

Fire fighting in the face 8-91 of the mine Warndt/luisenthal in 2004

Assessor of mines
Dr. Ing. Elmar Fuchs
Germany

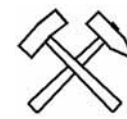
Convener of european and international
standardization Safety on Machinery in Mining

Face 8-91, mine Saar, Warndt

27.05.2004:

Hidden minefire with explosion

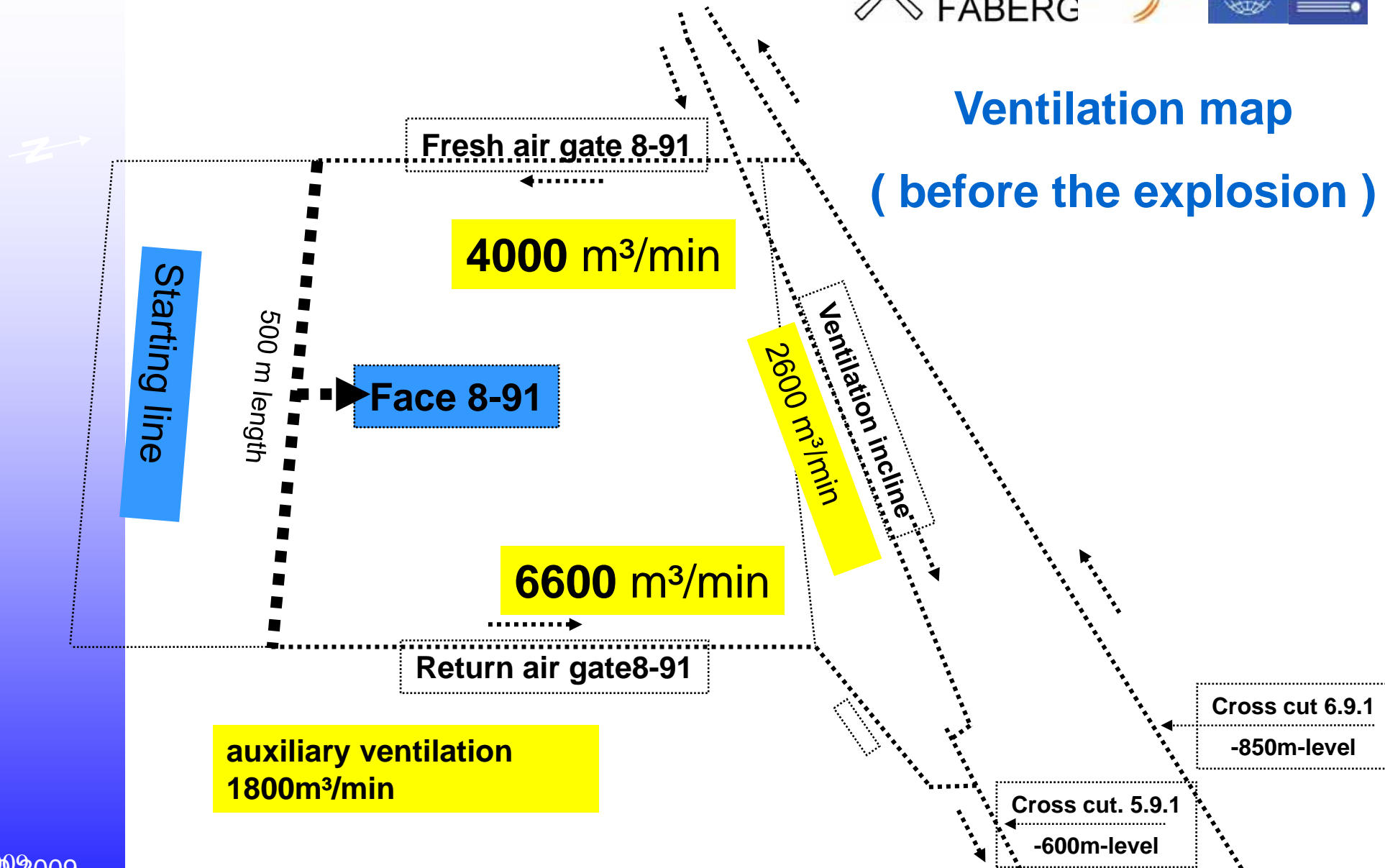
- prevention fire measures**
- fire developpment**
- fire fighting**



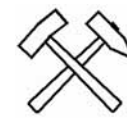
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Ventilation map (before the explosion)



Sealing with phenolic resin foam on the surrounding rock



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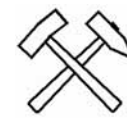
4. International Rescue Mines
Conference Czech Republic

Sealing of the starting line and the roadside pack in the back conveyer road with phenolic resin foam



**Harden phenolic resin foam
near by the starting line of the face**

**Boring boreholes for injection
of phenolic resin foam in he road
side pack with turbo drilling
and screw drill pipe**



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Injection of fly ash in the starting line of the face and behind the roadside pack



