



# Registry and management of (potentially) contaminated sites in Germany

Michael Kerth

Dr. Kerth + Lampe Geo-Infometric GmbH  
Walter-Bröker-Ring 17, D-32756 Detmold  
[m.kerth@dr-kerth-lampe.de](mailto:m.kerth@dr-kerth-lampe.de)



## Agenda of my presentation:

1. What is the **legal and administrative framework** of the management of (potentially) contaminated sites in Germany like?
2. What sites are registered and what are the actual figures in the **registry of (potentially) contaminated sites** in Germany?
3. Some aspects of the **multi-stage approach for the management of (potentially) contaminated sites** in Germany
  - „Best practice methods“ for historical investigations as the basis for registries
  - „Triggers“ for exploratory and detailed investigations
  - „Remedial goals“
4. Who is **financing the management of (potentially) contaminated sites** in Germany? And how much money has been spent already?



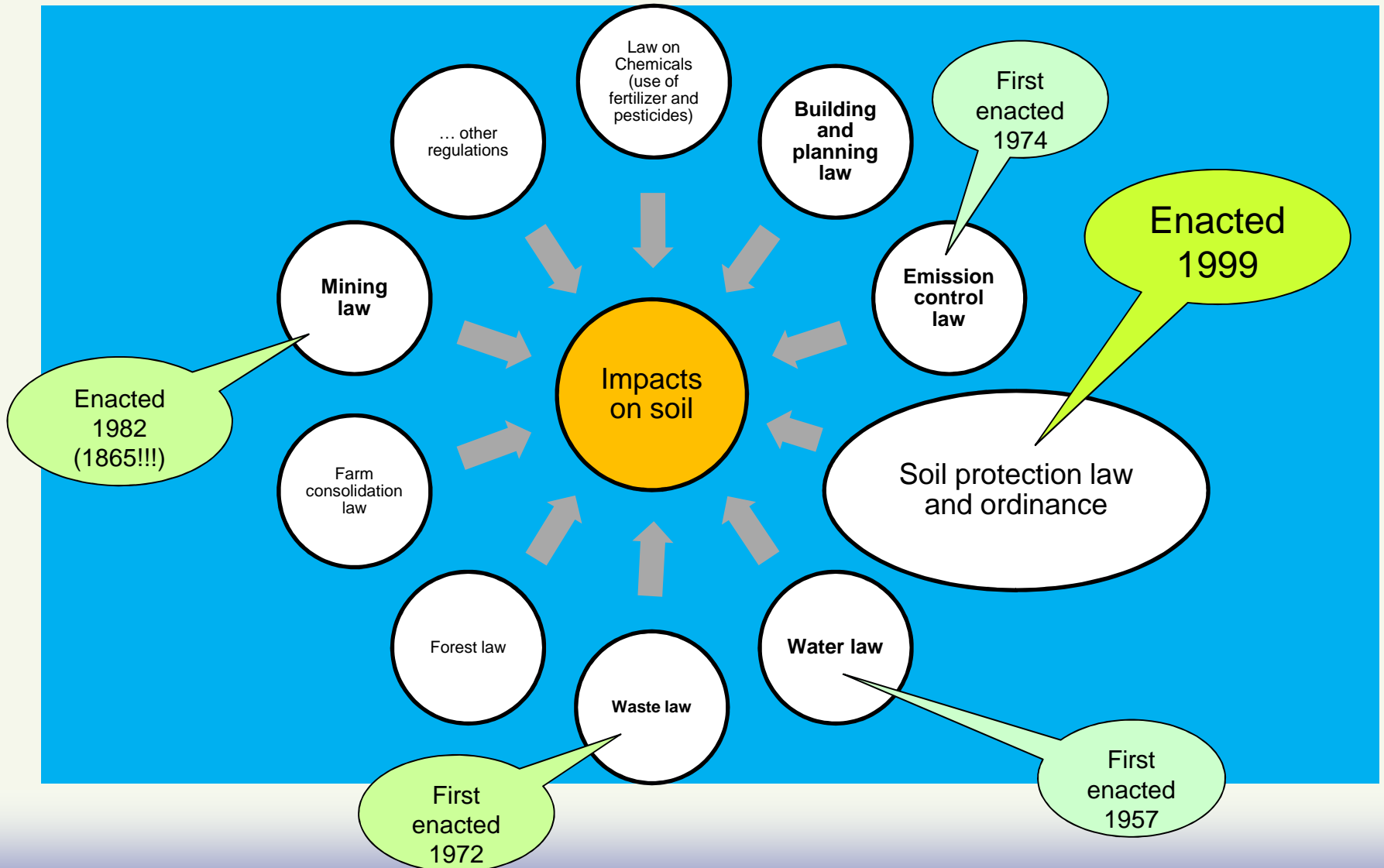
# Germany – a few facts:

