

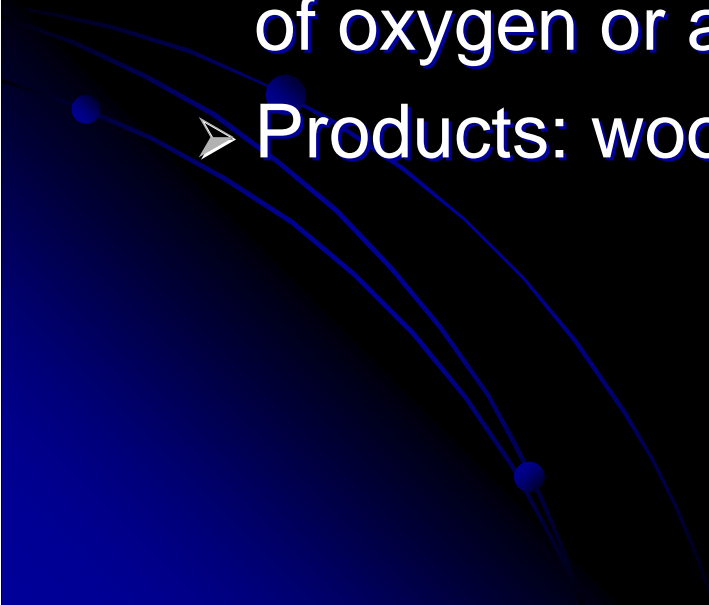
RECONSTRUCTION OF WOOD DISTILLATION PROCESS IN HORIZONTAL RETORTS

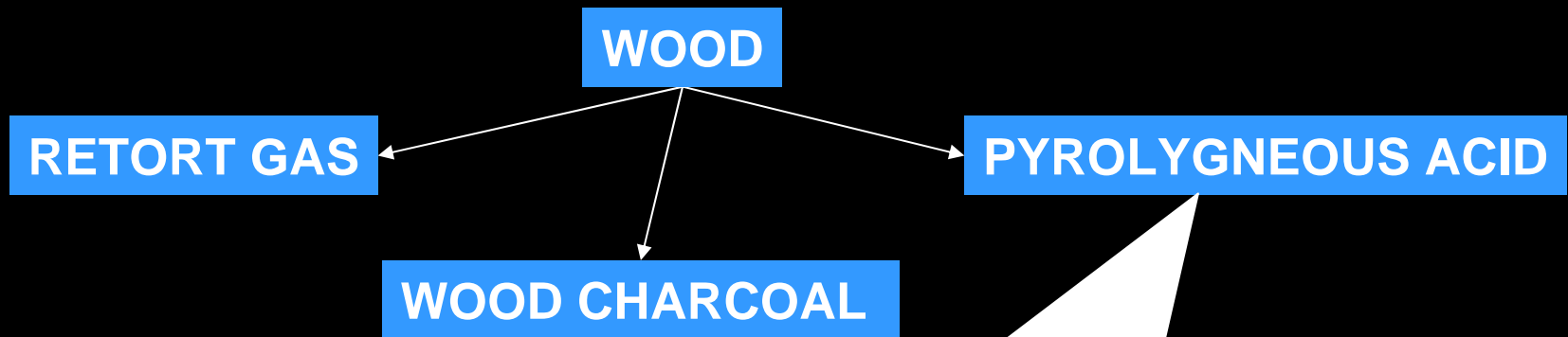
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Wood charcoal processing in Belišće Ltd., Factory of wood processing

