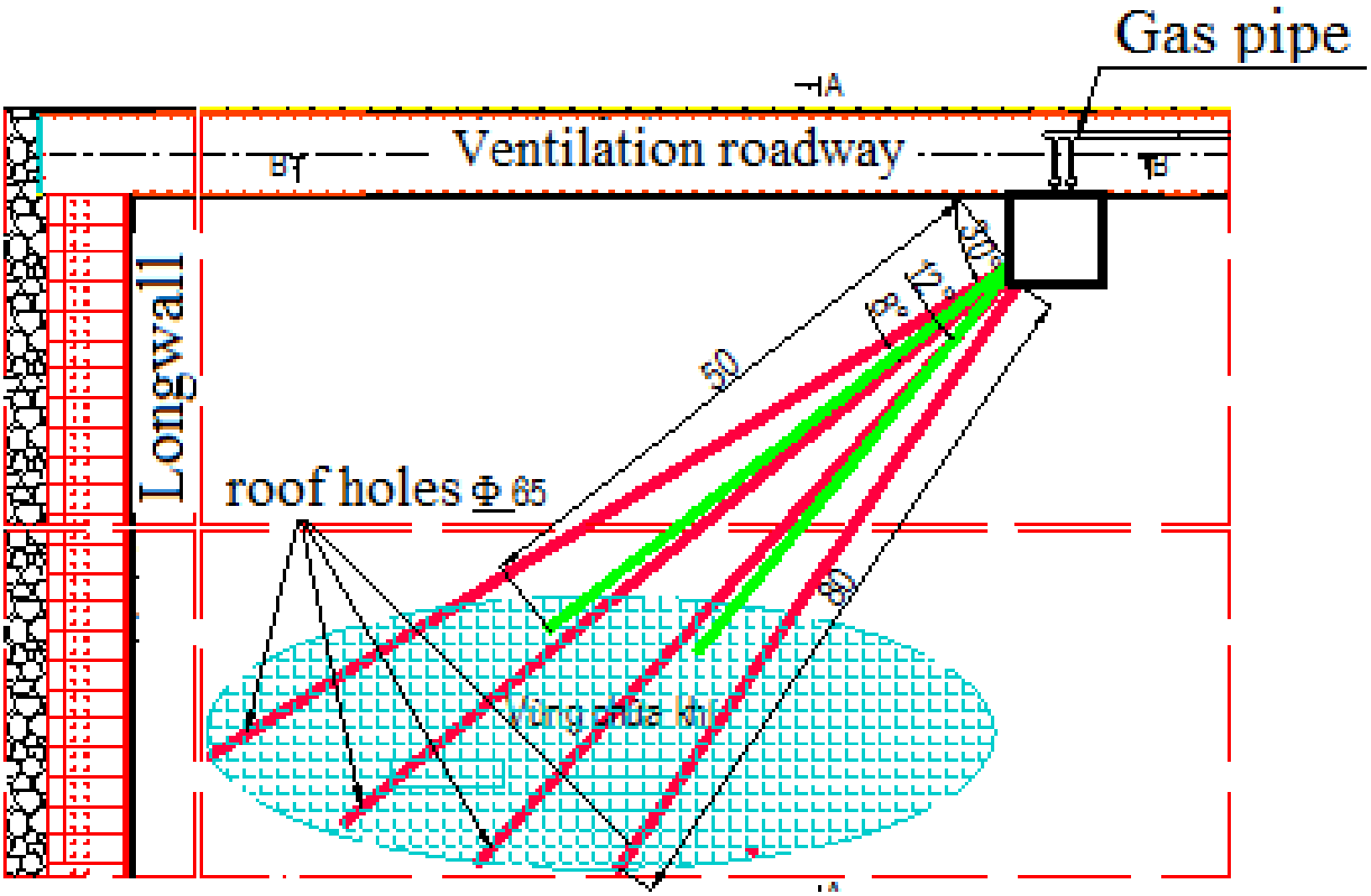
GAS DRAINAGE TECHNOLOGY



