

Explosion at the Hazardous Waste Treatment Centre Leverkusen-Bürrig 27th July 2021

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REFERAT 33 – AIR QUALITY, AIR POLLUTION CONTROL



Baden-Württemberg

On the 27th July 2021 an explosion with a subsequent fire occurred in the hazardous waste treatment centre in Leverkusen-Bürriig

7 people died

31 people were injured

ca. € 20 000 000 damage occurred

The Incident

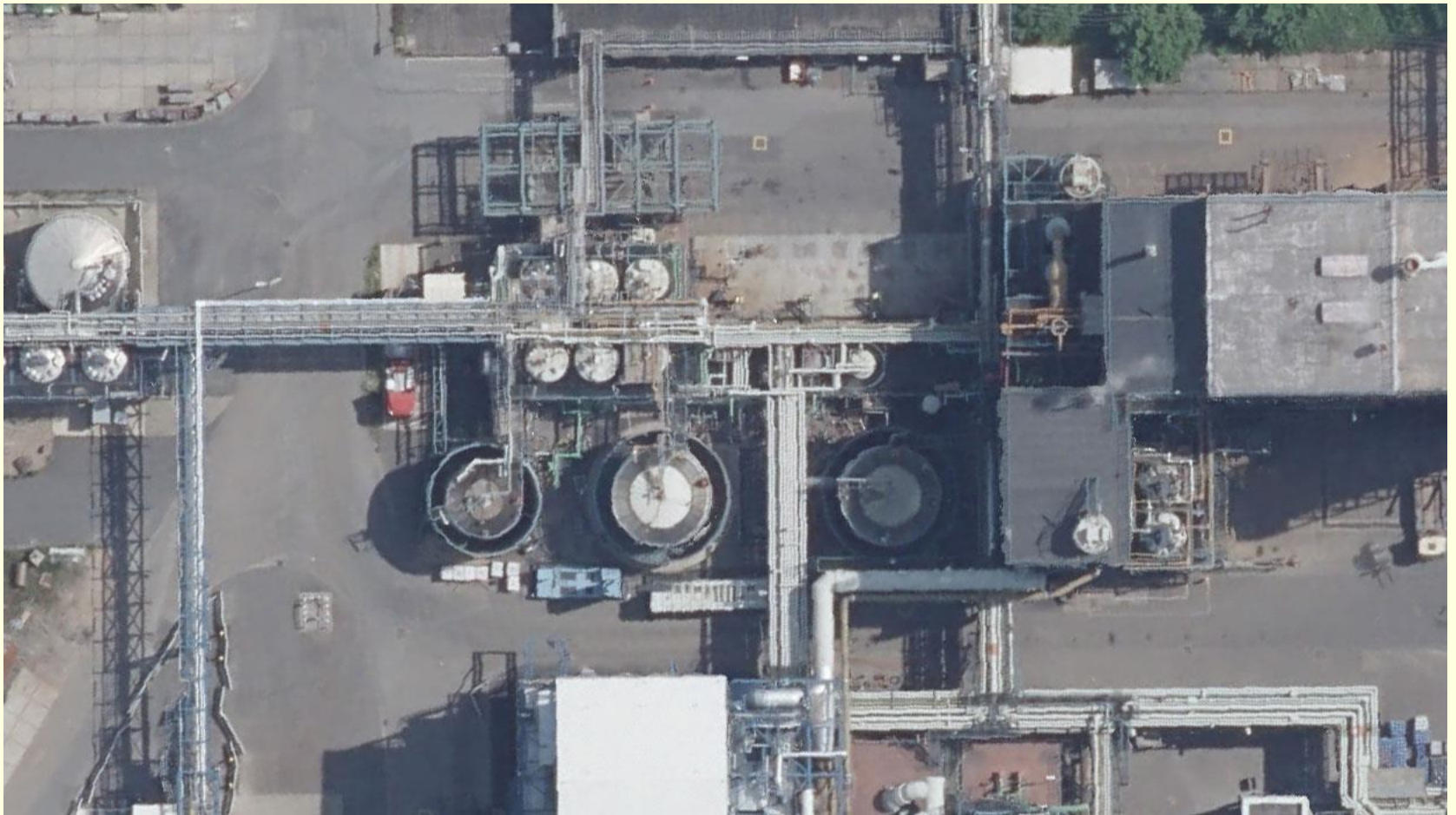
- An explosion occurred on 27th July in the hazardous waste management centre in Leverkusen, followed by a fire
- 7 Fatalities, 31 Injured
- Explosion was registered at a seismological station 40 km distant
- Large black cloud was visible over a great distance and led to soot deposition in the local area (Bürrig, Opladen und Quettingen).
- The fire fighting water was retained. Following an analysis for hazardous components it was to be disposed of according to the analysis results.
- No contamination of neighbouring rivers (Rhine, Wupper) was identified.

