

Central Control of Nitrogen Distribution in Ostrava-Karvina Coalfield



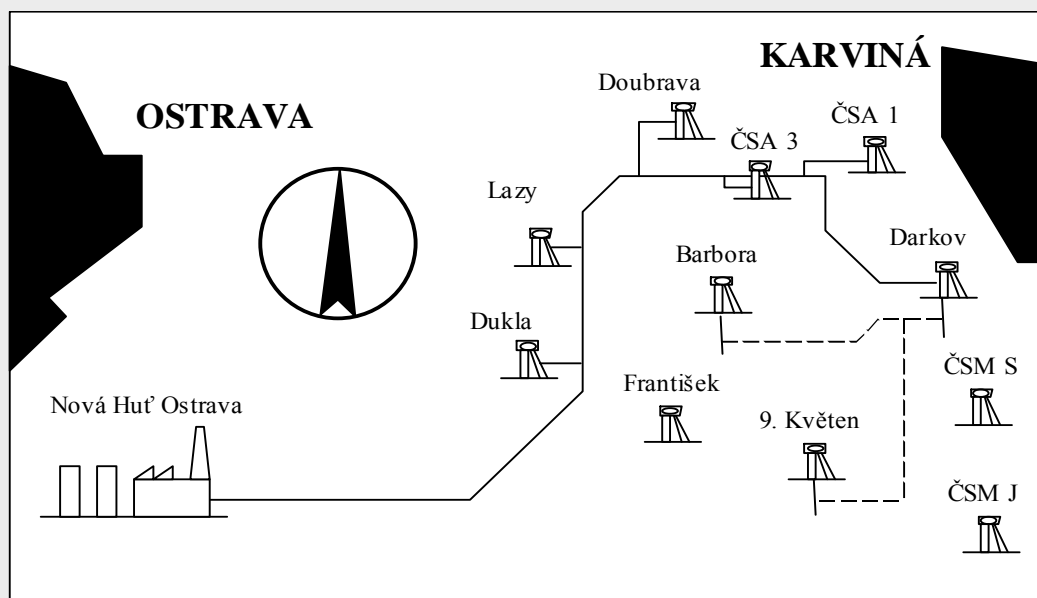
Prof. Ing. Alois Adamus, Ph.D.