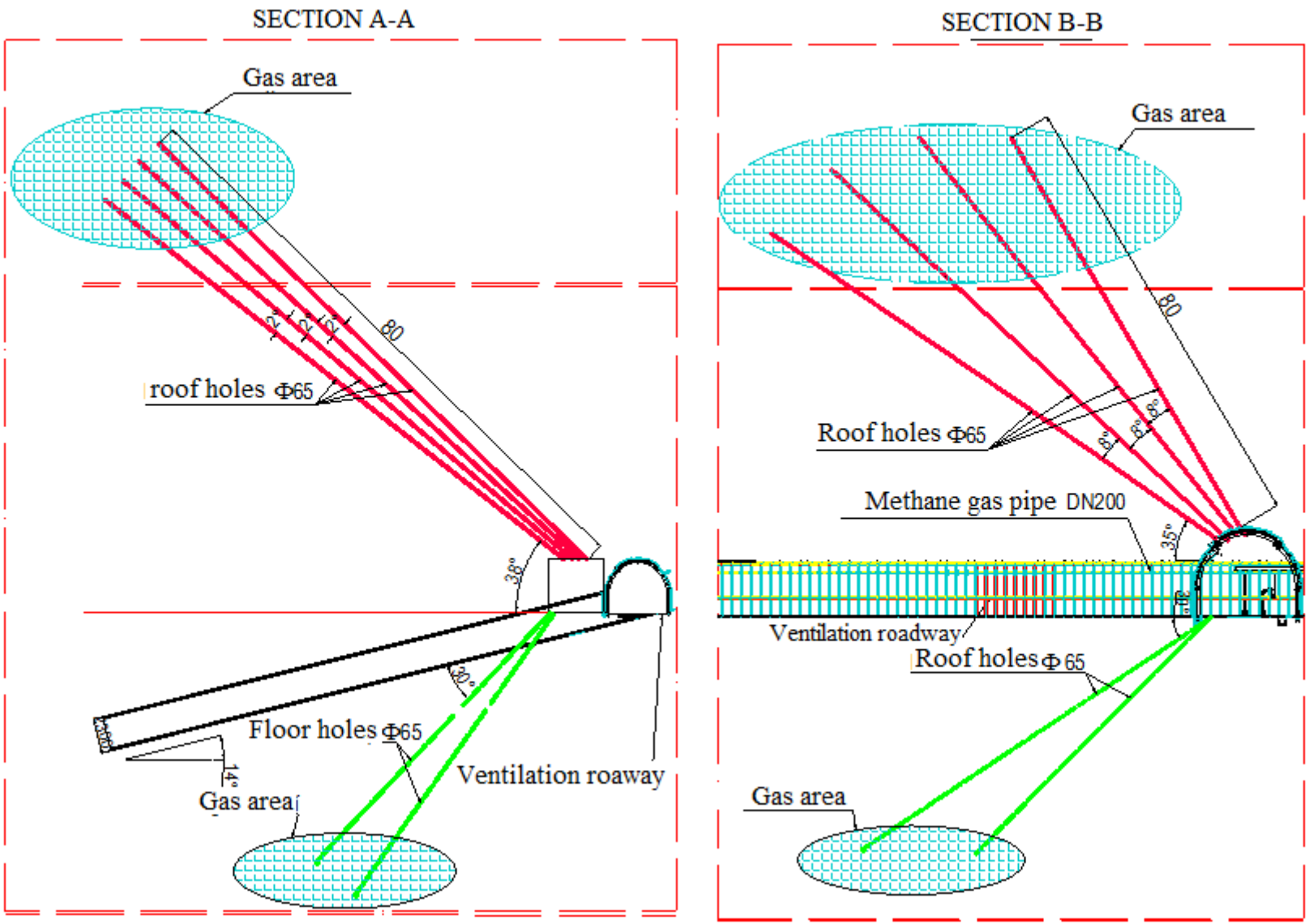
DESIGN OF DRILLING PASSPORT (1)