Chronology

- 09:37 Emergency call to the works fire brigade
- 09:46 Fire brigade arrives on site
- 09:47 Emergency medical services take care of the injured
- 09:49 Sirens in Leverkusen
- 09:51 Warning via app is launched
- 10:00 Highways closed by the police
- 11:02 Information Hotline is launched
- 12:15 Fire brigade reports: “Fire out”



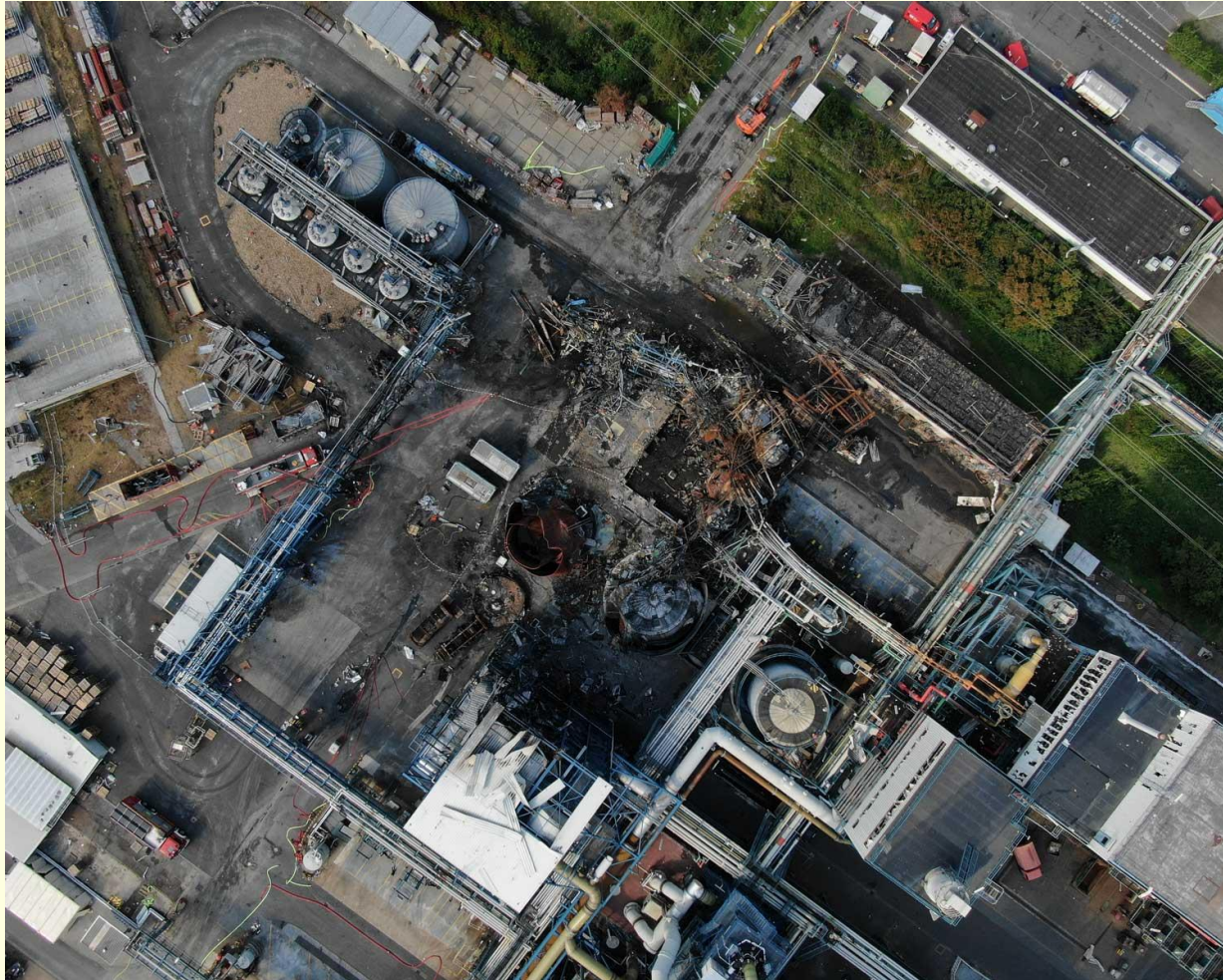
Before the explosion



After....