- **Federal** republic
- 16 States (“Länder”)
- with about 400 counties and municipalities
- **Population:** ~ 84 Mio  
(South Korea: ~ 50 Mio)
- **Area:** ~ 364,000 km<sup>2</sup>  
(South Korea: ~ 100,000 km<sup>2</sup>)
- **Population Density :** ~ 226 per km<sup>2</sup>  
(South Korea: ~ 489 per km<sup>2</sup>)
- **German Federal Soil Protection Regulations:**
  - Federal Soil Protection Act 1998
  - Federal Soil Protection Ordinance 1999
- **Specific Soil Protection Regulations in each “Land”**
- **In general, counties and municipalities are responsible for the enforcement of soil protection**





# German Laws regulating impacts on the soil





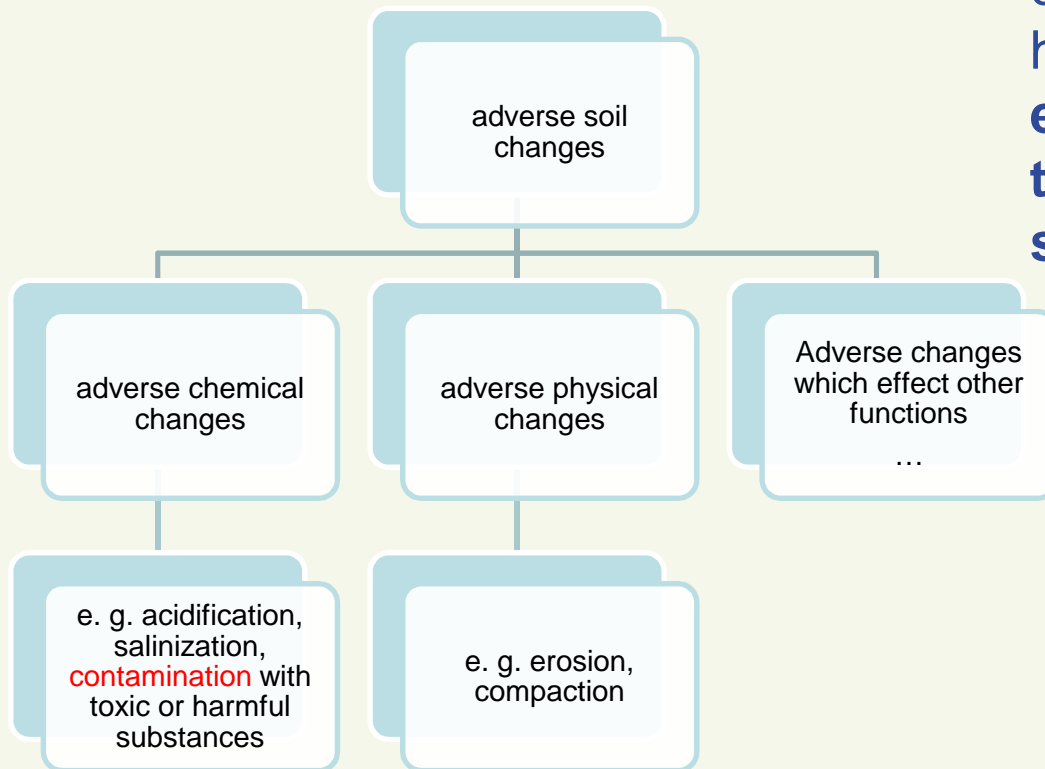
## The federal soil protection law ...

- was enacted in 1999 as the **last of the major environmental laws** in Germany,
- **fills the gaps** left by the other environmental and planning laws and is therefore not generally regulating impacts on and use of soils,
- generally **regulates the management of contaminated sites**, if contamination is caused by abandoned landfills or commercial / industrial sites,
- **gives material „measures“** for assessing or tolerating certain impacts on the soil, which have to be applied when other laws regulate the impact on the soil.