- Destructive distillation of wood
 - Traditional processing of wood charcoal
 - Chemical decomposition of wood by gradually heating of wood (up to ~400 °C) in the absence of oxygen or any other reagents – pyrolysis
 - Products: wood charcoal & by-products
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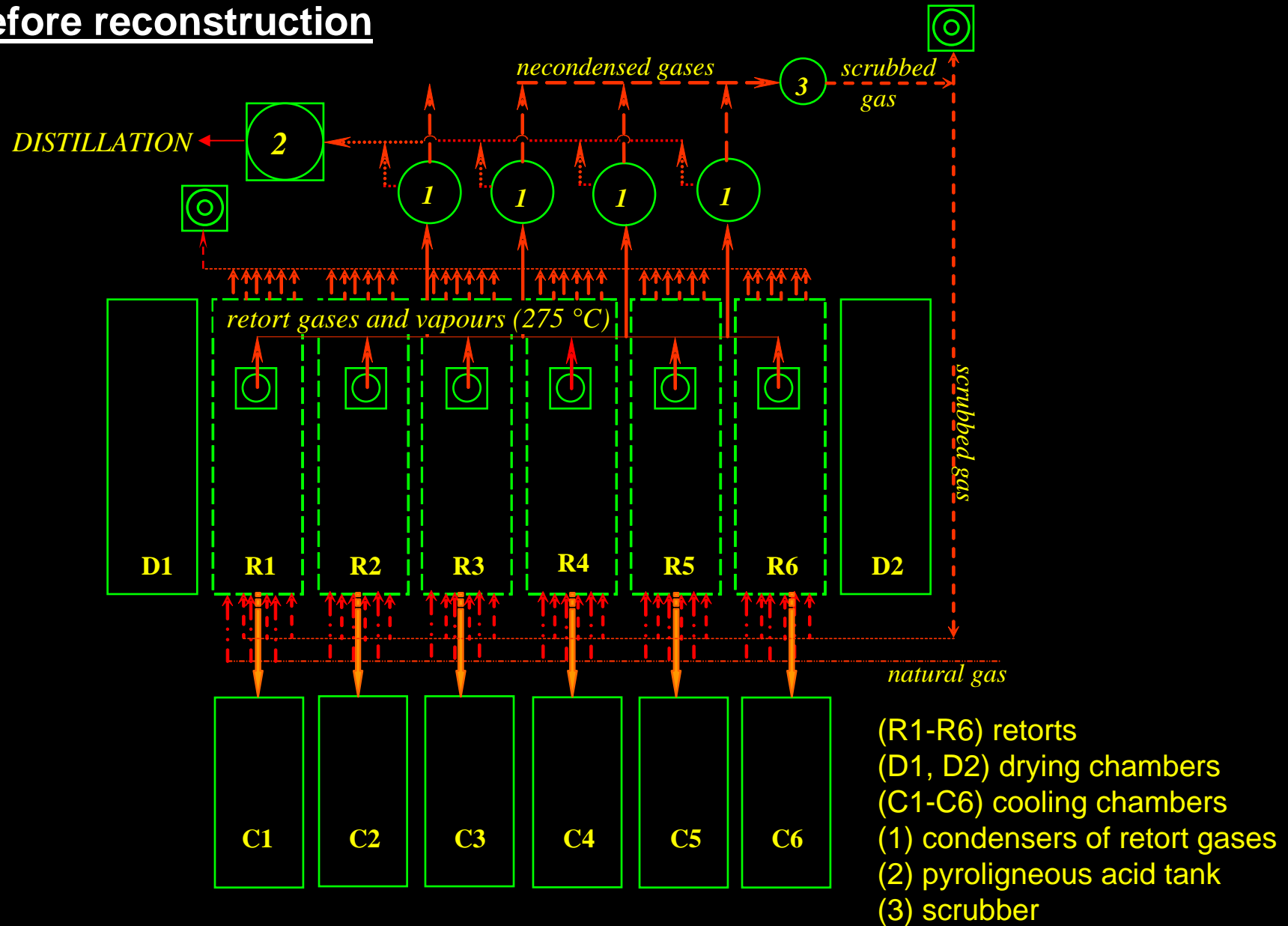


25 000 kg/day of waste, dark red-brown liquid with characteristic, sharp odour, composed of:

- 80% water
- 4% methanol derivatives
- 9% acids (acetic acid)
- 7% tar derivatives and other aromatic substances

ECOLOGICAL ISSUE!