The Central Nitrogen Plant



Since 1993



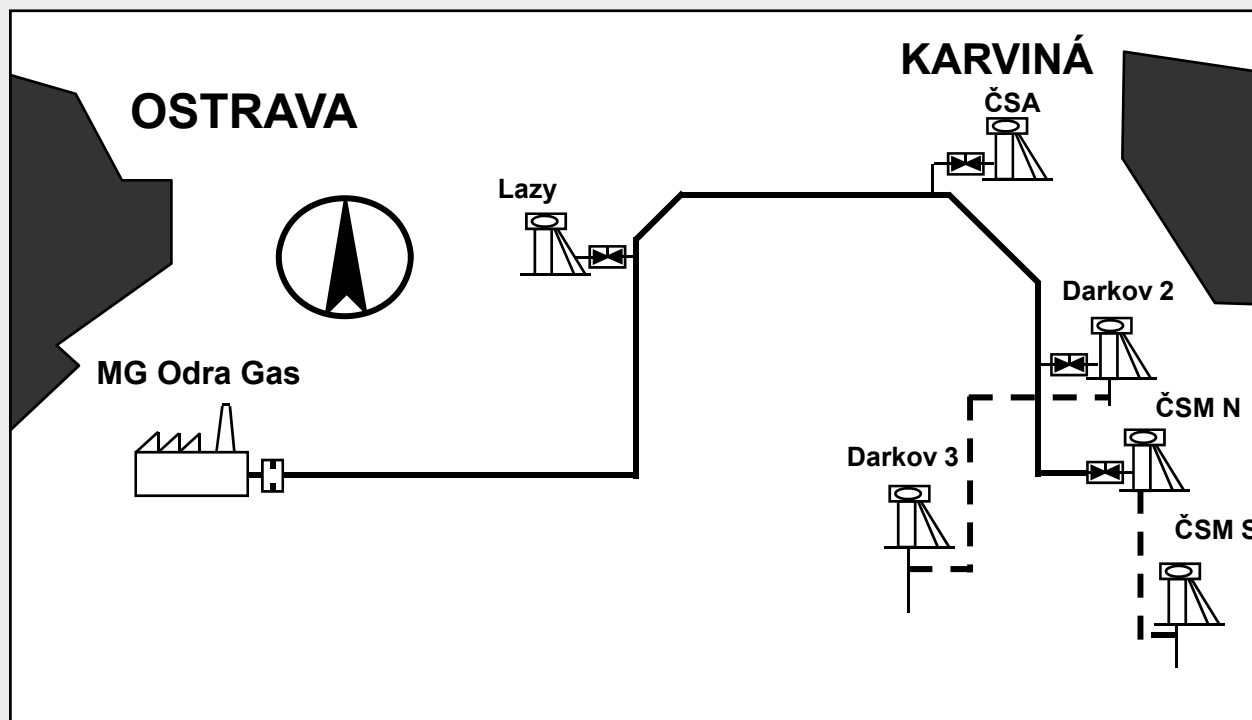
Pipeline - Ø 300/250/200/150 mm

40 km

The Central Nitrogen Plant

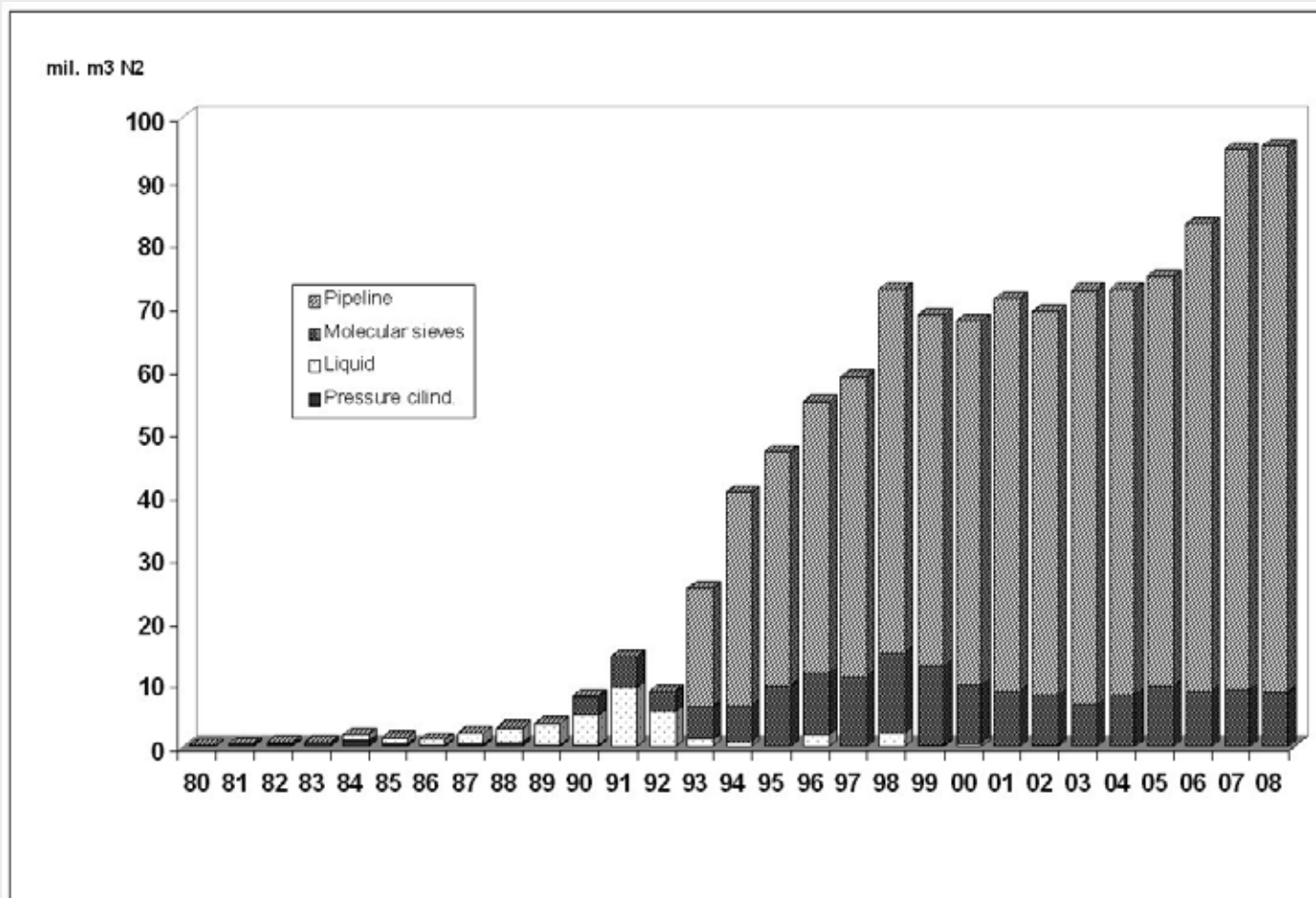


2009



N_2 flow-rate :