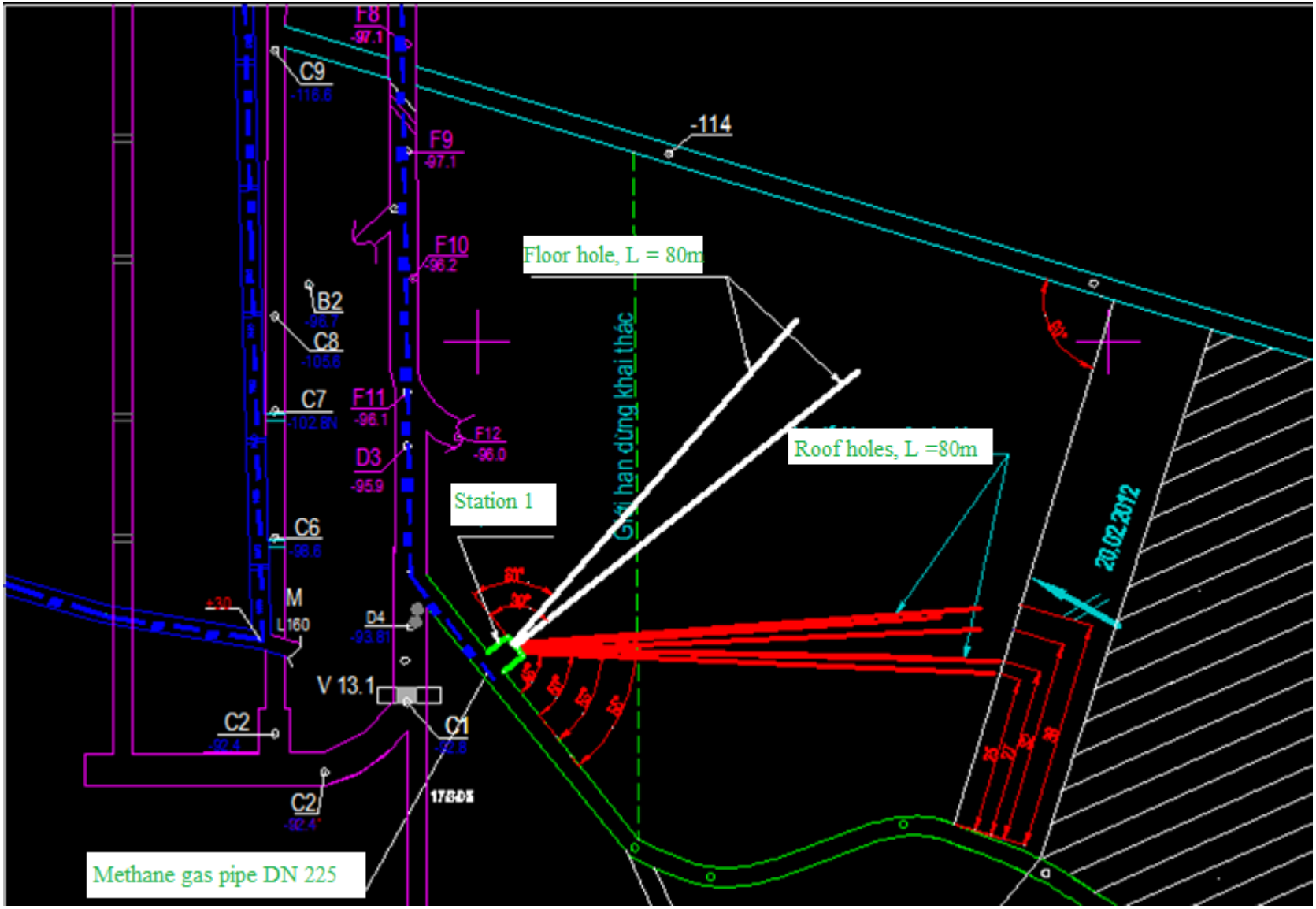
DESIGN OF DRILLING PASSPORT (2)



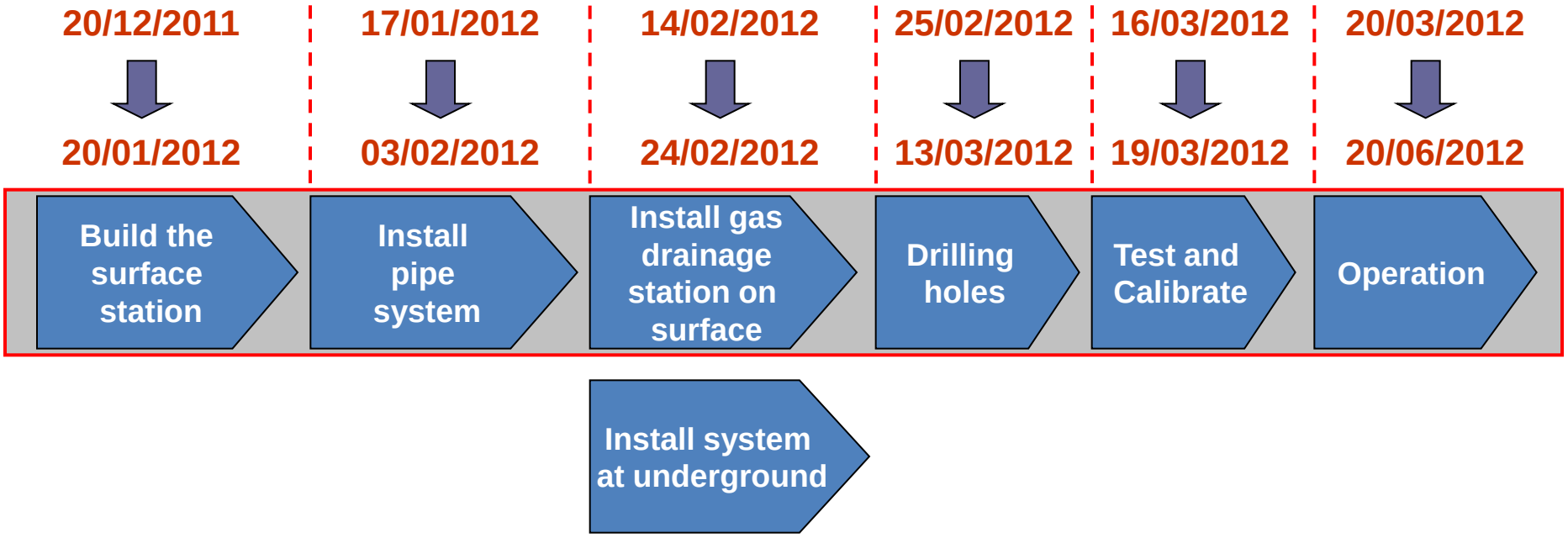
DESIGN OF GAS DRILLING PASSPORT(3)