Process plant scheme of destructive distillation of wood in Belišće before reconstruction



Proposition of issue solution

- **Starting point** → daily full capacity of plant (6 retorts):
 - ↗ process: 65 520 kg of wood mass (25% moisture)
 - ↗ produce: 17 042 kg of wood charcoal,
 - ↗ produce: 32 098 kg of total retort gases and steams (45% of burning compounds)
- **According to the theoretical calculation** →
 - ↗ plant energy required: ~170 GJ/day;
 - ↗ combustion of total retort gas with O₂ supply produce the fume gases (~910 °C) that almost provide necessity of heat for daily plant work

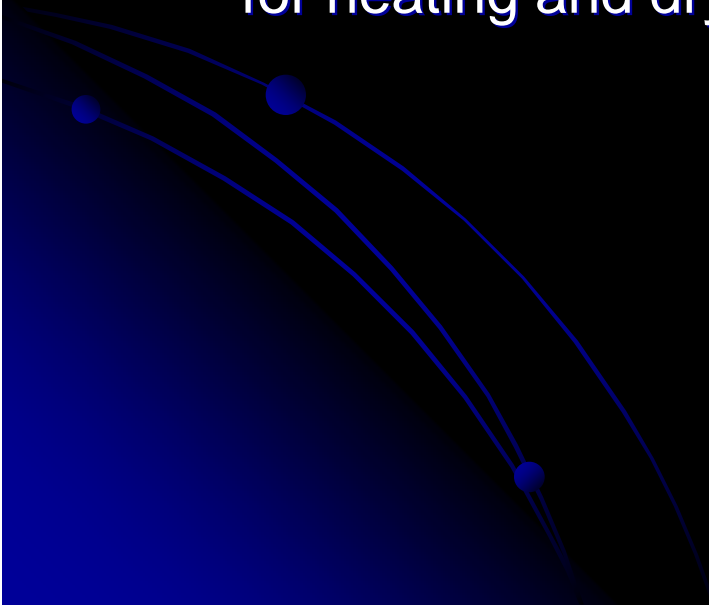
- Proposition

- reconstruction of existing process plant!

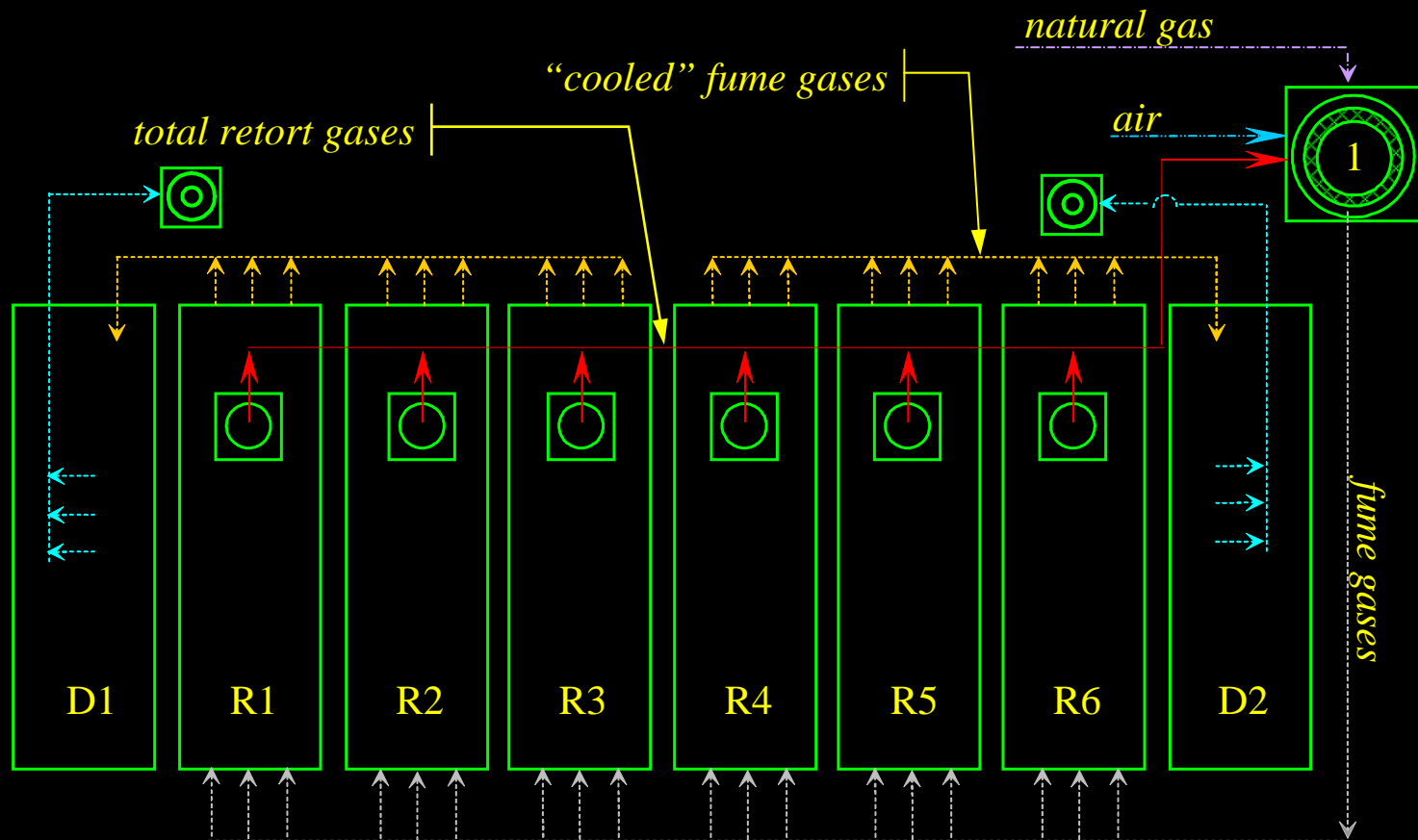
- ↗ combustion of total retort gases and steams (condensation phase is eliminated)

