Bavarian Environment Agency

Workshop UNECE Air Convention with Focus on Countries in the EECCA Region

Inspection and Monitoring according European Industrial Emissions Directive (IED) using an Example from the Cement Industry in Bavaria

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Air Quality Control in Plants

Agenda

- Cement Plants in Germany / Focus of Inspections
- General Aspects: IED Inspection
- Example Cement Plant: IED Inspection
- New Bavarian Approach on Inspection

Cement Plants in Germany / Focus of Inspections

- **Cement plants in Germany**

  - 42 plants (6 plants in Bavaria)
  - 37 rotary kilns with cyclone preheaters (dry process)
  - production capacity: typically 3000 – 4000 $t_{clinker}$ /day
  - use of alternative fuels: ca. 65 % of total fuel energy demand (average 2017)

- **Sources of Emissions**

  - waste gas of rotary kiln
  - 100 – 200 stationary emissions sources (dust)
  - different diffuse emissions
  - differnt sources of noise, like mills

- **Focus of Inspections**

  - emissions to the air, especially dust
  - noise
  - waste co-incineration (quality control)

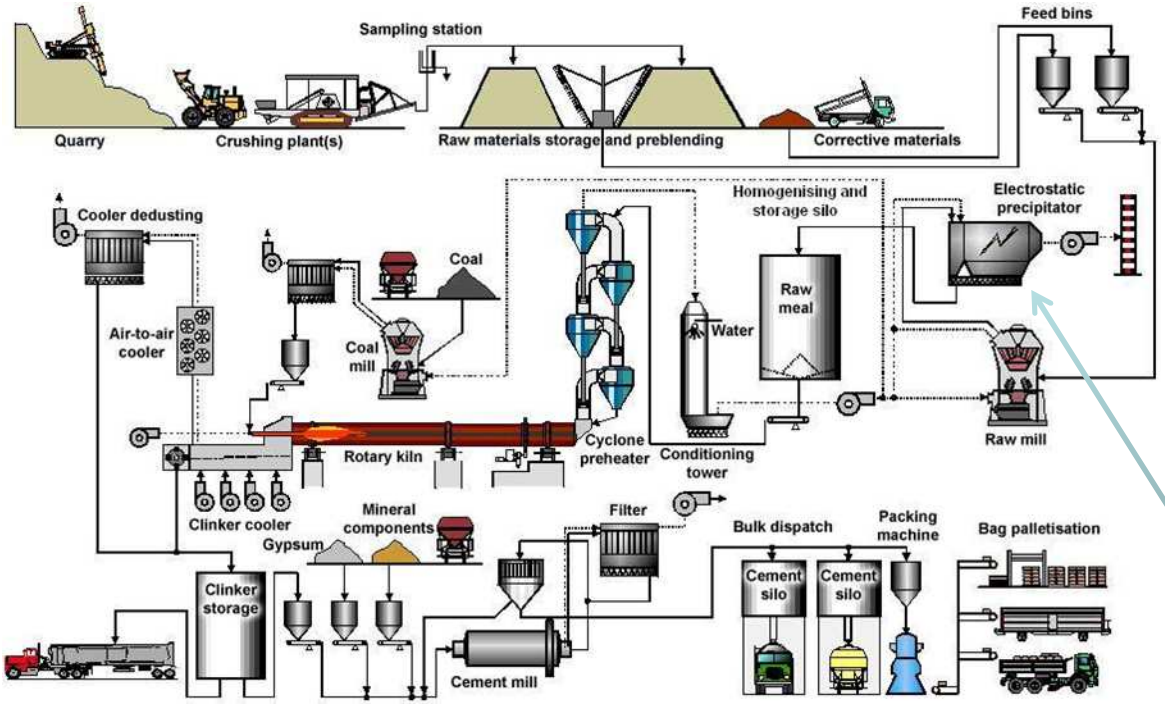
} Impact on the neighbourhood

Note: ca. 25 % of dust emissions are kiln born, ca. 75 % are from other sources!!