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Initial measures after the event

- Searching for missing people
- Protection of storage tanks, pipework and road tankers (cooling)
- Sampling and measurement for airborne contamination in the area:
 - No hazardous pollutant levels were detected
- Retention of fire-water and interim storage in waste water tanks. Following an analysis for hazardous components it was to be disposed of according to the analysis results.
- No contamination of neighbouring rivers (Rhine, Wupper) as a result of the fire was identified.
- However a leaking valve in a pipes from a waste water tank led to the unintentional release of ca. 1300 m³ contaminated water to the waste water treatment system.

What happened?

- An explosion occurred in one of the waste storage tanks
- Main components of the tank contents:
 - O,O'-Dimethyl Dithiophosphate (CAS-No. 756-80-9)
 - Dimethyl thiophosphonate (CAS-No. 5930-72-3)
 - O,O,O,O-tetramethyl thiodiphosphate (CAS-No. 5930-73-4)
 - Tetramethyl thioperoxydiphosphate (CAS-No. 5930-71-2)
- Investigation is still ongoing
- An exothermic runaway reaction could be experimentally verified.
- The hazardous waste originated in Denmark (Agricultural Solutions A/S) and had been transported across Germany.

Root cause analysis is ongoing

- The investigation involves:
 - The operating company: Currenta
 - The State Prosecutor - investigating possible culpable homicide
 - The Environmental Authority - investigating (a) possible breaches of the operating permit, (b) the causes under the Major Accident Ordinance (Seveso-III-Directive)
 - External experts - working on behalf of the organisations above

Currenta is working hard to restore trust within the workforce and the community

- Biomonitoring of the staff
- Cleaning of the neighbouring area: e.g. streets, playgrounds (where soot deposits were found), cars, etc.
- Very detailed and transparent information to the public
<https://www.currenta-info-buerrig.de/>
- Involving senior management
- Providing facts and explaining their meaning
- Also providing information from conflicting views (Greenpeace)
- Using graphics, videos and photos to provide clear information

Re-starting – the operator's concept

- Only thermally stable wastes will be accepted and incinerated-
- Only wastes recognised by the operator from customers recognised by the operator, following an intensive assessment will be accepted and incinerated.
- The delivery of wastes which have been falsely declared will be prevented through effective measures. This includes a 3-person principles (6-eyes) as well as a more extensive and finer analysis of the waste substances on declaration and site entry.
- no wastes to be stored in tanks and/or heated.

[<https://www.currenta-info-buerrig.de/die-anlage-in-buerrig/>]

Some thoughts on the operator's concept (1)

- Only thermally stable wastes will be accepted and incinerated
This means that parameters must be set, also the potential for reactions due to mixing of wastes must be avoided.
- Only wastes recognised by the operator from customers recognised by the operator, following an intensive assessment will be accepted and incinerated.
The waste that led to the accident was from a customer who had been served previously. The SDS described the hazards of the waste correctly, despite being incorrectly classified for transport.

Some thoughts on the operator's concept (2)

- The delivery of wastes which have been falsely declared will be prevented through effective measures. This includes a 3-person principles (6-eyes) as well as a more extensive and finer analysis of the waste substances on declaration and site entry.

It is unclear what these “effective measures” are. If the falsely declared waste has arrived on site, then there are transport regulations which make returning it difficult.

Three person principle suggest that one or even two would be insufficient. This is not a robust system.

- No wastes to be stored in tanks and/or heated.

The first loads were not transferred to a tank – why did the change take place? Is this a suggestion that the accident was caused by heating a thermally instable waste?

First thoughts on lessons from this incident:

- Exothermic chemical reactions in tanks for chemical waste cannot be discounted.
- These tanks can be found in waste incinerators and in facilities for the chemical/physical treatment of wastes.
- The hazards associated with wastes being received must be assessed and understood (as far as possible)
- The potential for exothermic chemical reactions must be recognised and appropriate measures taken to:
 - enable early detection and monitoring of the situation
 - take mitigating steps e.g. immediate incineration, dilution with non-reactive substance.
- This includes both technical and organisational measures.

**Thank you for
your attention!**



Baden-Württemberg