**Injection of fly ash through
testing boreholes in the
roadside pack and the back
conveyor gate**

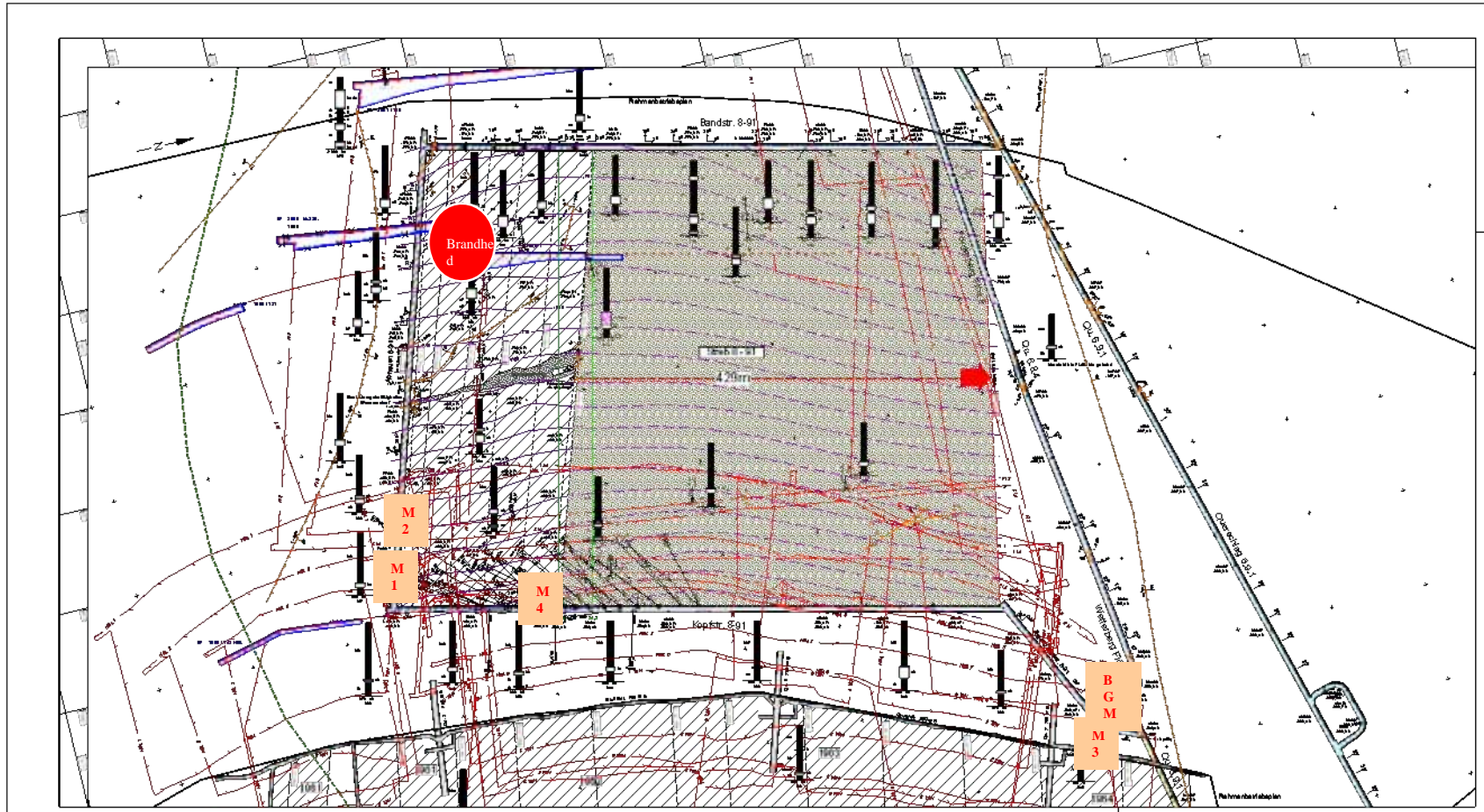


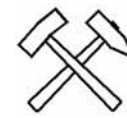
Tube switch



**Gas-Testing tube
in the roadside pack**

Mine Warndt-Luisenthal, face 8-91 fire after an explosion 27.05-31.07.2004





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Monitoring with stationary measurements devices in the air flow

CO- and CH₄-measurement point

CO-measurement device

CH₄-measurement device



Shaft Lauterbach, surface installations

(with smoke fumes in the return air, 110 ppm Co = 1100 l/min CO)



Chronology:

Thurs, 27.05.04: 12⁰⁰

Deflagration on the intersection :
Face-Tail gate 8-91
CO in the tail gate >200 ppm

14¹⁷

increasing nitrogen from 700 to 4000 m³/h

15⁵⁸

putting up a standby place in the conveyor road

16¹⁷

exploration with 2 rescue teams
from the standby place through the face

⇒ smoke fumes in the last shields

⇒ gas fire on the surrounding rock and the goaf

⇒ starting the extinguishing work with water and powder extinguisher

Friday, 28.05.04:

06³⁵

Bringing in phenolic resin foam in the last shields

09³⁰

increasing nitrogen to 6000 m³/h

6 places for water extinguishing

Inerting on shaft Lauterbach (3)

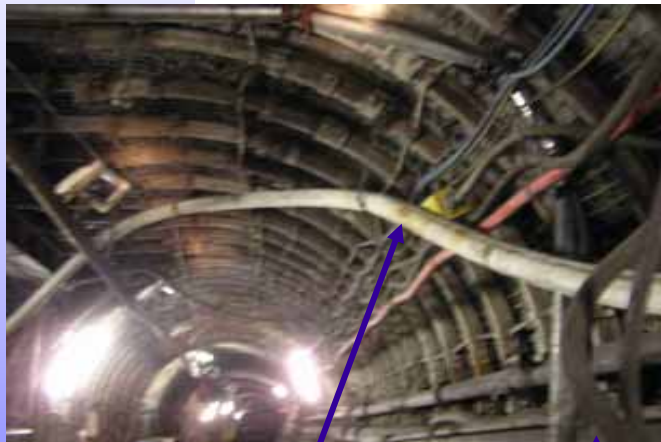
MoGruV (max. 6000 m³/h)



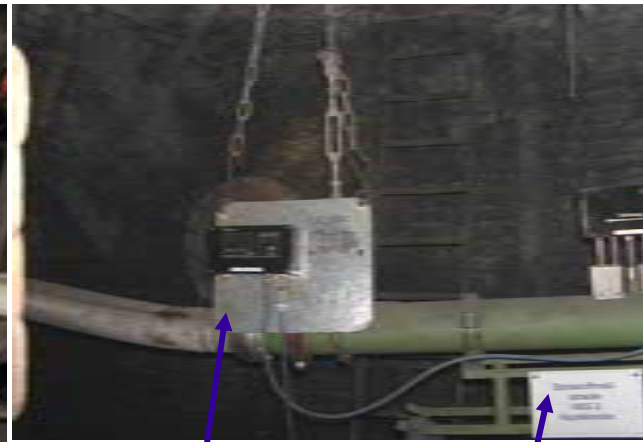
Stationary Nitrogen supplying in the main galleries and moving of F-hoses in the gate-roads in the case of a emergency



