

# Transport and disposal of NORM/TENORM

C. Kunze, S. Kahnwald

WISUTEC

Wismut Environmental Technologies

Chemnitz

# Structure

- Overview of legislation
- Waste problem
- Practical experience
- Questions

# (TE)NORM disposal: a German case study

- Simple regulations help the industry to solve (TE)NORM waste problems quickly
- Legal certainty to all parties and minimal administrative hassle
- Transport issues link in with regulations on release from radiation protection regulations
- Despite conceptual clarity in principle, some confusion still persists

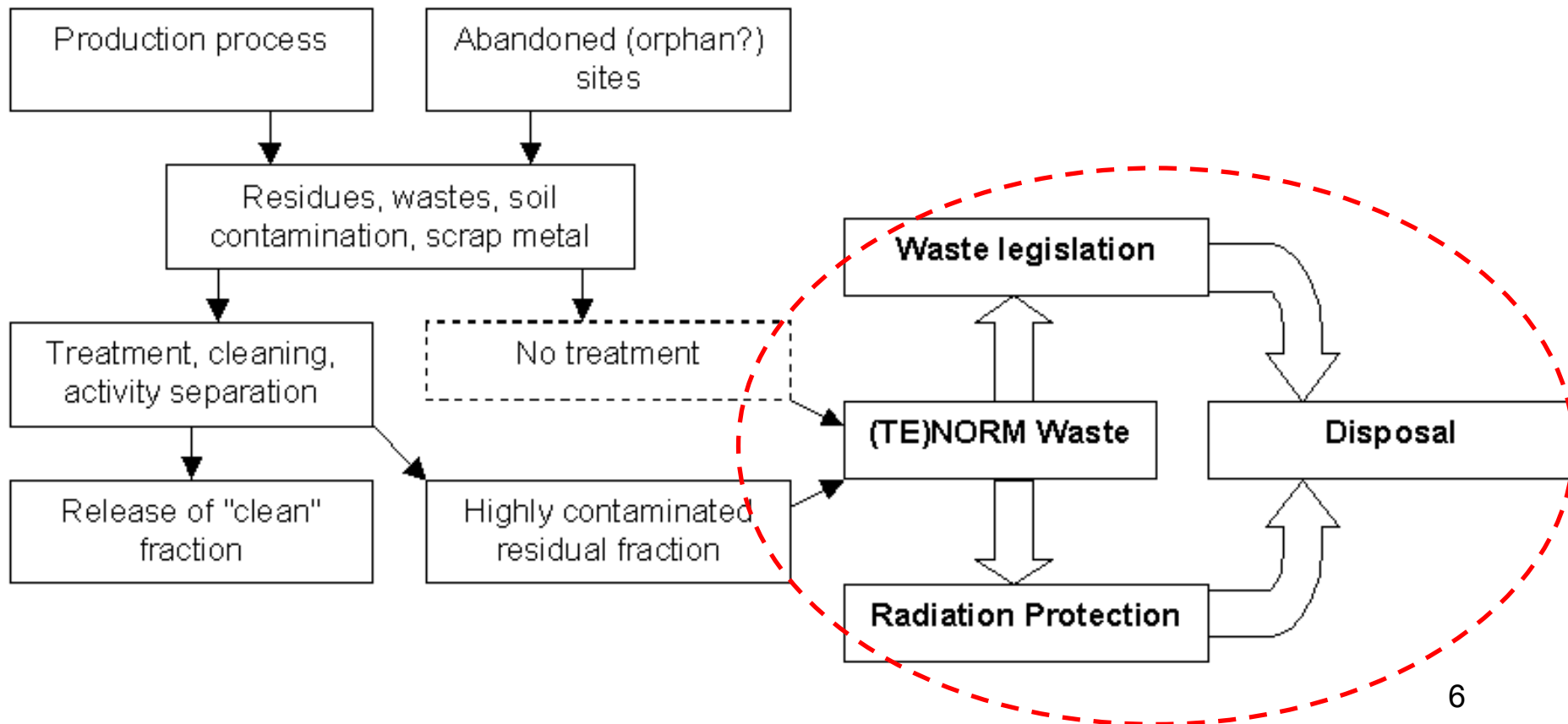
# Regulatory background

- Waste legislation (Landfill Act, 2001, 2006)
  - Based on 1999/31/EC Landfill Directive
  - leachate quality, gas generation
  - caloric value
  - geotechnical properties
- Radiation Protection (Rad. Protection Act, 2001)
  - Based on 1996/29/EURATOM
  - Is waste subject to supervision? - „Positive list“
  - Effective dose for the public  $< 1 \text{ mSv/a}$
  - Clearance (release) from supervision