- ↗ produced fume gases use for indirect heating of retorts,

- ↗ after heating of retorts, "cooled" fume gases (~500 °C) use for heating and drying the raw wood mass in drying chambers



Scheme of reconstruction proposal of destructive distillation of wood in Belišće



(R1-R6) retorts
(D1, D2) drying chambers
(1) combustion chamber

- **Expectation** → ecological and economical effects:

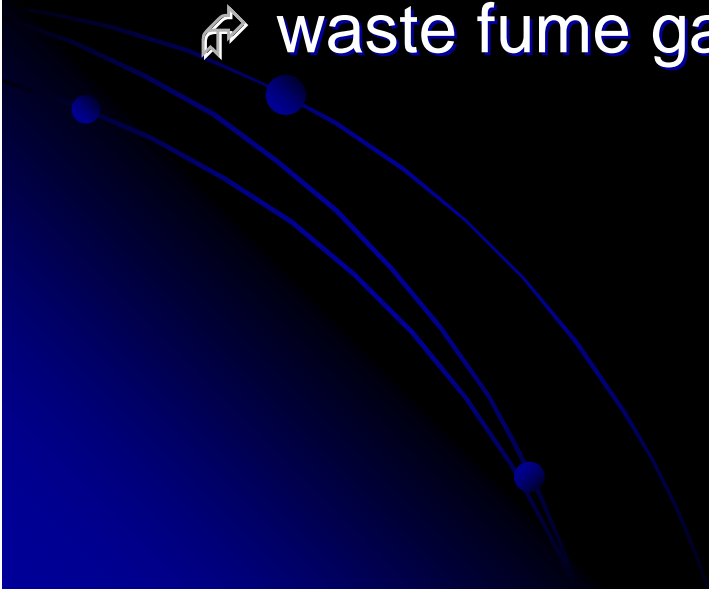
- ↗ energy source utilization,

- ↗ decreasing of operating costs,

- ↗ process time saving,

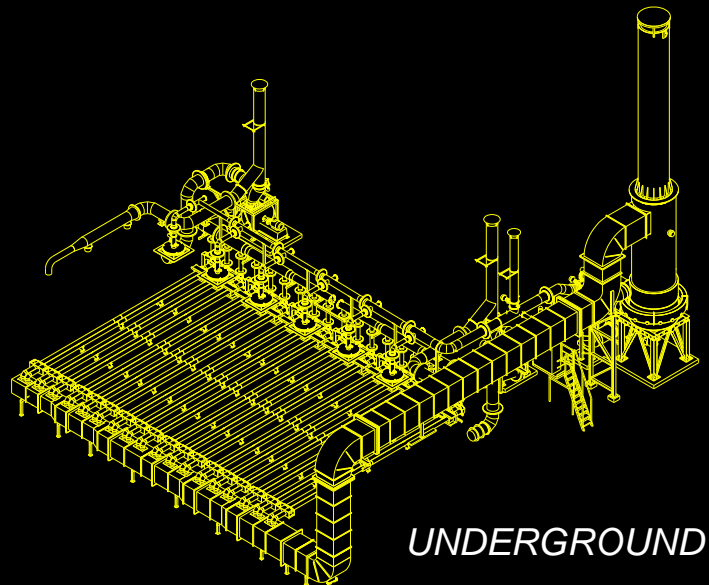
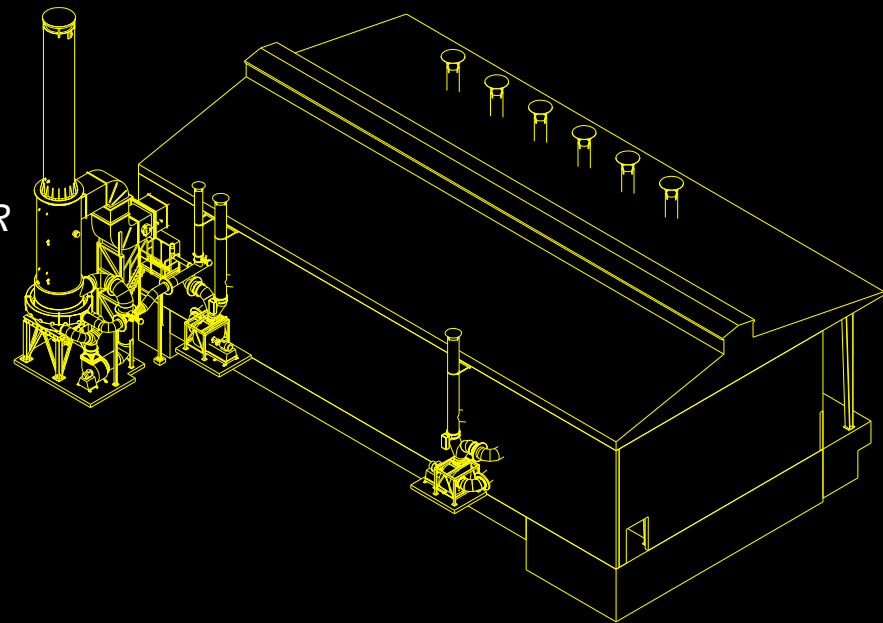
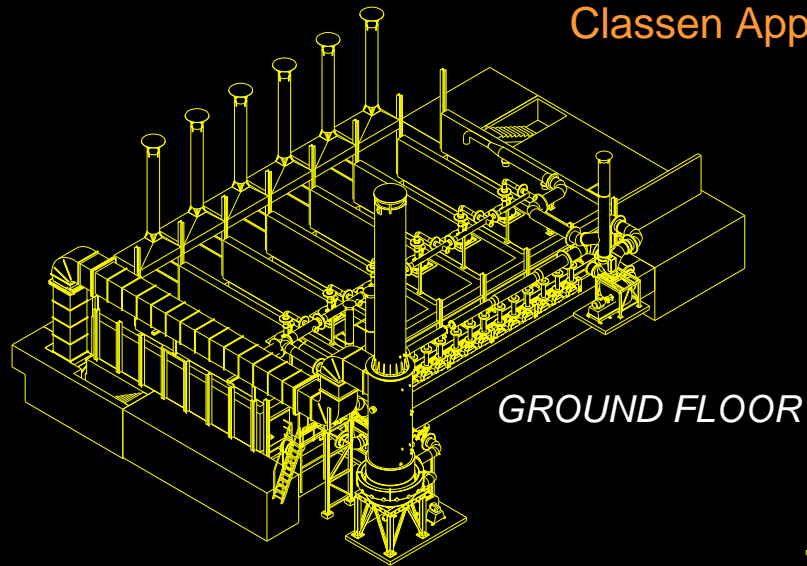
- ↗ **no production of pyroligneous acid!**