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F-hose in the tail gate



Evaluation device

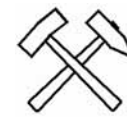


Measurement pipeline

**Stiff pippeline DN 150
in the cross cut**

**Nitrogen injection
Behind the barricade
In the conveyor road**

Back tubes in the abandoned tail gate for injection of nitrogen

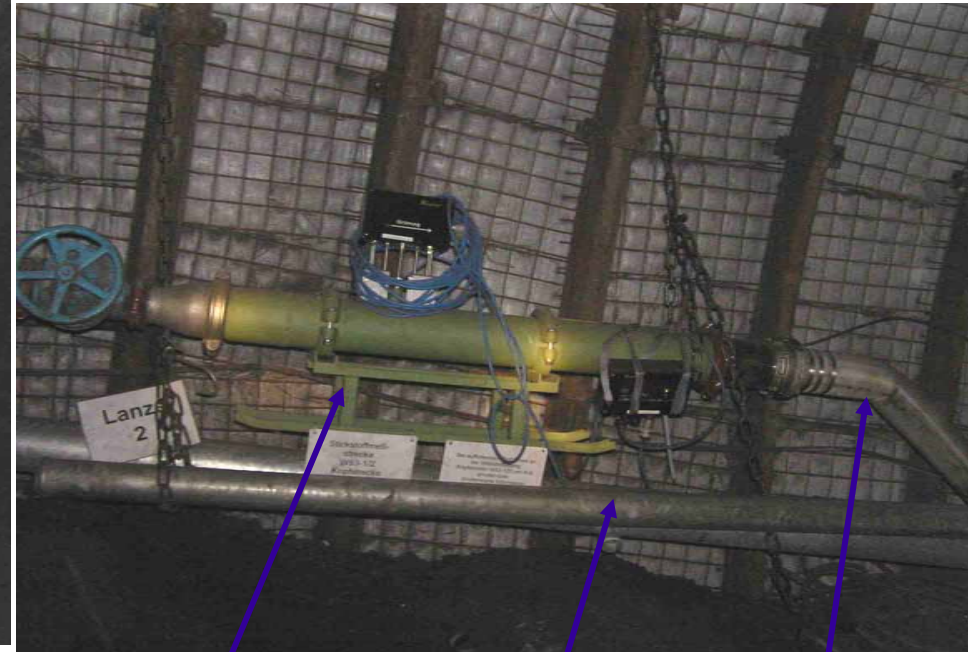


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**Stif tube DN 150
to the starting line**

**. Tube DN 100
with length 60 m**



Measurement tube

Evaluation device

F-hose

Sat., 29.05.04

07⁵⁵ withdrawing the rescue teams to the standby place because of no chance to extinguish the fires with the water and because the values of the measuring places of **the mobile fire gas analyser** increase to the explosion triangle. Fixing the extinguishing water lances for automatic working

09³⁰ decision of the **emergency managment** for **abandon the face** with 2 airdocks in the gate roads and inerting the face

13¹⁰ Starting with the building of **a phenolic resin foam dam in the fresh air gate**

19⁰⁸ opening the water tubes for filling the water hollow on the intersection of the tail gate o the inclined entrance gate as **a water dam (air close)**

20³⁰ increasing the nitrogen to **15.000 m³/h**

Inerting on Shaft Lauterbach (1)

Air evaporator (max. 4000 m³/h)



Inerting on Shaft Lauterbach (2)

TV 60 (max. 6000 m³/h)