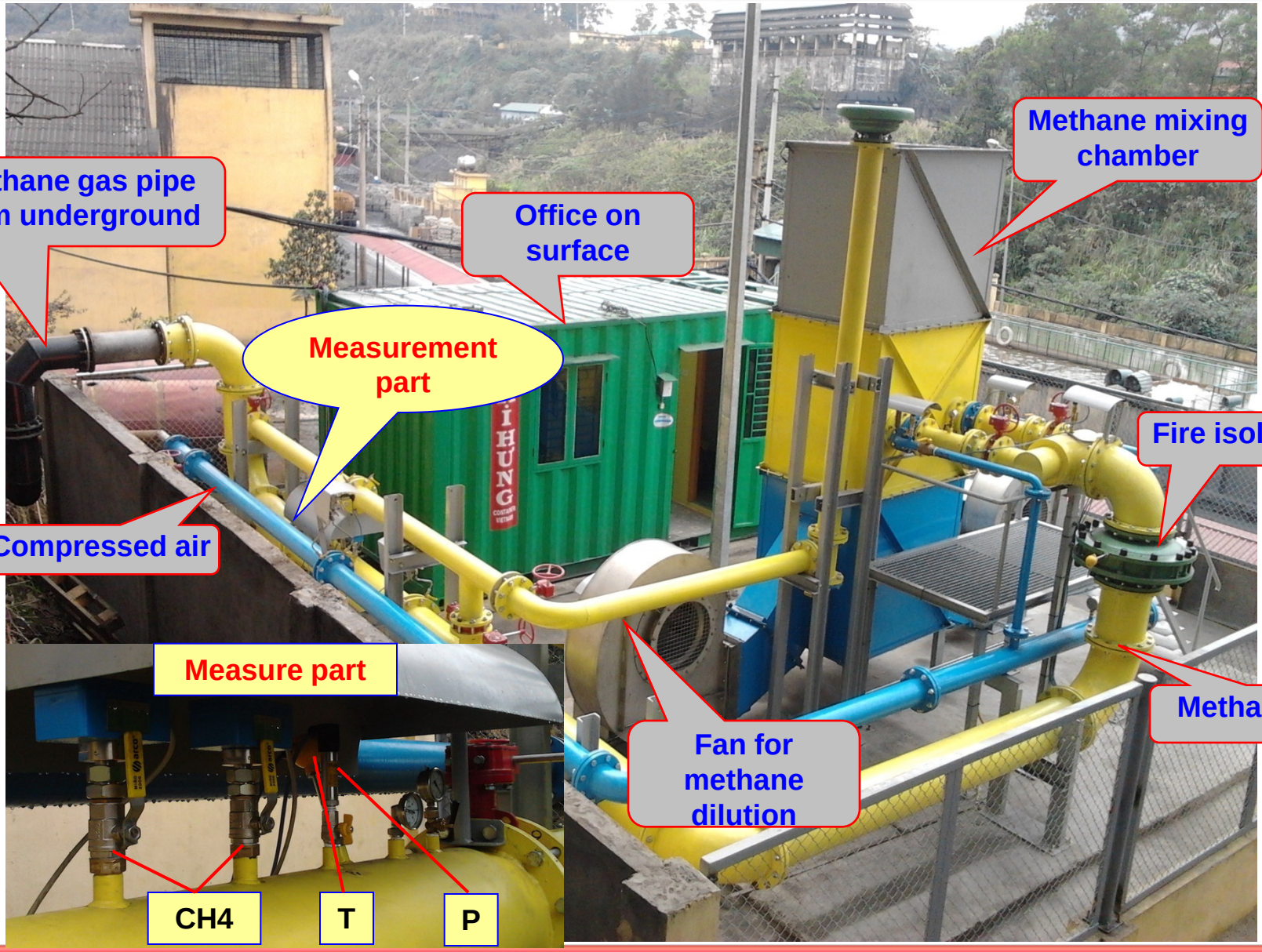
Location of gas drainage system



3. Installation deployment