- prevention mode $2,916 \text{ m}^3 \cdot \text{s}^{-1}$ continuously
- repression mode $5,0 \text{ m}^3 \cdot \text{s}^{-1}$ 10 hours

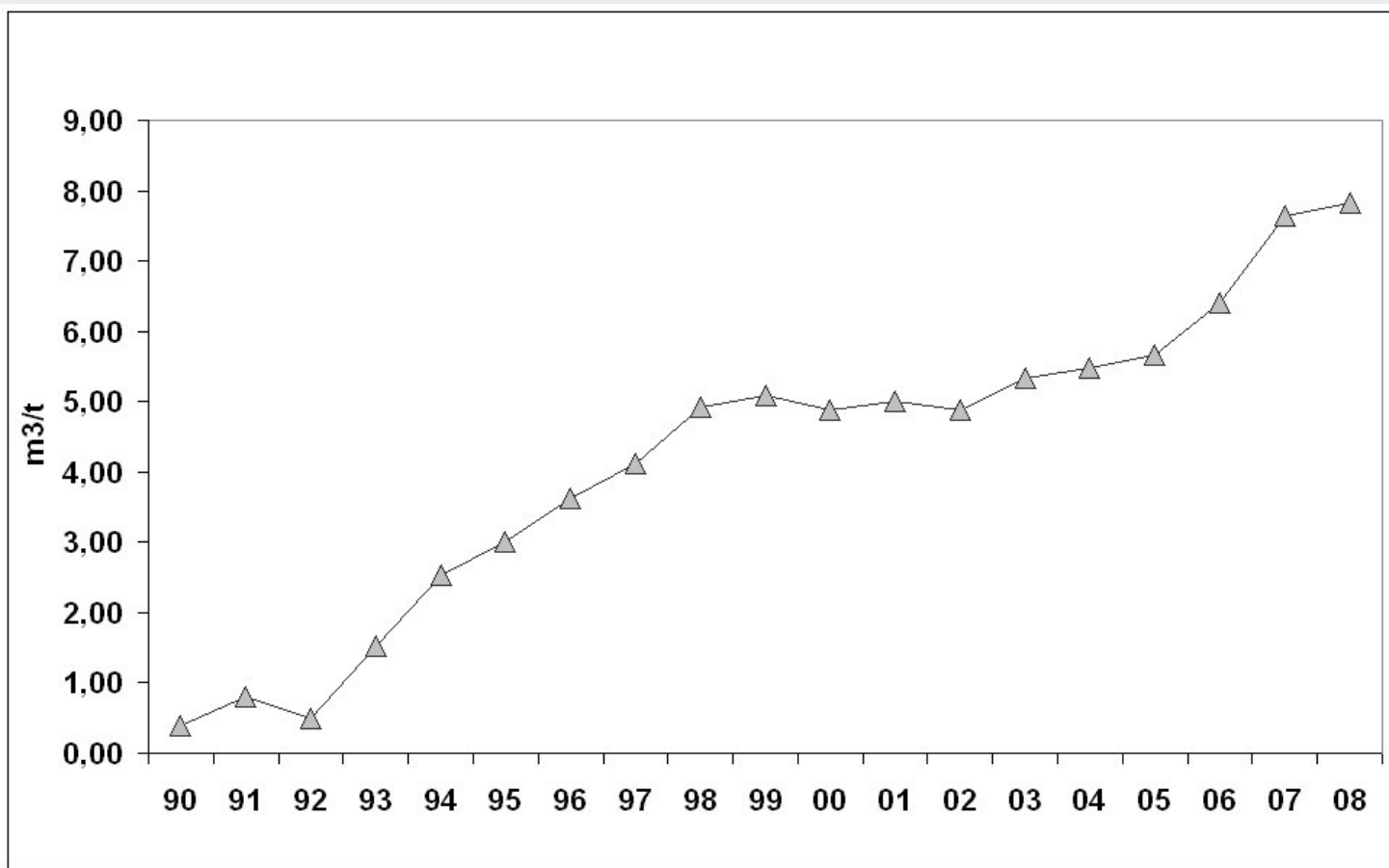
Consumption of N₂ in Ostrava-Karvina Coalfield