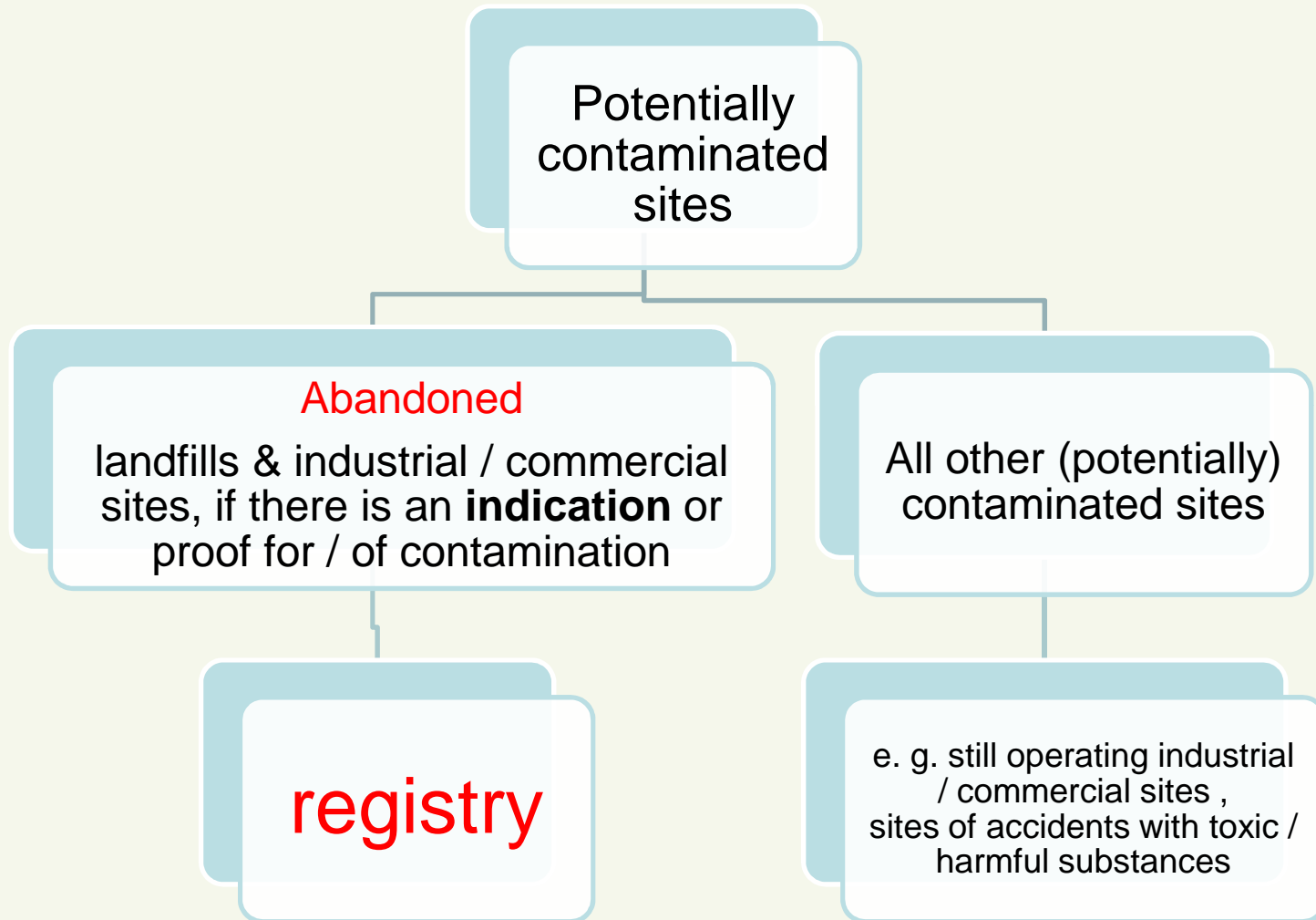
# „Adverse soil changes“ as a central concept in the German soil protection law

Adverse soil changes are changes which cause hazards or have **adverse effects on natural and technical functions of the soil.**





## What kind of potentially contaminated sites are registered?





## Status of Registry and Management of (potentially) contaminated sites resulting from abandoned landfills / industrial sites (2014)

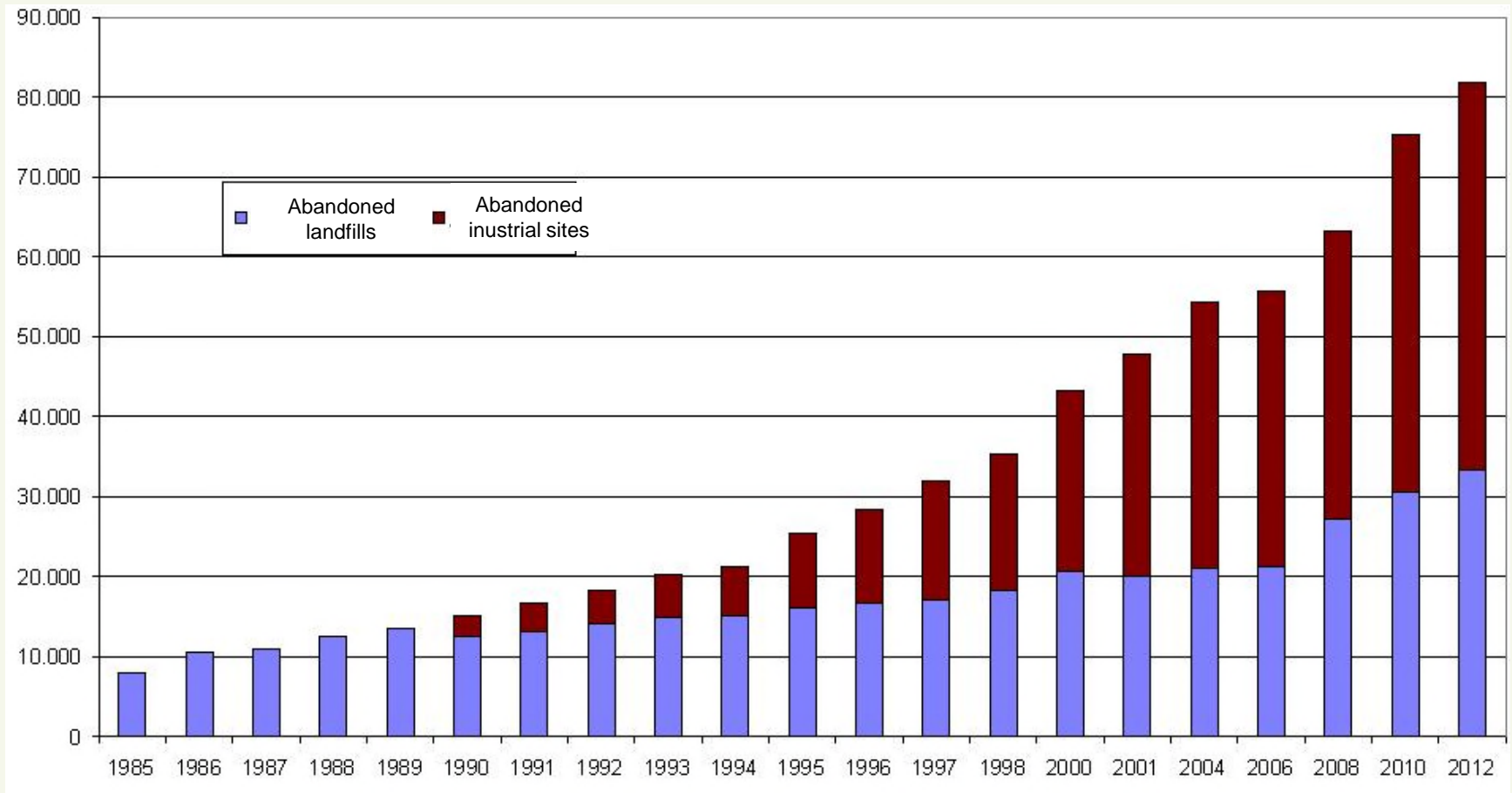
Registered sites	Risk assessment completed	Remediated sites & sites being currently remediated	Contaminated sites being currently monitored
317,000	94,000	20,500	4,000