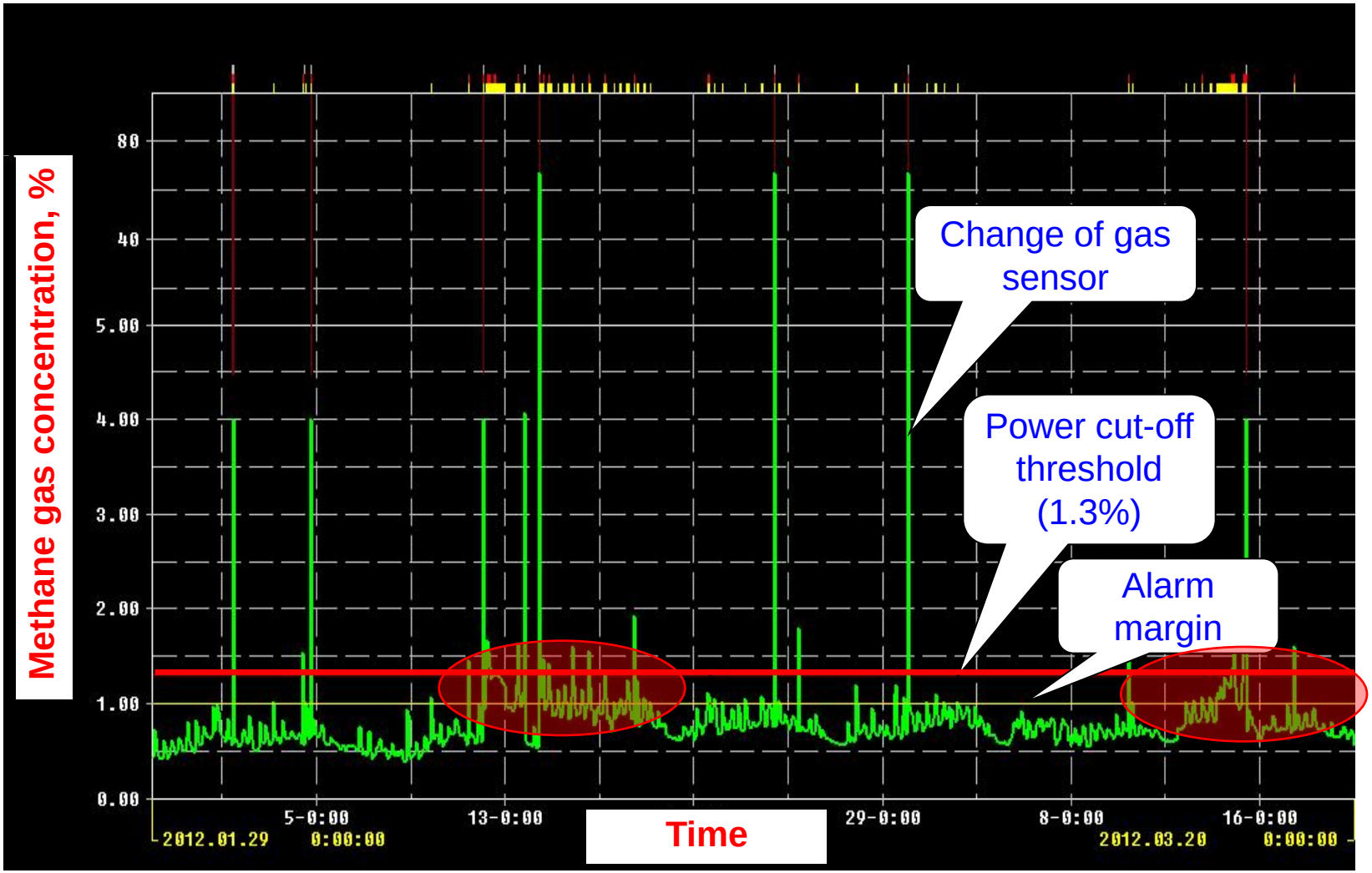
Methane drainage system at Khe Cham coal mine