- ↗ waste fume gases are environmental-friendly

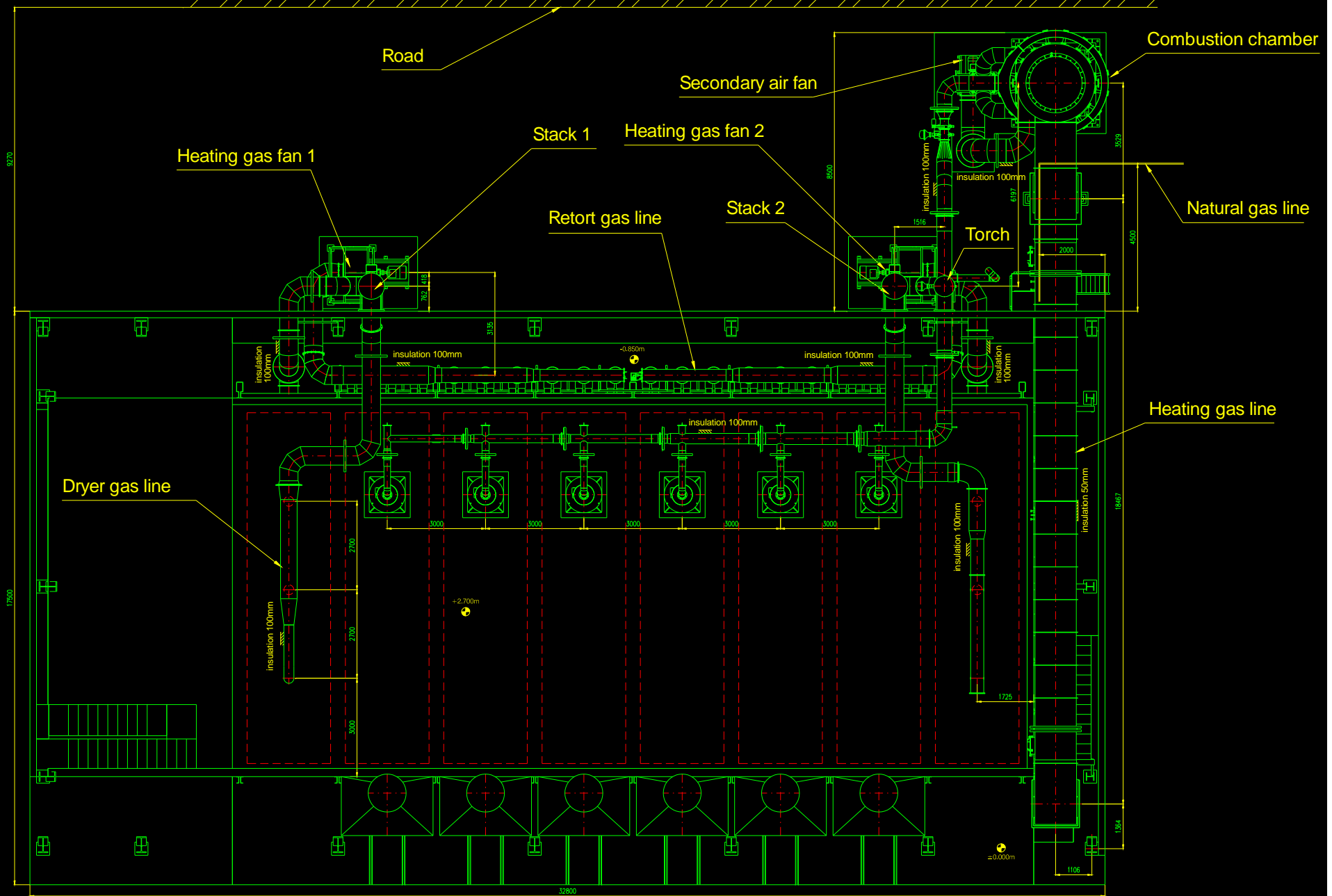


Scheme of wood distillation plant in Belišće after reconstruction (2004/.2005.)