- Data within the registry are not completely consistent!
- Strong increase of registered (potentially) contaminated sites (e. g. abandoned landfills and industrial sites) since the mid 1980ies due to:
  - area-wide historical investigation on the level of counties / municipalities
  - structural economic change with abandonment and „recycling“ of (heavy) industrial sites (e. g. economic transformation in the former German Democratic Republic and the old industrial „hearts“ of Germany)
  - abandonment of military sites in connection with the end of the „Cold War“ in Middle Europe
  - „accidental“ detection of contaminated sites (e. g. in connection with land transactions, building activities)





## Development of registered sites in the state of Northrhine-Westphalia including the „Ruhr“ (former heavy industrial area )





# Multi-stage approach for the management of (potentially) contaminated sites



**1.**  
**Registration stage**  
area wide historical investigation  
site specific historical investigation

„Best practice methods“!

**2.**  
**Risk Assessment stage**  
Exploratory investigation  
Detailed investigation

Triggers for investigations!

**3.**  
**Remediation stage**  
Remediation study  
Remediation planning  
Remediation

Remedial goals!

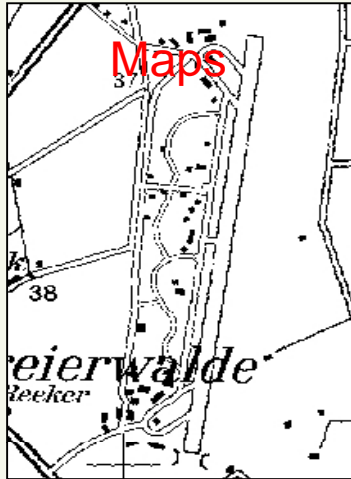


## „Best practice methods“ for historical investigations (1)

- **Archive research** with evaluating the unprinted and printed documents obtained in public archives and company archives and in official registries
  - Identification of potentially contaminated sites (e. g. by historical professional registers, business directories etc.)
  - Research into potentially contaminated sites (e. g. by public and company archives) leading to reconstruction of the site history
- **Multi-temporal mapping** i.e. the evaluation of maps and aerial photos of various subjects and times of origin
  - Aerial photos allow the verification of actual (non-) realisation of buildings / installations shown in plans!
- **Site inspection** to survey the actual situation
- **Questioning** of contemporary witnesses