SYSTEM PARAMETERS

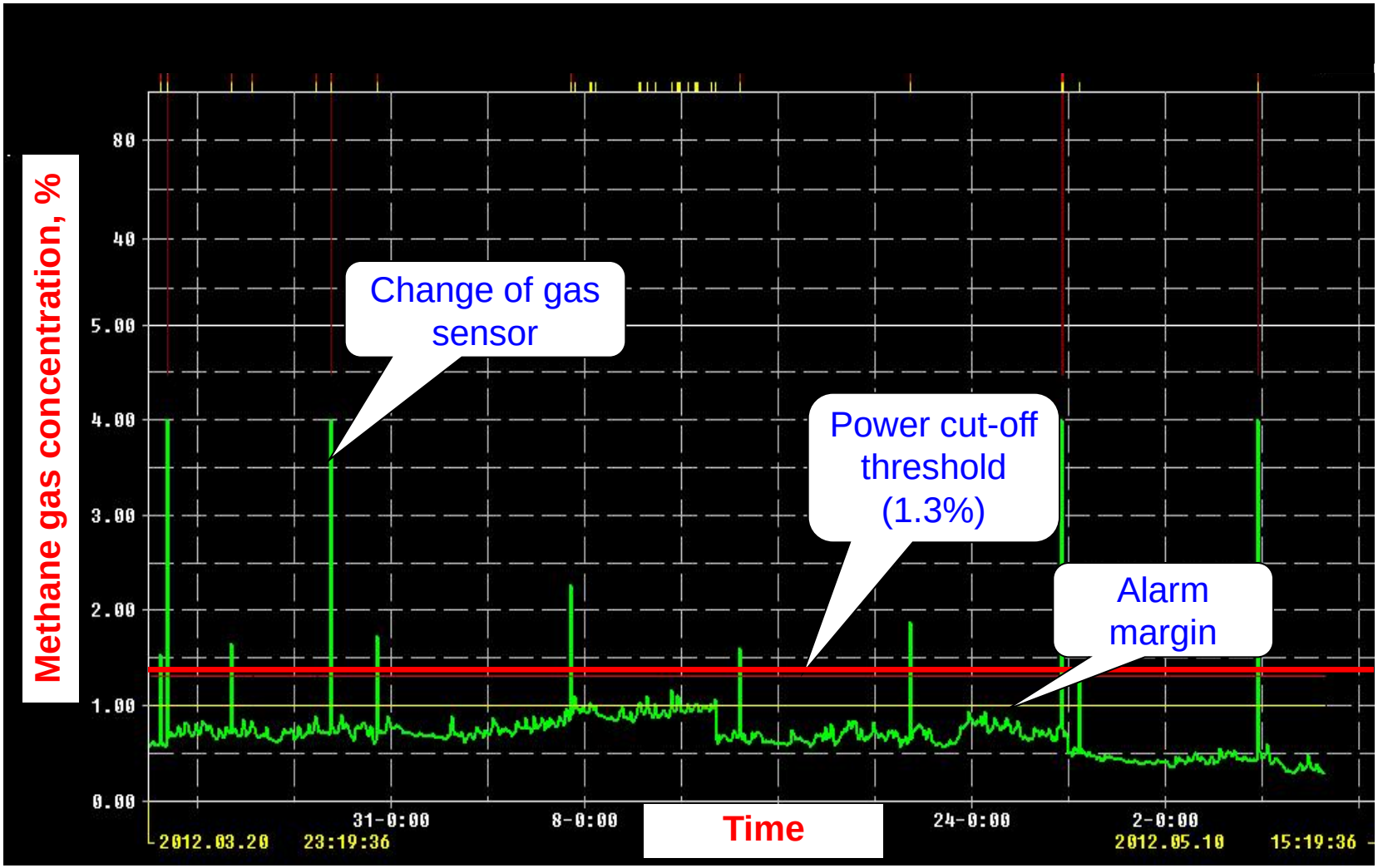
No	Main specifications	Unit	Value	
			Design	Practice
1	Airlow of gas mixture	m^3/min	10	5
2	Airflow of methane	m^3/min	5	2.5
3	Maximum suction pressure	kPa	-16	-7
4	Number of bore holes	hole	4	6
5	Depth of bore hole	M	80	80
6	Drilling speed	m/min	0 - 2.3	0.2
7	Compressed air consumption for Injector	m^3/min	10	6
8	Methane concentration	%	50	40