1964-2008 - 1 121 mil. m³

2008 - 95 mil. m³

Consumption of N₂ in Ostrava-Karvina Coalfield

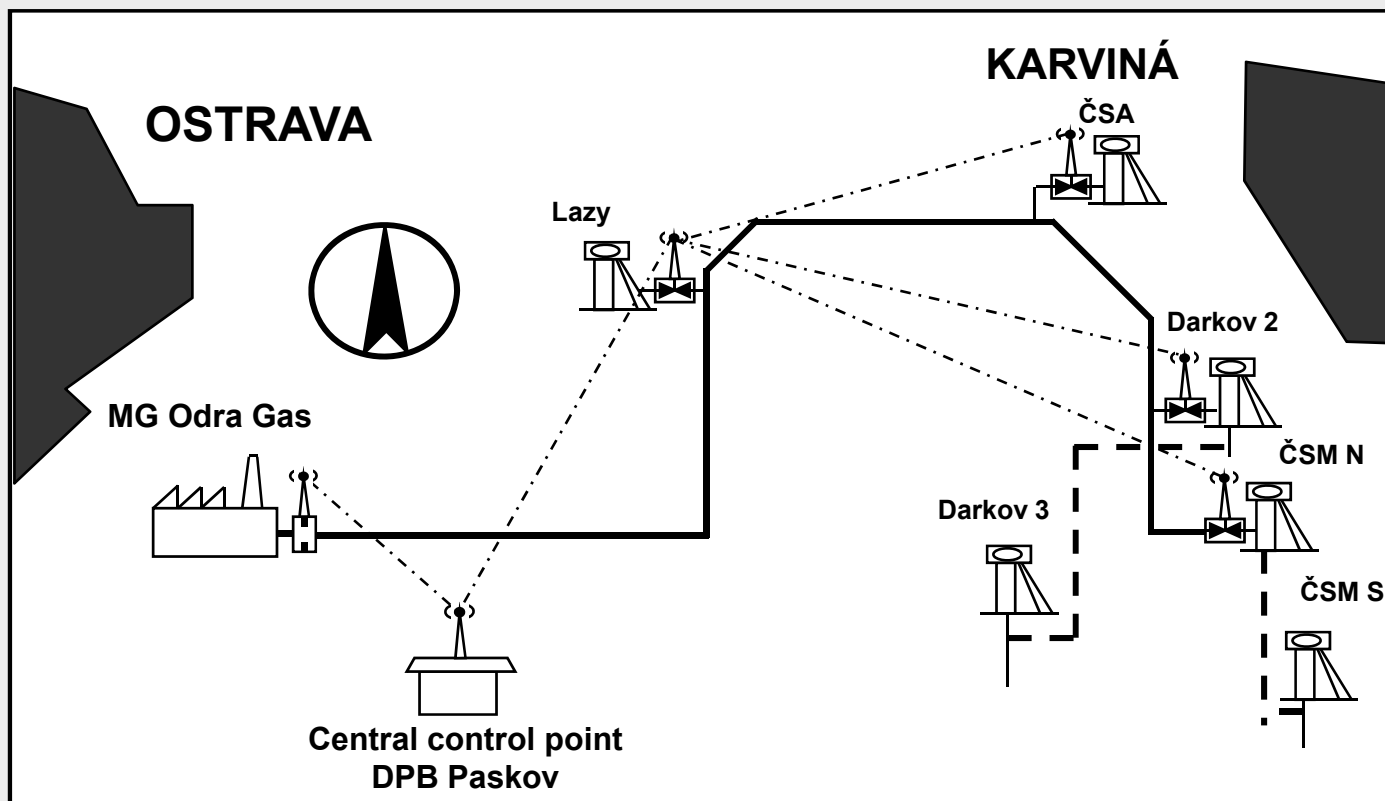


2008 - 7,83 m³ t⁻¹

The Central Control System



Since June 2006



The Central Control System



- two-way radio data communication network uses the UHF band 420 – 430 MHz
- flow rate of nitrogen gas is measured
 - at the surface by Vortex sensors made by Yokogawa/Japan
 - underground by Vortex sensors made by Trolex/GB
- the control software based on SCAD
(Supervisory Control and Data Acquisition system)
- nitrogen flow-rate regulated by electrical servo-valves