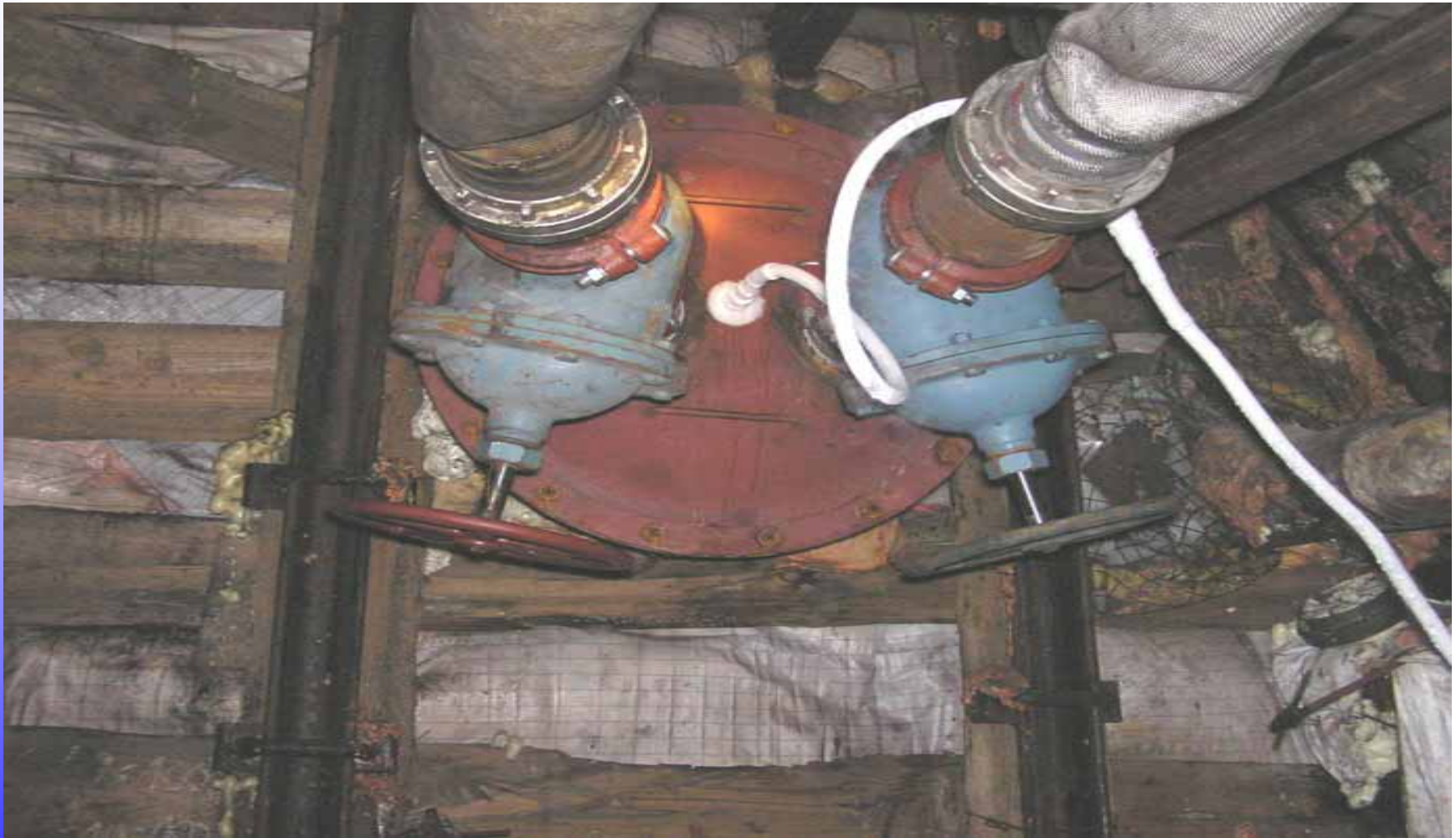


Inerting on Shaft Lauterbach (3)

High Efficiency Evaporator (max. 15.000 m³/h)



Inerting the fresh air barricade



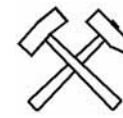
Filling of deep cool liquid nitrogen(- 273°C) in special underground container



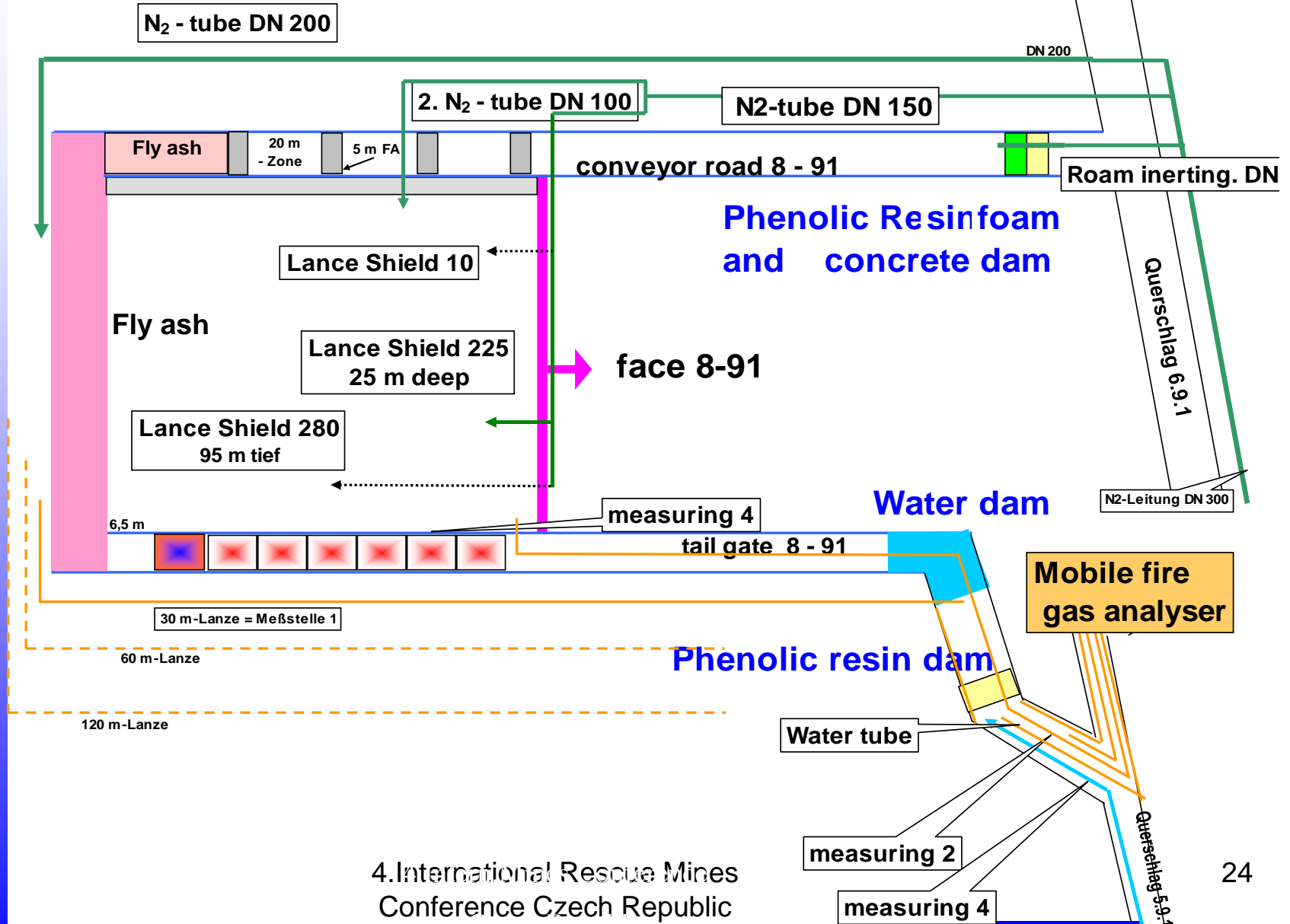
Spraying of liquid nitrogen in the dammed area for cooling