Focus of Inspections of Cement Plants

Diffuse dust emissions:
e.g. road transport, material transport and delivery

Channelled dust emissions, other than kiln
dusty operations, cooling and milling processes



Reference: JRC Reference Report BAT 2013 Production of Cement, Lime Magnesium Oxide

Channelled emissions kiln

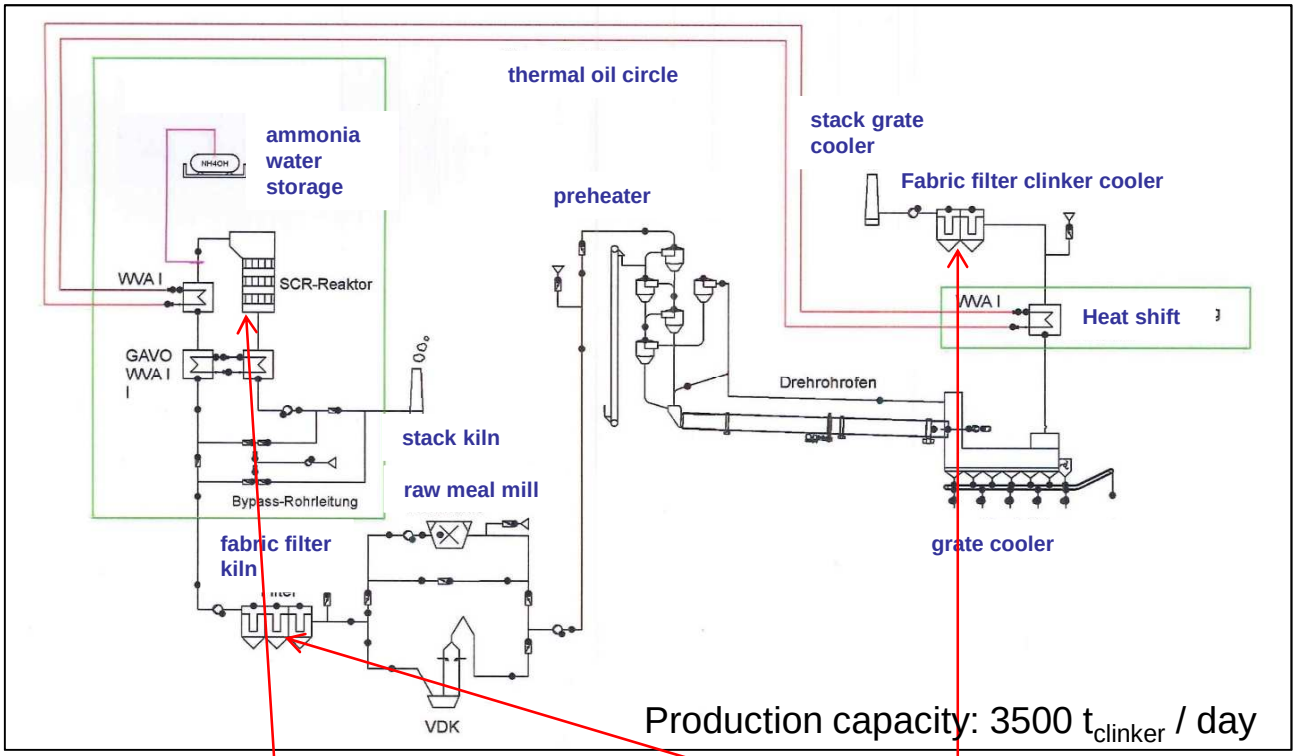
waste gas kiln firing

- dust
- NOx
- SOx
- CO
- HCl / HF
- VOC
- Heavy Metals
- PCDD/F

Sources of Noise: e.g. raw meal mills, cement mills, etc.

CO trips in case of electric precipitators

Waste Gas Cleaning and Emission Monitoring (Bavarian Kiln)



Continuous Emission Monitoring

Clean gas kiln

- Dust
- NO_x
- SO_x
- TOC
- CO
- Mercury
- NH_3
- V, T, p, humidity

Clinker cooler, mills

- Dust

Yearly Measurements

- HCl, HF
- heavy metals
- PCDD/f

Every three years

- Dust (other sources)

NOx Reduction

Selective catalytic reduction (SCR)
NOx < 200 mg/m³ (daily mean value)
NH_3 < 10 mg/m³

Dust Precipitation

Fabric filters (cooler and kiln)
Dust << 10 mg/m³ (daily mean value)

Bavarian Cement Plant

(Will be provided during presentation)

Picture of the Cement Mill

SCR Technique Bavarian Kiln

- Pictures

(Will be provided during presentation)