4. Results



Methane gas concentration at long wall area before gas drainage

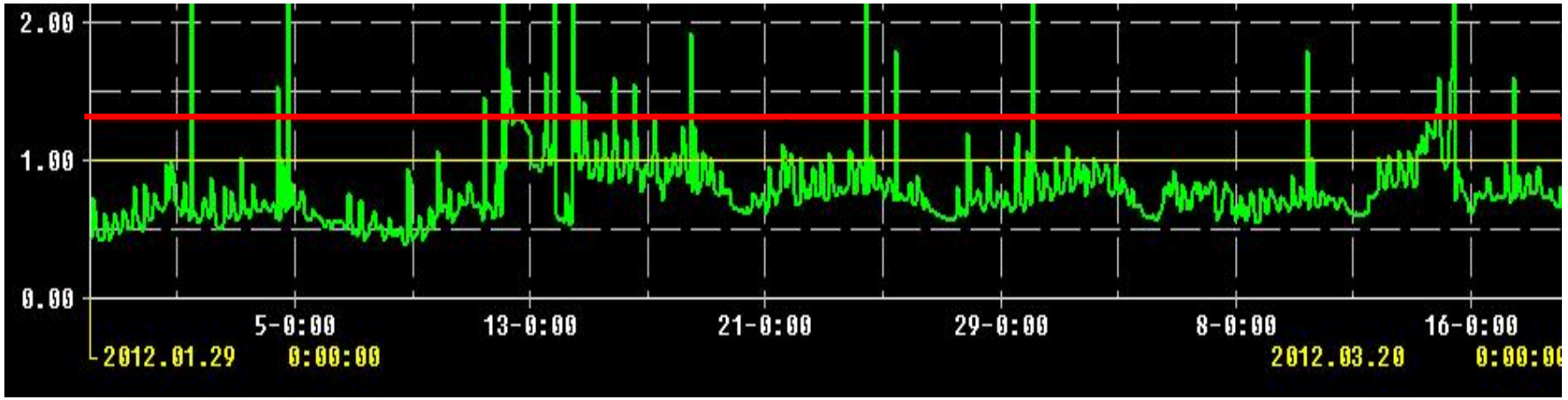
Evaluation of variation of CH_4 concentration



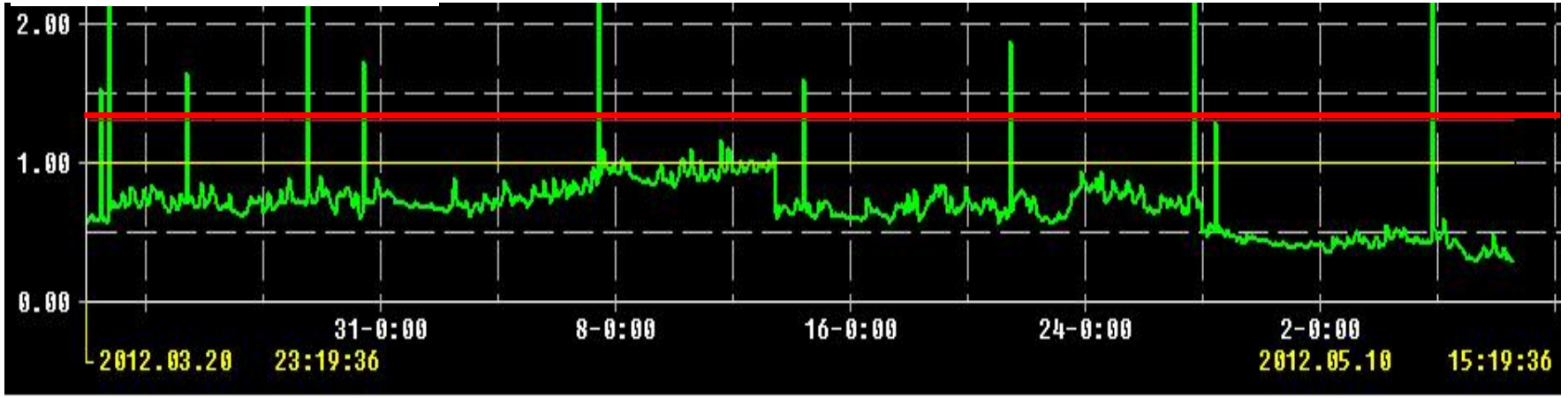
Methane gas concentration at long wall area after gas drainage