# „Best practice methods“ for historical investigations (2)

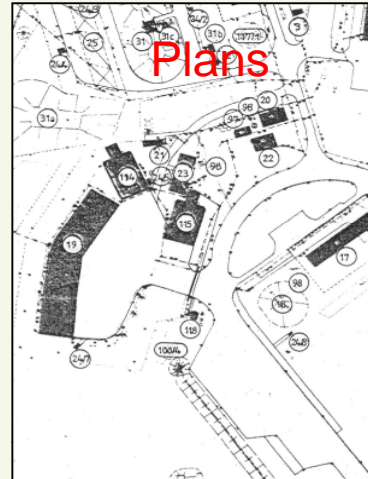


Maps

1909, 1915, 1925, 1935, 1940, 1950

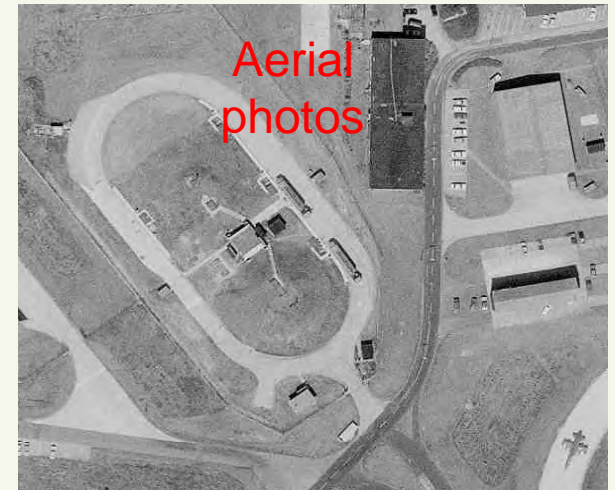


1945



Plans

1950, 1960, 1965, 1979, 1988



Aerial photos

1945, 1965, 1974, 1982, 1990, 1995, 2000, 2005, 2009



Books

1887 - 1992

SAP REPORTS - PAYROLL REPORTS  
The University of Mississippi  
End User Documentation - ERP 2005  
3/2005

R/3 Menu Path: UM Region - Time - Payroll Reports Selection  
Transaction Codes: ZPAYRREPORTS  
ZCOMMIT\_CC\_REPORT

ZPAYRREPORTS\_ALV  
+ Actual (expense) details of Salary, Wages and Fringe Benefits by employees  
+ This report allows you to break down Actuals (expenses) by employees  
+ Actual (expense) details of Salary, Wages and Fringe Benefits  
ZCOMMIT\_CC\_REPORT

Fiscal Year: Fully FY: July 30  
(Example: FY 2003 = July 1, 2002 - June 30, 2003)

Accounting Periods: July=01  
(Example: July 2003 = July 1, 2003 - June 30, 2003)

Pay Periods: Salary pay period in 01 - January 1975 - 0199  
Example: First pay period in 01 - January 1975 - 0199  
Last pay period in 01 - December 1975 - 1975  
For more: Year Period = 200 201 in 1975m - 0199m

Profit Center =  
Cost Center or Internal Order

Plant Year (July - June)	Accounting Period (Fiscal Year)	Pay Per Info (Calendar Year)
July	01	11 & 12
August	02	11 & 10
September	03	11 & 09
October	04	10 & 30
November	05	31 & 30
December	06	11 & 29
January	07	1 & 3
February	08	1 & 2
March	09	1 & 0
April	10	1 & 3
May	11	0 & 10
June	12	11 & 12