Closing dams in the conveyor and tail gate



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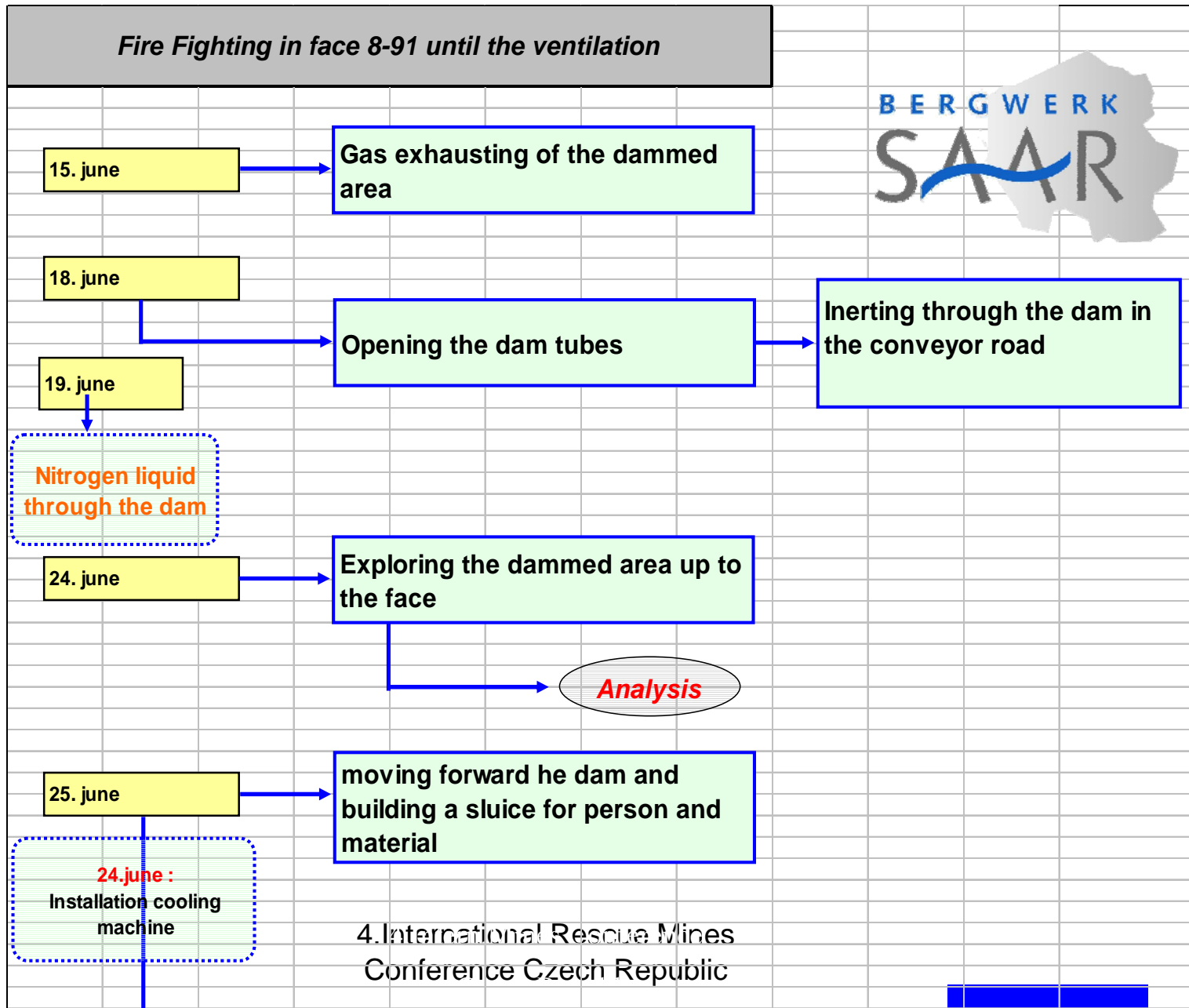


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Fire Fighting in face 8-91 until the ventilation

BERGWERK
SAAR



Rescue team prepared to explore the dammed area

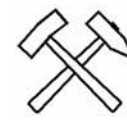


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25.09.2009
20.09.2009
Dr.Fuchs

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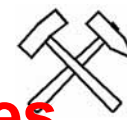


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Burned water through barriers





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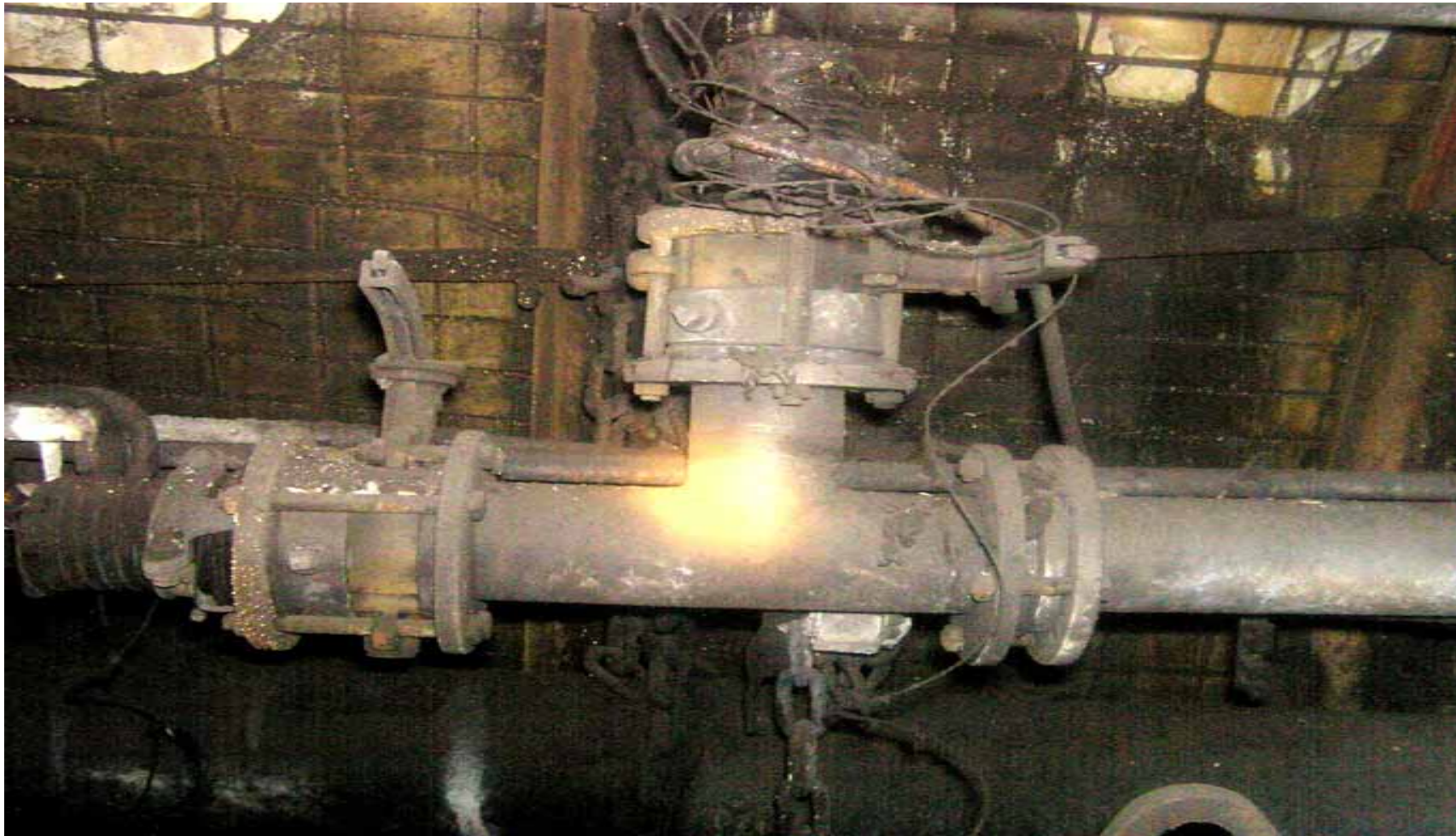
Measuring the open gas boreholes (the drainage plastic tubes are burned)