Gas concentration before and after drainage

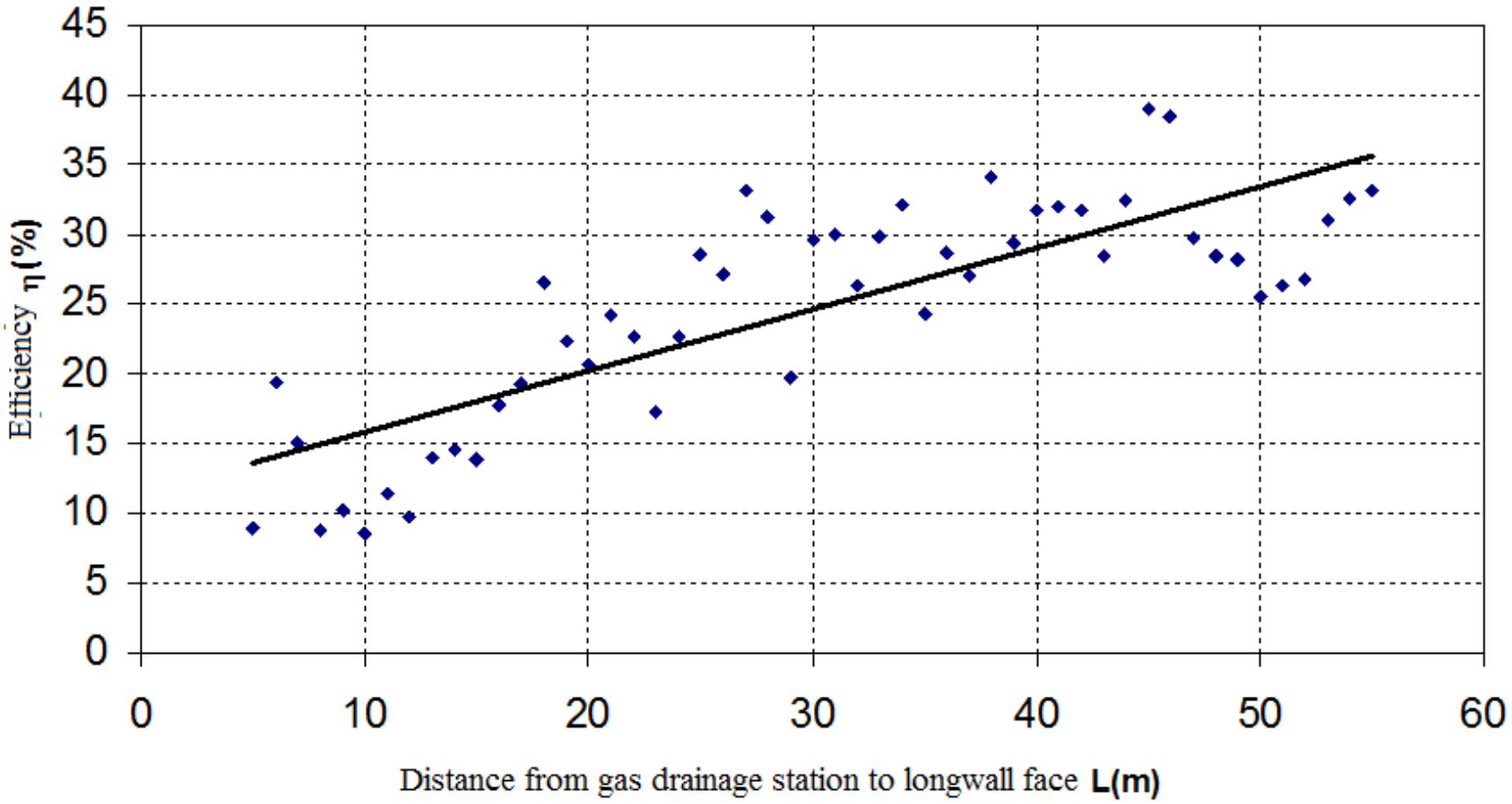
Before



After



Efficiency on methane drainage



Time efficiency

Before

- Electricity cut – off by gas concentration increases the limitation (1.3%).
- From Jan 20th 2012 to March 20th 2012: electricity cut – off had been occurred for 20 times
- It needs 30 ÷60 minutse for reproduction again

After

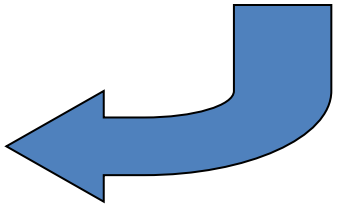
- **Working time increase 20h/month**

Efficiency on ventilation issue

	Parameters		
	Air flow, m^3/min	Gas conc, %	Absolute gas emission, m^3/min
Before	524	0.8	4.19
After	524	0.6	3.14
Different		-0.2	-1.05

$\Delta Q = 131\ m^3/min$

$\cong$ 25% Air flow at longwall

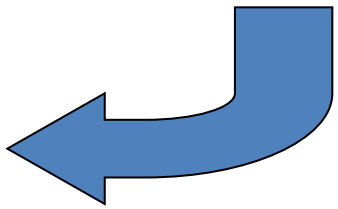


Efficiency on coal production increase

	Parameter		
	Coal production, ton	Absolute gas emission, m^3/min	Relative gas emission, m^3/T.day.night
Before	400	4.19	15.08
After	400	3.14	11.3
Different		-1.05	-3.78

ΔA = 133.7 tons

$\cong$ 33.4 % production



5. CONCLUSION

The effectiveness of the methane drainage system at Khe Cham Coal Mine

1. **Gas concentration reduces 0.2÷0.6%, increases time for working, increases coal production about 33.4%**
2. **Reducing the time of electricity cut-off by gas concentration increase (1.3%).**
3. **Average gas concentration from gas drainage system is 30%, gas flow is 2.5 m^3/min (equivalent to pure methane concentration).**

Thank you very much for your attention.

For more information, please contact us!

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