Unpublished documents

+

+

+

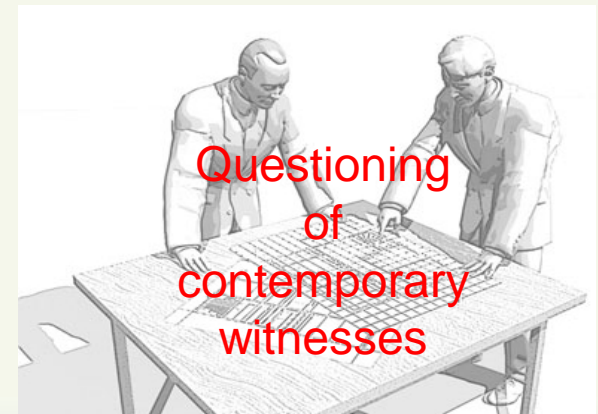
+

+



Site inspection

2014



Questioning of contemporary witnesses

2014

+

+

+



## „Best practice methods“ for historical investigations (3)



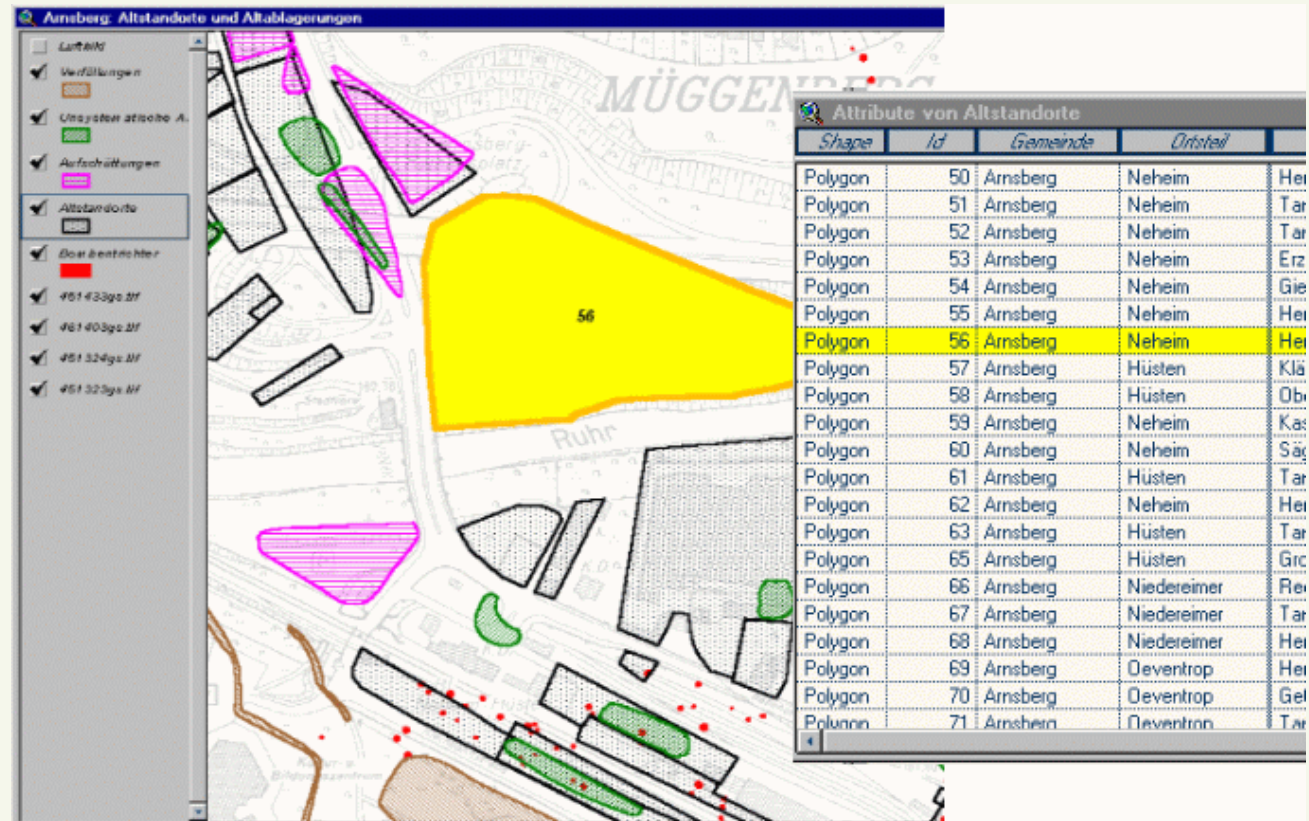
War-related  
contamination:  
Site of a  
refinery in  
Germany at the  
end of WW2

Royal Air Force Bomber Command, 1942-1945. CL3418“ von Royal Air Force official photographer - <http://media.iwm.org.uk/iwm/mediaLib//9/media-9832/large.jpg>This is photograph CL 3418 from the collections of the Imperial War Museums.. Lizensiert unter Public domain über Wikimedia Commons - [http://commons.wikimedia.org/wiki/File:Royal\\_Air\\_Force\\_Bomber\\_Command,\\_1942-1945.\\_CL3418.jpg#mediaviewer/File:Royal\\_Air\\_Force\\_Bomber\\_Command,\\_1942-1945.\\_CL3418.jpg](http://commons.wikimedia.org/wiki/File:Royal_Air_Force_Bomber_Command,_1942-1945._CL3418.jpg#mediaviewer/File:Royal_Air_Force_Bomber_Command,_1942-1945._CL3418.jpg)



## „Best practice methods“ for historical investigations (4)

Use of  
Geographical  
Information  
Systems for the  
management of  
registry data



For reasons of privacy (and property) protection registry data on (potentially) contaminated sites are not made available to the public and can only be obtained after proof of entitlement!