The Central Control System



Flow, pressure sensors, Yokogava

Central control point DPB Paskov



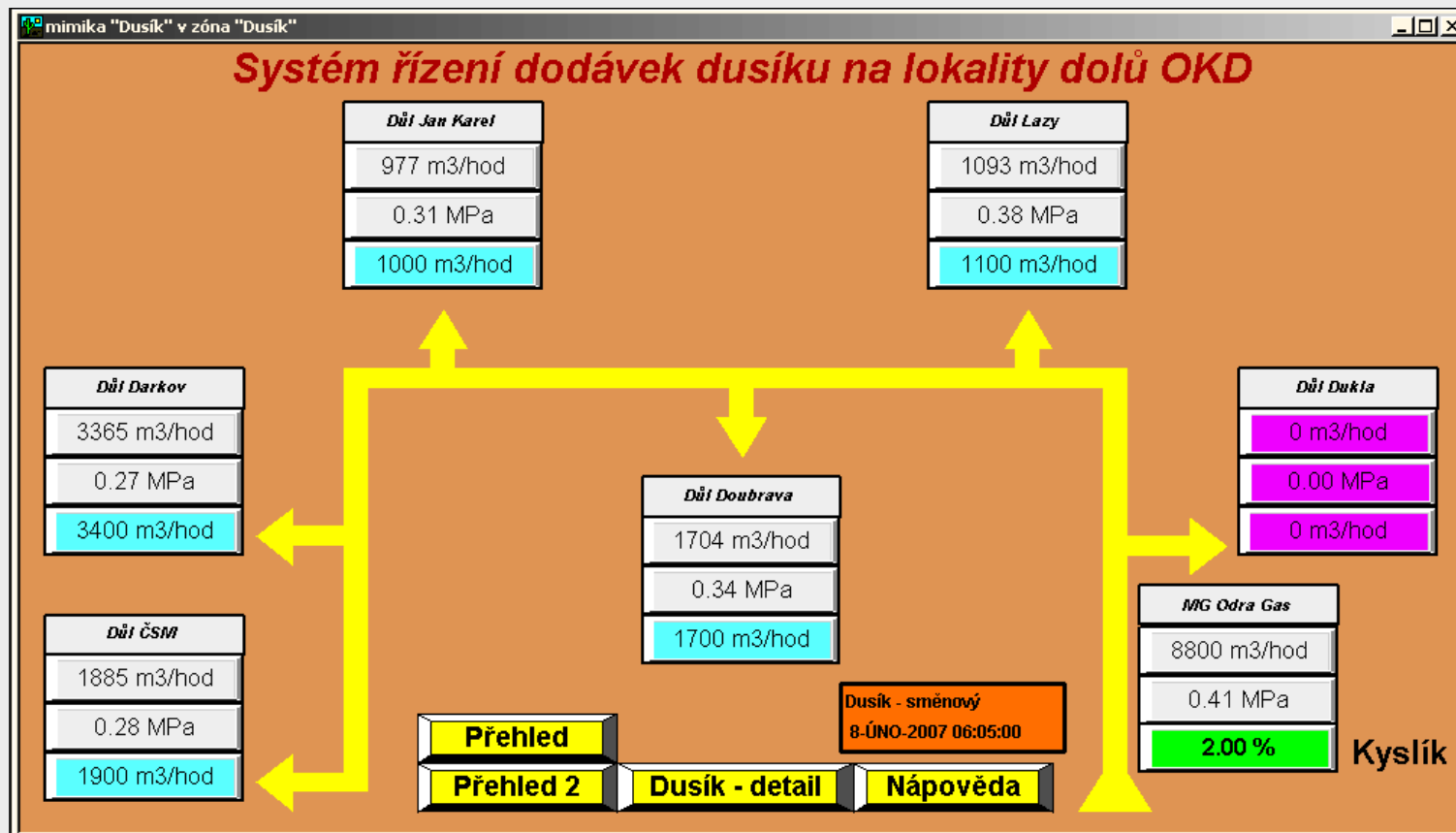
Servo valves



The Central Control System



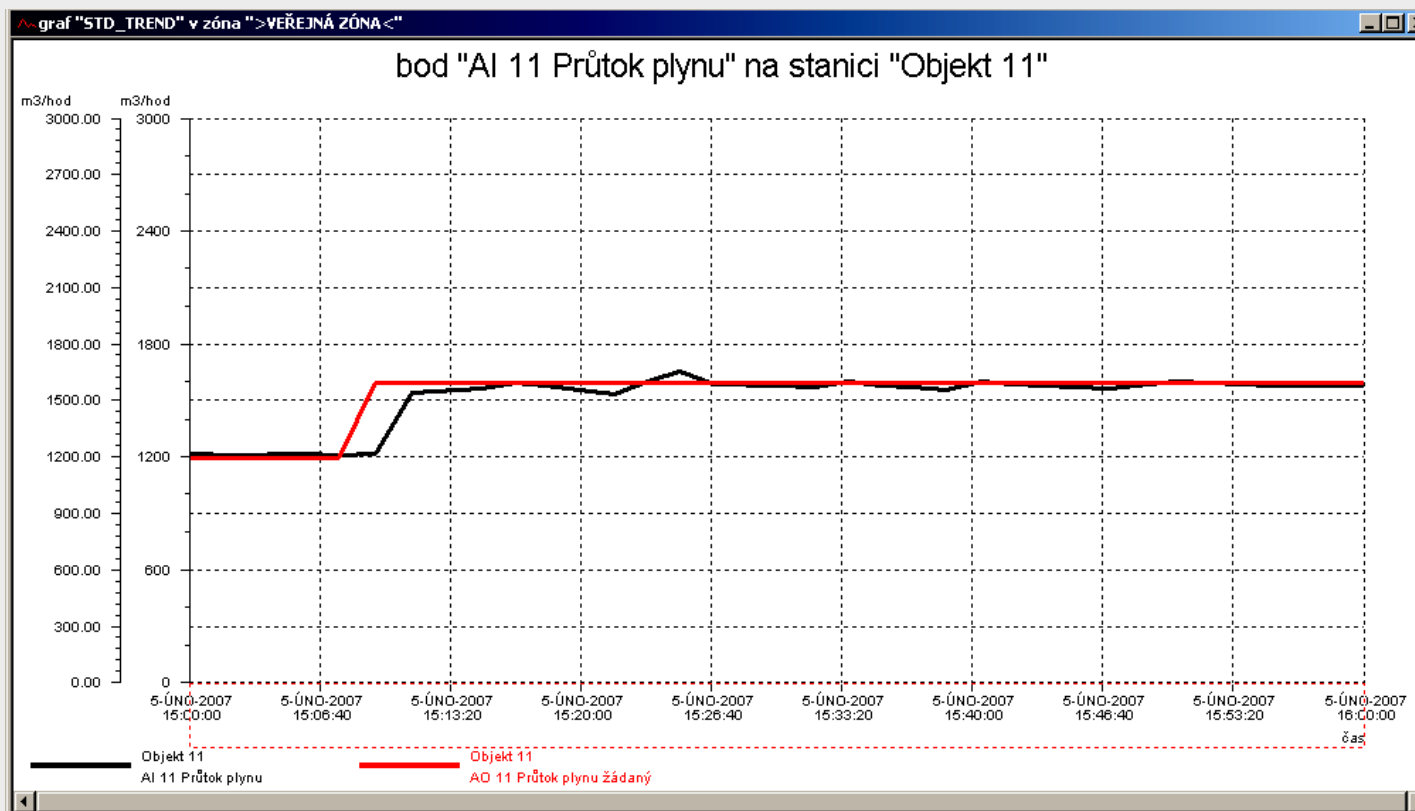
The Central Control Panel



The Central Control System



Adjustment of nitrogen flow-rate



The Central Nitrogen Plant



N₂ flow-rate underground

- Vortex sensors made by Trolex/GB