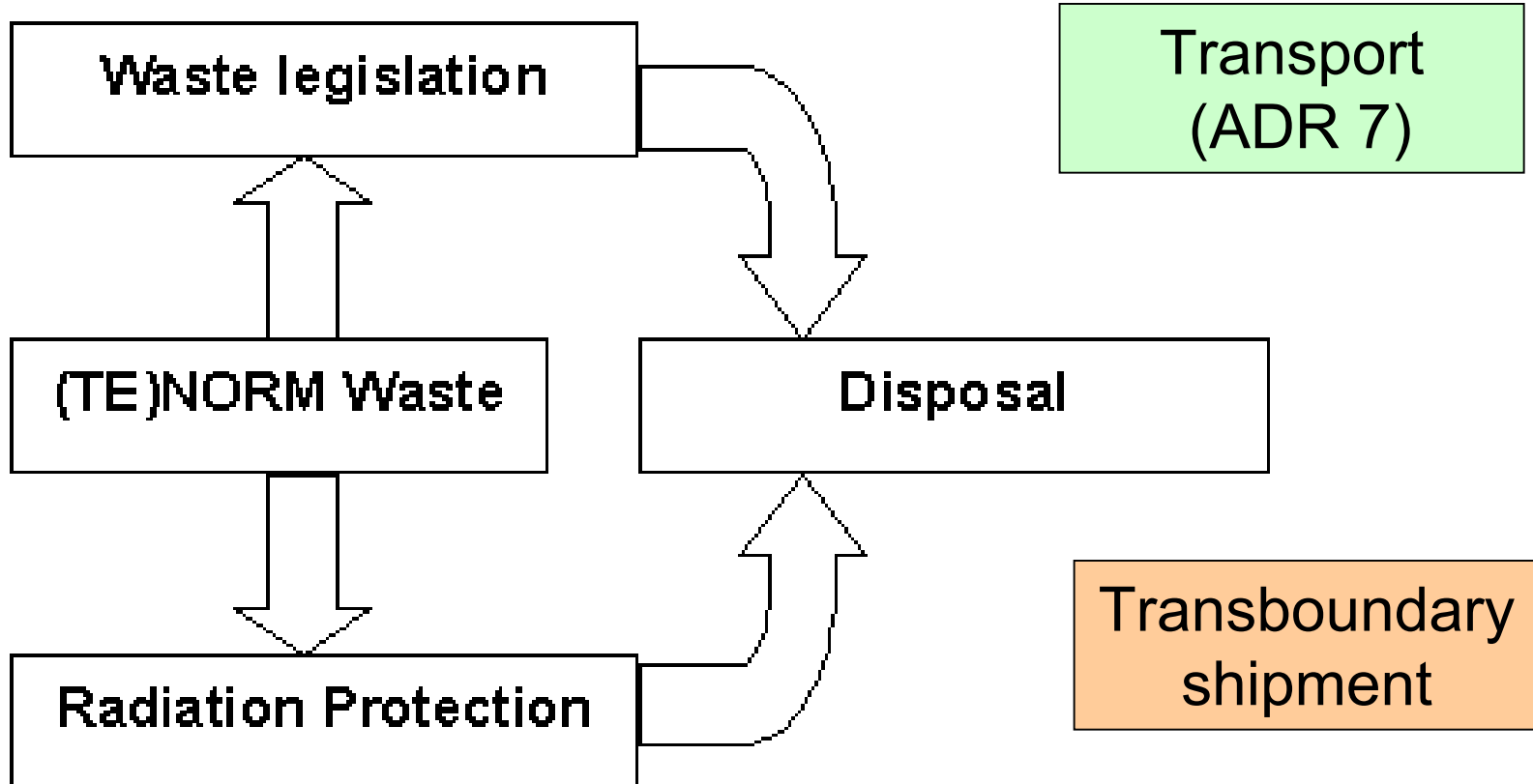
# Parallel permitting procedure

- Waste and RP regulations must be satisfied in mutually conditional permitting procedures
- Radiation Protection Act, Art. 98 (3) „no release unless acceptability under waste regulations is proved“
- Landfill operator issues certificate of acceptance conditional on clearance from RP supervision
- Transport regulations (ADR 7) have to be considered

# The (TE)NORM waste problem



# (TE)NORM disposal



# Transport issues

- ADR: **A**ccord Européen relatif au transport international des marchandises **d**angereuses par **r**oute
- Transposition into German law: **GGVSE** (Dangerous substances road and rail transport act)
- Transboundary shipment: **AtAV** (ordinance concerning waste shipment according to atomic energy act)
- Cl. 7: „RADIOACTIVE“ defined in Section 2.2.7 of ADR
- Exceptions for natural materials such as ore (10-fold activity thresholds, 2.2.7.1.2. e ADR)



# Transport issues

- Relevant criteria:
  - Activity (total activity per consignment, specific activity of material, empirical formula for mixture of nuclides)
  - Ambient dose rate (external gamma radiation) of package
  - Classification (LSA, SCO,...)
  - Licensed packages (big bag, drum, container,...)
  - Identification/labelling of package and vehicle (hazard label, warning sign)
  - Documentation (transport document, accident procedures sheet)
  - Qualification of driver



# Example 1

- 5000 tubings from a gas production site (400 t)
- Scales: 70...1000 Bq/g, mainly Ra-226
- Steel pipe and scale treated as physical entity, effective specific activity: 2...30 Bq/g
- Clearance from RP supervision using secondary criterion ( $< 50$  Bq/g, Appendix XII, Part C, German Rad Protection Act)