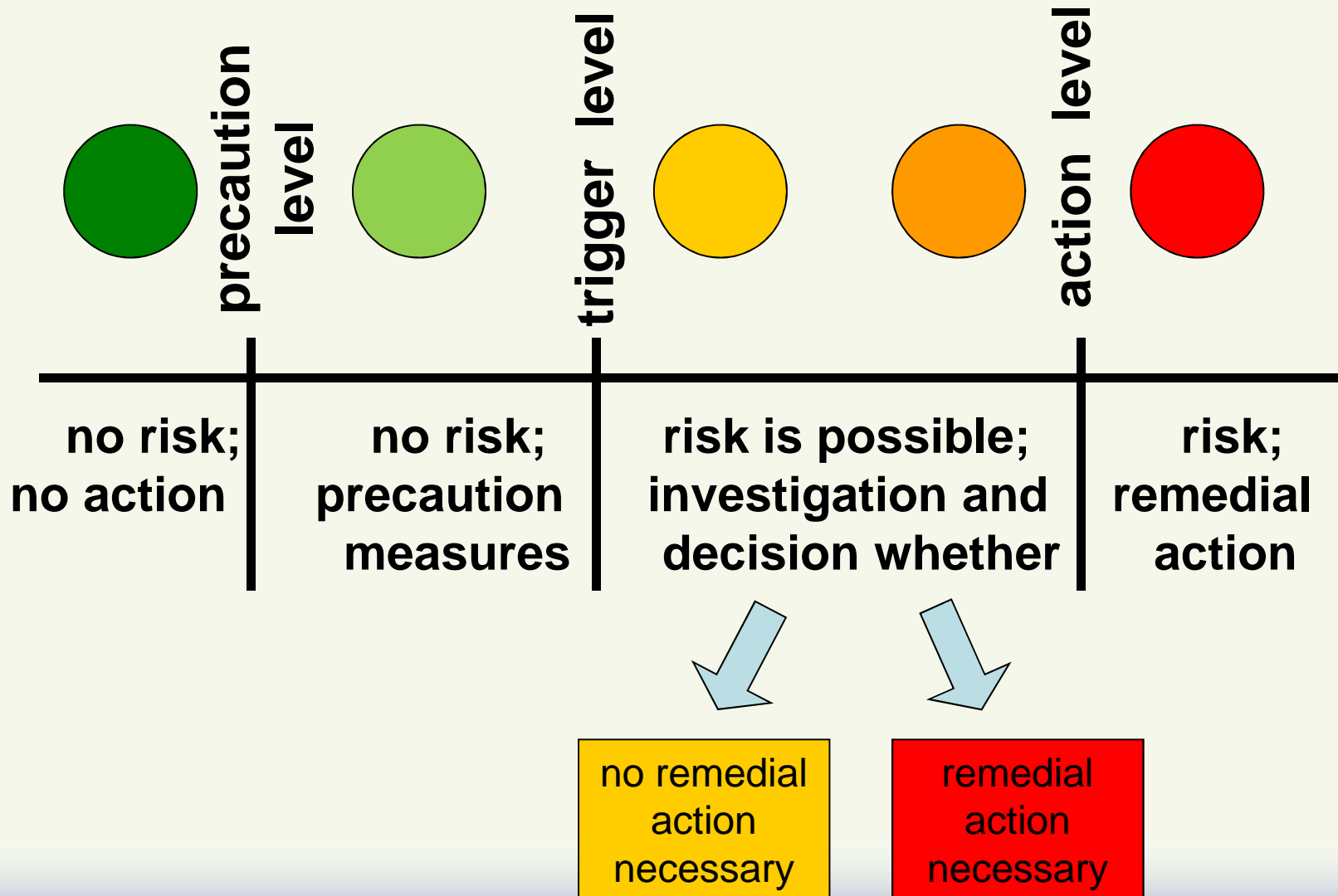
## Triggers for (further) investigations of pot. contaminated sites (1)

German Soil protection Ordinance (§ 3):

- **Exploratory investigations** should be carried out (by the responsible authority) if there are “**indications**”, that on a site for a extended period of time or in relevant amounts toxic substances were used and there is reason to believe that this has led to a contamination of the soil. In the case of abandoned landfills these indications are given, if it can be assumed wastes were not treated and disposed properly.
- **Detailed investigations** have to be carried out if there are concrete or ascertained indications, e. g. proven or very likely exceedance of the “**trigger values**”. These investigations have to be carried out by the responsible party, e. g. the polluter or the owner or some other legal entities such as the legal successors of the before mentioned parties.



## German soil protection law and ordinance – soil quality levels







## Triggers for (further) investigations of pot. contaminated sites (3)

### Authority driven risk assessment and remediation

- **Priorization** of registered sites
  - Potential health risks (sensitivity of current or prospective site use!)
  - Potential risk for groundwater contamination
- Multi-year program for **exploratory investigations**
- If exploratory investigations reveals contamination, **the polluter of the contamination or the site owner are obliged to further assess the risks and, if necessary, to remediate**
- **Activities controlled by authority**

### Investor driven risk assessment and remediation

- Connected with **land development planning and site development**
- When investor is applying for a **building permit**, authority checks the registry data
- In case the site is registered, **building permit will only be issued if risk assessment for future use and – if necessary – remediation is ensured**
- **Activities controlled by authority**



## Triggers for (further) investigations of pot. contaminated sites (4)

- Exploratory (or other) **investigations are not compulsory for transactions of (potentially) contaminated sites / land**, but quite common in practice (e. g. Due Diligence Assessments).
- The European Union wanted to install a compulsory investigation of industrial /commercial sites when being transacted. However, there was strong political opposition (including from Germany) against a **European-wide “soil framework directive”**, so this directive has not been issued up to now.
- In the **European “Industrial Emission Directive”**, which came into effect as part of the European environmental legislation last year, certain (bigger) industrial sites have to carry out soil and groundwater investigation as part of the “immission permit”. This certainly will lead to the detection of so far unknown contaminations.



## Remedial goals (1)

- German Soil protection law / ordinance does not contain a list of values to be achieved by remediation measures).
- Legal “measure” for defining remedial goals is the general aim of **risk reduction to an “acceptable level”**.
- These “acceptable levels” have to be defined for each case individually and are therefore “tailor made”. The “acceptable levels” strongly depend on the sensitivity of the after-use of the site!
- Legally, the fixation of remediation goals is part of the “**legal discretion**” of the **responsible authority**, in which the principle of proportionality has to be taken into account. So remediation goals have to be both **technically feasible** and **financially “proportionate”**.