Destroyed gas drainage system



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25.09.2009
20.09.2009
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Burned air piping in the return air galery

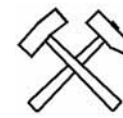


Fire damage on the upper shields of the face and on the shearer



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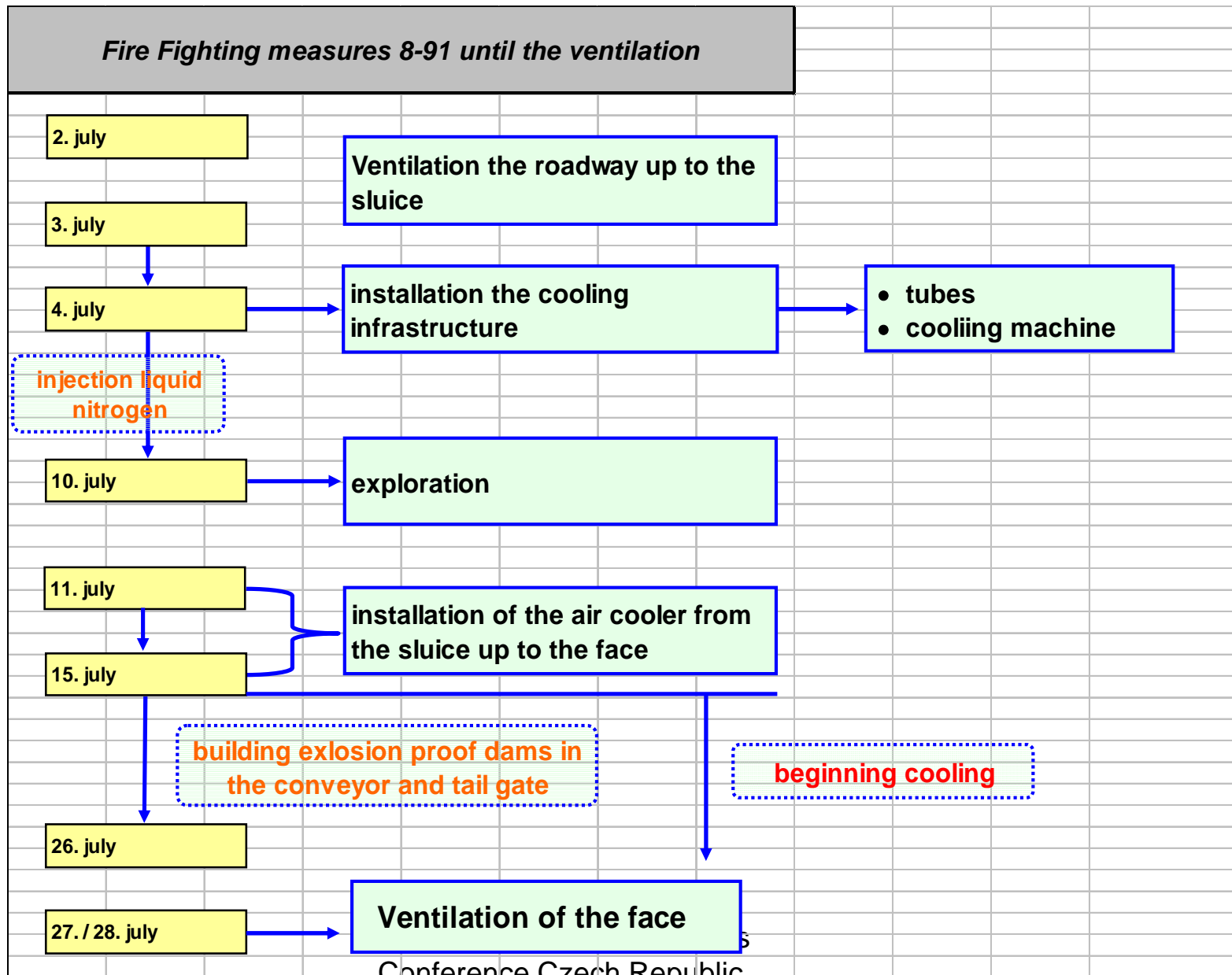


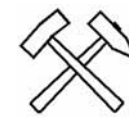


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Fire Fighting measures 8-91 until the ventilation





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Sluice with phenolic resin foam



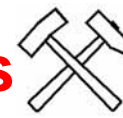
Sealing the crossing of the tubes and cables with phenolic resin foam



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Sealing the ventilation barricades with phenolic resin foam