- 20 ADR cl. 7 transports from gas production site to hazardous waste landfill without any complications

## Example 2

- 3000 tons of NORM (radioactively contaminated soil of former production site)
- No domestic disposal site available in country of origin, but well-regulated, practicable regulations in Germany
- Dose estimate:  $< 1$  mSv/a for members of the public after disposal in hazardous waste landfill
- Release accepted in country of origin
- Activity concentration well below ADR 7 thresholds
- Ordinary waste shipment notification was sufficient

# Conceptual confusion?

- Question: „Are wastes which have been released from RP supervision automatically exempt from ADR 7 (i.e. non-radioactive)?“
- Answer: „As long as they have not reached their final destination for disposal, they are subject to supervision and thus to ADR 7, too.“

# Other issues to consider

- Different definition of „radioactive waste“ by different countries (NORM=radioactive waste?)
- Acceptance of trucks with ADR 7 label by landfill operators and public?
- Inhomogeneous distribution with activity concentration peaks inside container vs. average activity concentration of bulk?



# Other issues to consider

- Intention to prohibit transboundary NORM shipments into Germany for disposal vs. free movement of goods and services within EU?



# Thank you

- WISUTEC Wismut Environmental Technologies GmbH
  - Jagdschänkenstr. 33
  - D-09117 Chemnitz
  - Phone: +49-371-8120-180
  - Fax: +49-371-8120-175
  - [www.wisutec.de](http://www.wisutec.de)
  - [c.kunze@wisutec.de](mailto:c.kunze@wisutec.de), [s.kahnwald@wisutec.de](mailto:s.kahnwald@wisutec.de)