## Remedial goals (2)

- What are acceptable levels in each remediation case partly depends on the “context” of remediation. If remediation is directed at hazard (risk) control “only”, acceptable risks can be derived from the **scientific approach for deduction of the trigger level** (which is part of the legal regulations). But as the trigger values are only indicating a level, above which a (detailed) risk assessment should be carried out, these trigger values are usually not suitable as remediation goals, at least not without further investigation. Usually, remediation goals for the soil will be above the trigger values.
- In quite a significant number of cases remediation is aiming at reuse of the land. In these cases the requisition of the “**Building law**” for **safeguarding healthy living conditions** have to be taken into regard. Commonly this leads to lower remediation goals as in cases with remediation for hazard control only. Background is, that the building law has a precaution approach.



## Financing the management of (potentially) contaminated sites (1)

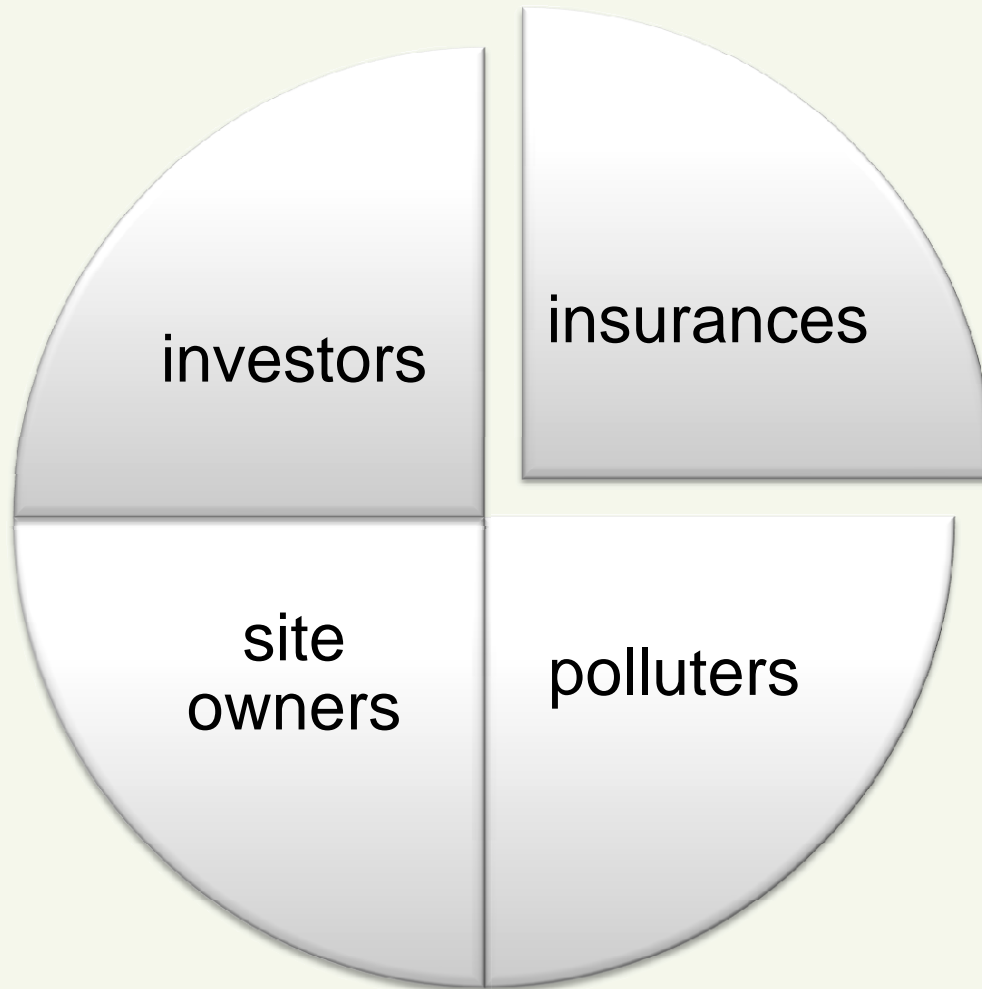


### Costs of contaminated site management – public sector

- abandoned public waste disposal sites
- abandoned German military sites
- abandoned sites of public enterprises (armaments industry in the Third Reich!)



## Financing the management of (potentially) contaminated sites (2)



**Costs of  
contaminated site  
management –  
private sector**



## Financing the management of (potentially) contaminated sites (3)

### Money spent by the Federal Government

Remediation of military sites (Bundeswehr) (totals until 2013):

- > 0.4 billion €

R & D (totals until 2013):

- 0.3 billion €

Remediation of contaminated sites in the former GDR (totals until 2012/2013):

- 2.6 billion €: formerly state owned enterprises and Soviet military sites
- 9.4 billion €: former lignite coal mining sites
- 6.2 billion €: former uranium mining sites

### Money spent by the „Länder“

- 0.5 billion € per year for investigation and remediation as subsidies for counties and municipalities

**Financing – no data of overall costs in Germany are available!!!!**



Many thanks for your  
attention!

감사합니다