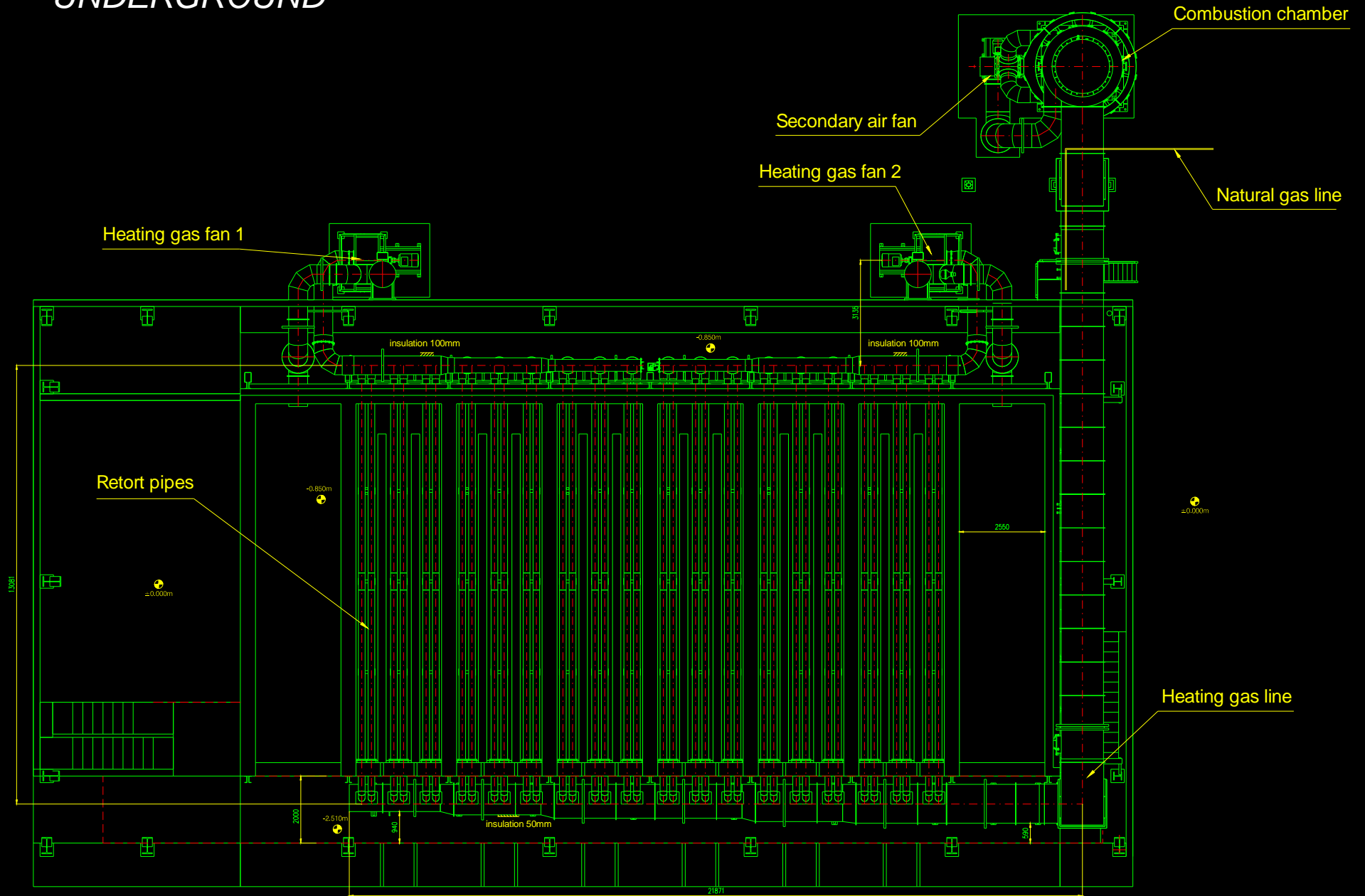
Classen Apparatebau Wiesloch GmbH, Wiesloch, GERMANY
Enerkon d.o.o., Zagreb, CROATIA