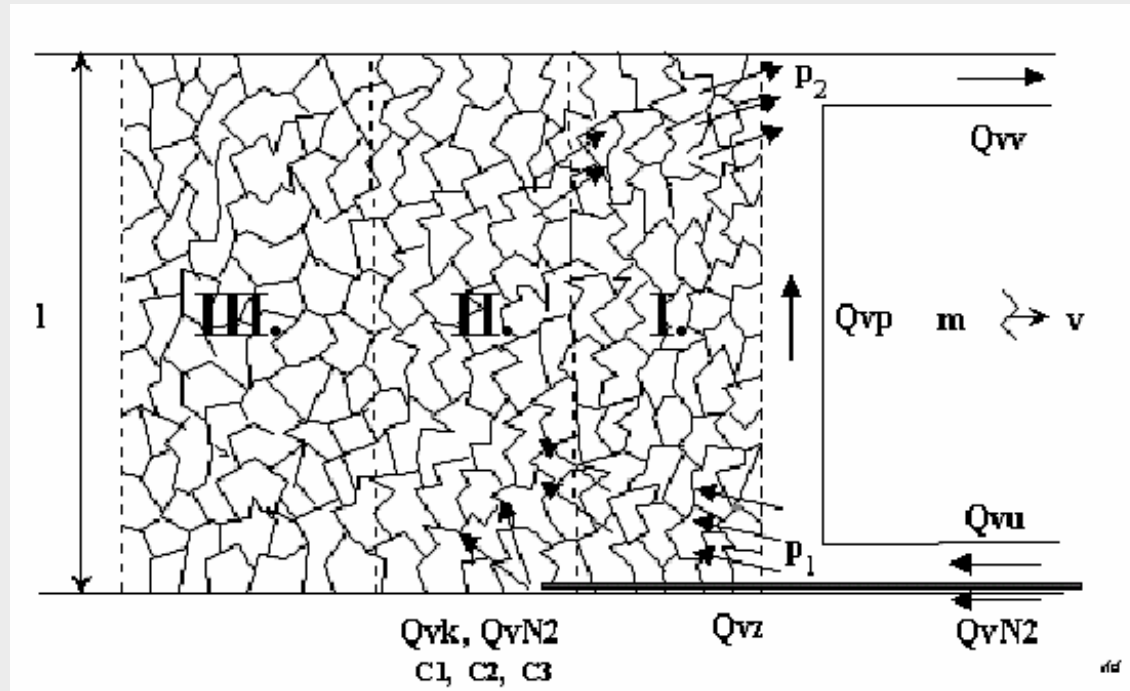




Application of the nitrogen gas in Czech mines

- **prevention of spontaneous combustion**
- **suppression of spontaneous combustion**
- **repression of underground fires**
- **inertization of methane explosive mixture**

Prevention/suppression of spon-com in a gob



Prevention : O_2 in a gob $< 10 \%$

Suppression : O_2 in a gob $< 5 \%$

N_2 flow rate $\sim 1 \% Q_v$

N_2 flow rate $> 1 \% Q_v$

Web page „www.vsb.cz/nitrogen“



Information from 17 countries



Information about the web was published :

The Mine Ventilation Society of South Africa 3/2001(JAR)

Mining technology A 2/2002 (GB)

Revista Minelor 11/2004 (Romania)

Coalmine Safety Information Abroad 7/2002 (China)

Conferences : IMRB Poland 2001, IMRB JAR 2003, IMRB Australia 2005

Thank you for your attention