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Sealing the goaf with phenolic resin foam



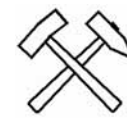
Air cooler in the dammed area drived with nitrogen (4 bar pressure)



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Looking for open cavities with the Infrared camera

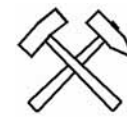


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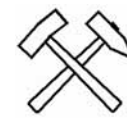
Open cavities in the roof



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Building a phenolic resin foam bolt behind the shield support



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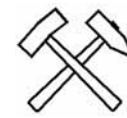


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Sealing with phenolic resin foam on the surrounding rock



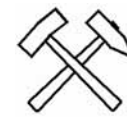
Installation of a new gas drainage system



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Observing the ventilation of the face with a Mobile fire gas analyser

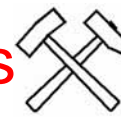


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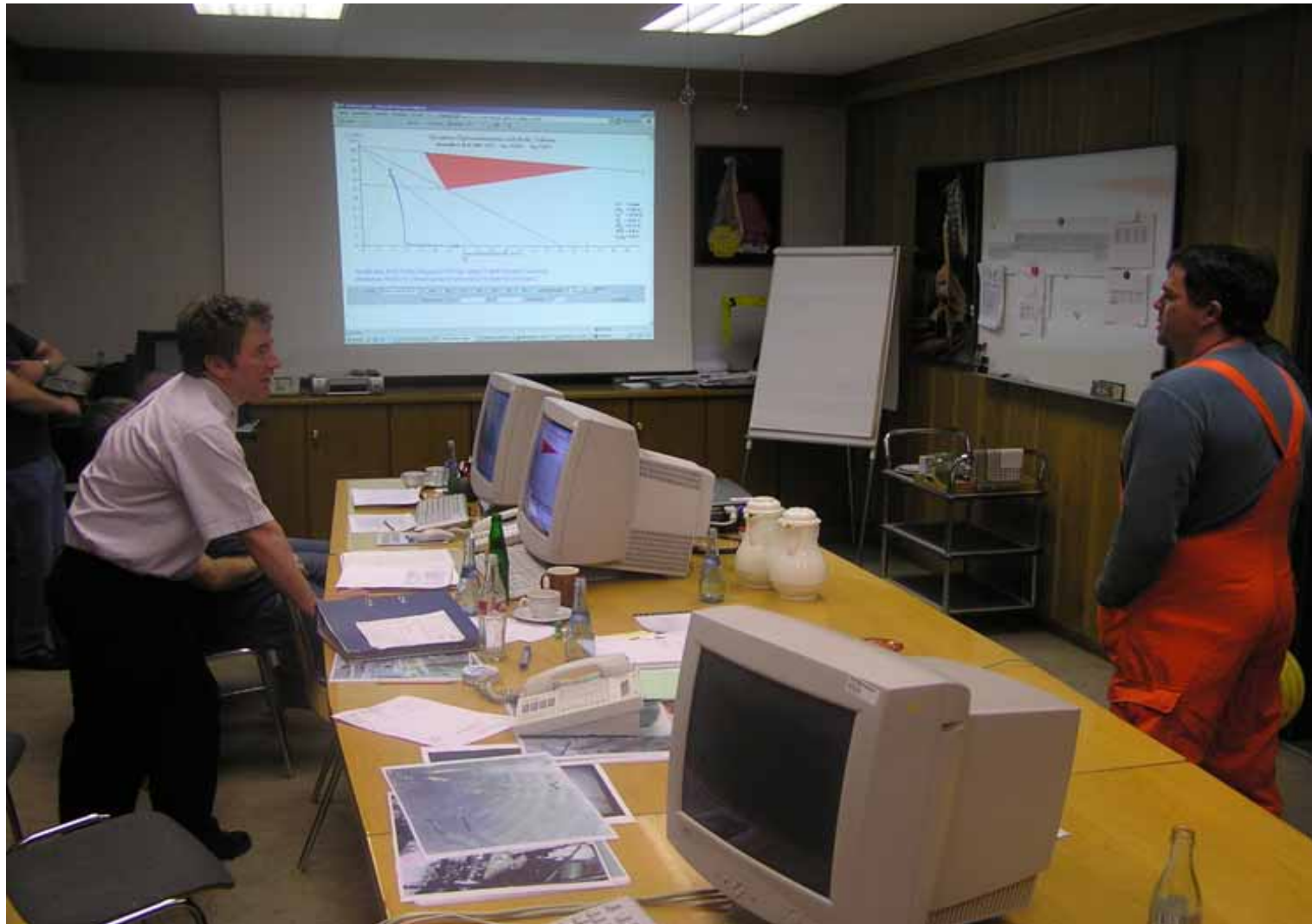


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Controlling of the fire fighting measures by the emergency managment