SCR- Catalyst

View into a catalytic module

General Aspects: IED Inspection

- **Environmental Inspections (Art. 3, Nr. 22 IED)**

All actions **to check and promote compliance of installations conditions** and, where necessary, to monitor their environmental impact, including

- **site visits**
- **monitoring of emissions**
- **checks of internal reports and follow-up documents**
- **verification of self-monitoring**
- **checking of the techniques used (Best Available Techniques)**
- adequacy of the **environment management** of the installation

=> very comprehensive inspection and monitoring approach of the IED

General Aspects: IED Inspection

- **Environmental Inspections (Art. 23 IED)**

  - **Frequency of site visits** (based on a systematic approach of the environmental risks)

    in Bavaria all cement plants: **yearly**

  - **Competent authority for Inspection of cement plants**

    in Bavaria: **regional authority** -> Inspection by environmental engineers

    coordination with -> water protection, occupational safety, nature protection

  - **Inspection Reports**

    reports with the relevant findings **are published via internet** on the homepage of the competent regional authority

- **Public Information Emission Monitoring (Art. 55 IED)**

  -> Internet or gazettes

  Bavarian Example: https://www.heidelbergcement.de/de/lengfurt/emissionen

General Aspects: IED Inspection

- **Scope of Site Visits**

- Plant identity: conformity of the realized plant with permission

- Conformity of the plant with the obligations of the permit

-> e.g. emission limit values, emission monitoring, quality control of waste, noise monitoring

- Permanent conformity with emission limit values

-> availability of maintenance and self monitoring programmes for all dust filters / waste gas treatments (documentation)

- Suitability of environmental management

-> environmental company organisation, policy
-> environmental responsibilities

- Best Available Techniques

-> Inline with BAT-Conclusions “Production of **C**ement, **L**ime and **M**agnesium oxid (CLM)”

https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0163&from=EN

Example Cement Plant: IED Inspection

- **Procedure of Inspection: Documents and reports**

- Preparation and checks of documents and reports

-> all permits -> if so, **reconsider with regard to BAT Conclusions „CLM“**

-> current flow charts ot the whole plant

-> scheme of all emissions sources

-> reports:

- periodical measurement air emissions (all sources)
- continuous measurements reports, functional and kalibration reports
- noise

Emission limit values kept ?

-> CO – trips, when using electric precipitator (< 30 h / Jahr, see BAT-Conlusions „CLM“)

-> in case of co-incineration of waste: quality assurence system

-> last but not least: Are there complaints?

- Continuous Air Emission Monitoring (Stack kiln)

Mercury Continuously

dust monitoring

Continuously: multi components NOx, SO_2, CO, TOC, NH_3

Sampling point for periodic measurements

all photos: Ebertsch

Example Cement Plant: IED Inspection

- **Procedure of Inspection: Site Visit (1)**

- Check Plant Identity

-> gap of existing components of the plant with the permit (-> flow chart)?
-> real clinker production capacity

- Check neuralgic points:

-> Diffuse emissions (see BAT-Conclusions)

- Enclosure /encapsulation of dusty operations, such as grinding, screening and mixing, conveyors, elevators
- Use flexible filling pipes for dispatch and loading processes
- tidiness of transport roads, pavement, etc.

-> Noise

- Enclosure of noisy operations (e.g. mills)
- soundproofed buildings, noise protection walls, closed doors etc.

-> Waste quality control: results of analytics from waste to be used as fuel

Example Cement Plant: IED Inspection

- **Procedure of Inspection: Site Visit (2)**

- Check neuralgic points (ff):

-> Functional Control of dust filters (exemplary)

- Self - control of the operator, check maintenance book; check operational instructons

- **Operational room (control panel)**

-> production capacity
-> waste feed
-> continuous emission monitoring

- Site visit stack

-> Function control of continuous emission monitoring analysers
-> suitability of measuring points for periodic measurements

Bavarian Approach on Inspections

- **New approach: Achiving a Reliable Operators Behavior**

- **Pilot project „systematic approach inspection“ for a cement plant**

-> documention with all necessary documents for inspection (folder) developed by competent authority and operator commonly

e.g. all permits, flow charts, scheme of emission sources, etc.

-> the documentation includes the self monitoring of the operator and the environmental management of the plant

-> The documention will be updated frequently

- **Advantages**

-> reduction of the extent of the inspections

-> extention of inspection period (2 years)

-> suitable for long term use

Thank you for your attention