GROUND FLOOR

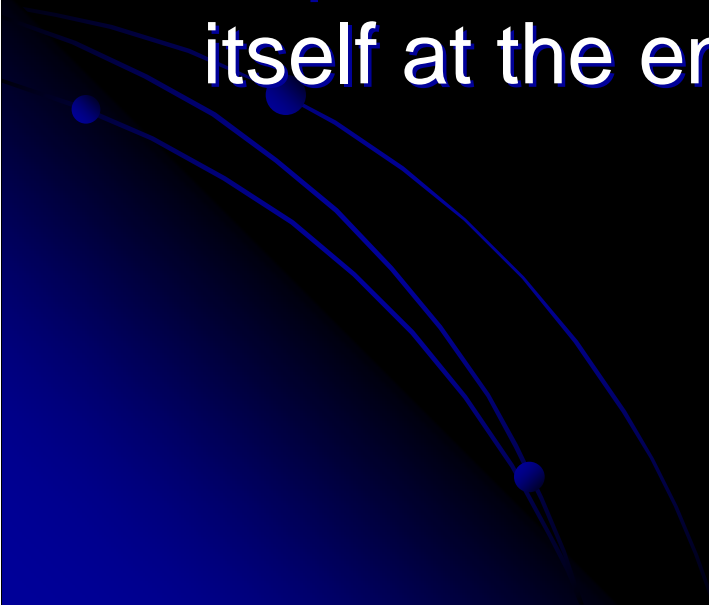


UNDERGROUND

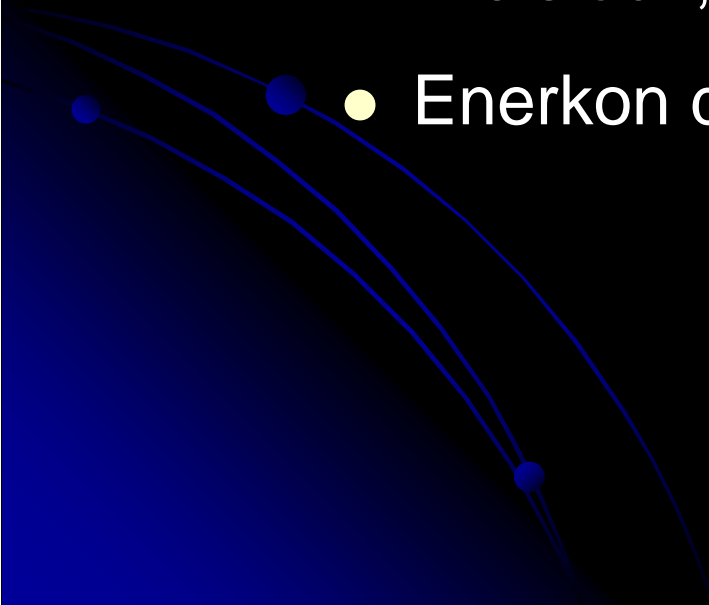


Reconstruction achievement

- The main expectations of preliminary design are obtained:
 - positive technological-economical, &
 - ecological effects:
 - no production of pyroligneous acid,
 - emission of pollutant is in accordance with *Decree of limit value of pollutant emission from stationary source to air* (“Zavod za unapređenje sigurnosti d.d.”, Osijek)
- Record production (~20% enhancement in regard to production of long-standing)
- Continue of traditional production of high-quality wood production
- Keep of 60 work places

- Total investment: 11.000.000,00 kn
 - Production in reconstructed plant started at 2005
 - Expectation: The investment will pay for itself at the end of 2008
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Acknowledgement:

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 - Enerkon d.o.o., Zagreb, Croatia
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**Thank you
for your attention !**