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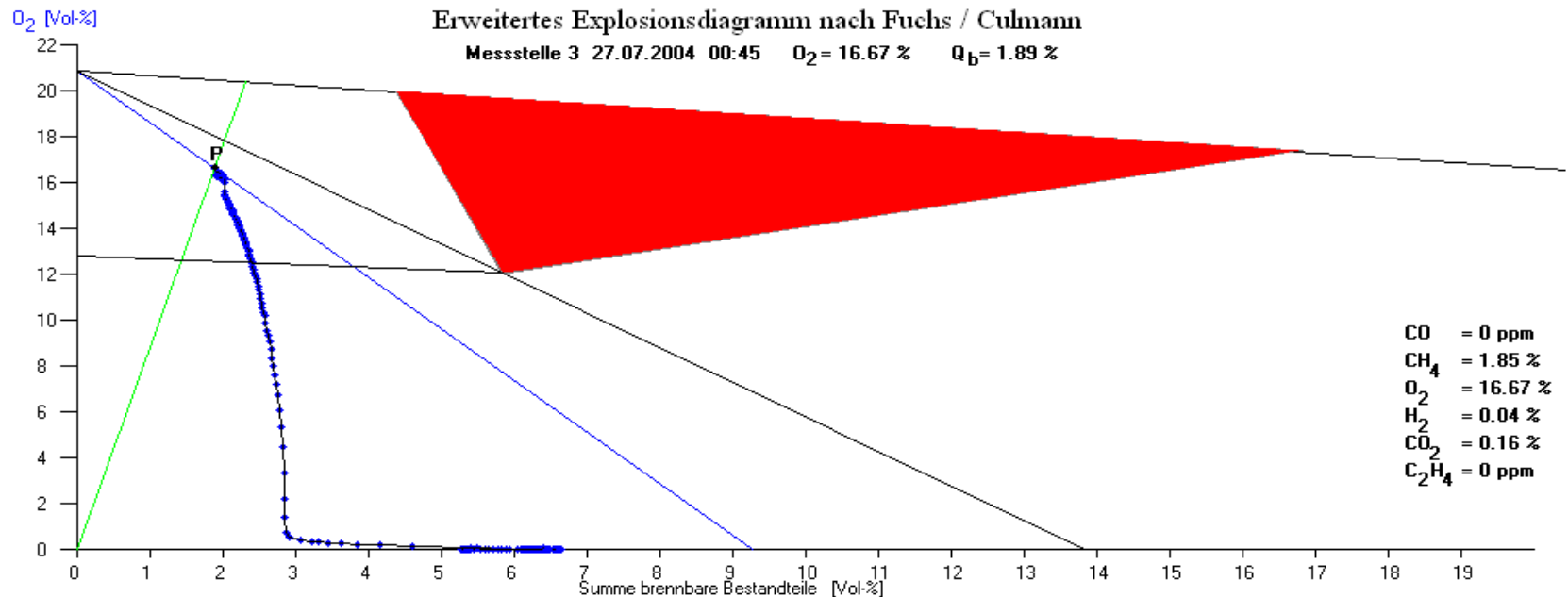


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Observing the explosion risk with the Explosion diagram of Fuchs/Culmann



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Gesellschaft: DSK-SAAR || Bergwerk: BW Saar Anlage Warndt || Baufeld: Lauterbach
Grubenbau: Streb 8-91 || Betriebspunkt: Kopfstrecke || Ort: hinter Roesil-Damm 1

BGM ☐ M1 ☐ M2 ☒ M3 ☐ M4 ☐ M5 ☐ M6 ☐ M7 ☐ andere Messstelle

☒ freier Zeitraum von bis ☐ letzte Mess.

Ventilation of the face (diagram of the mobile gas analyser)



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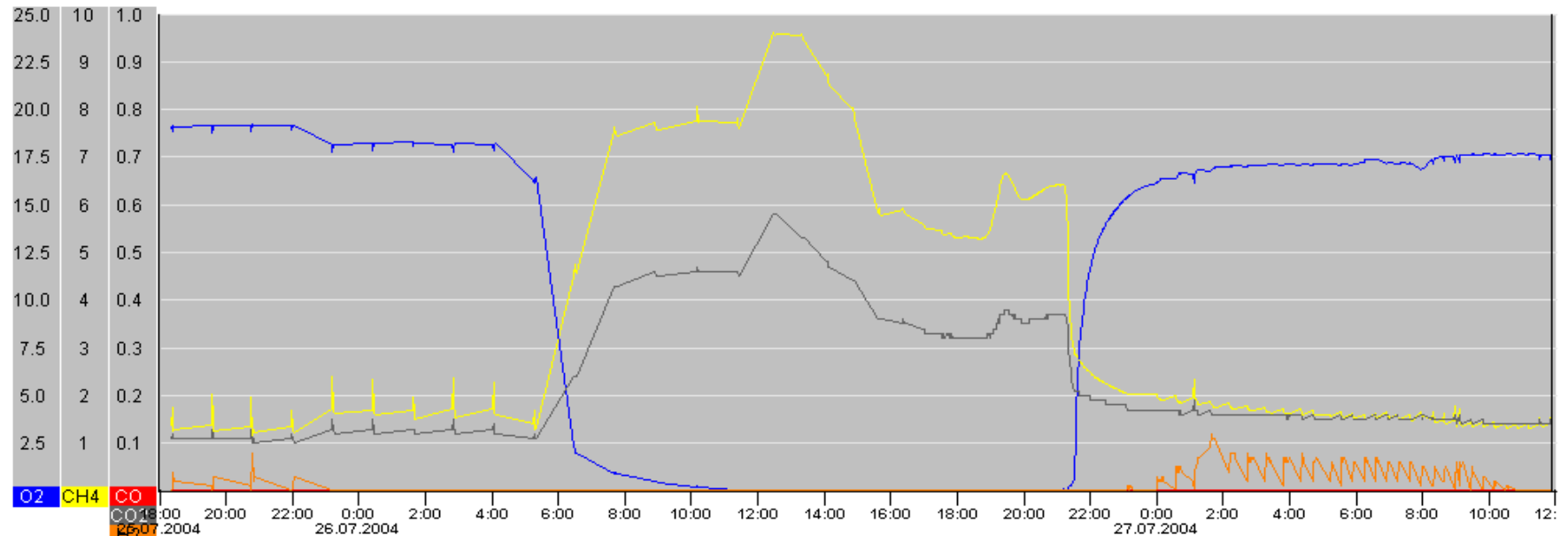


BGM 2000
sicher

Tabelle

Grafik

aktueller Benutzer:
Leitstelle



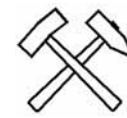
CO	0 [ppm]	CO2	0.14 [%]	Messdatum:	27.07.2004
CH4	1.34 [%]	H2	0.0 [%]	Messzeit:	11:54
O2	17.62 [%]	C2H4	0 [ppm]		

3

Gesellschaft: DSK-SAAR
Bergwerk: BW Saar Anlage Warndt
Baufeld: Lauterbach

Grubenbau: Streb 8-91
Betriebspunkt: Kopfstrecke
Ort: hinter Rocsil-Damm 1

Beginning again with the production after a succesfull fire fighting



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**Thank you very much for your
attention!**

**If you have questions
dont hesitate to ask me**

**Zdar buh - Glückauf
Welcome**