Deep Repository Progress
– Germany –

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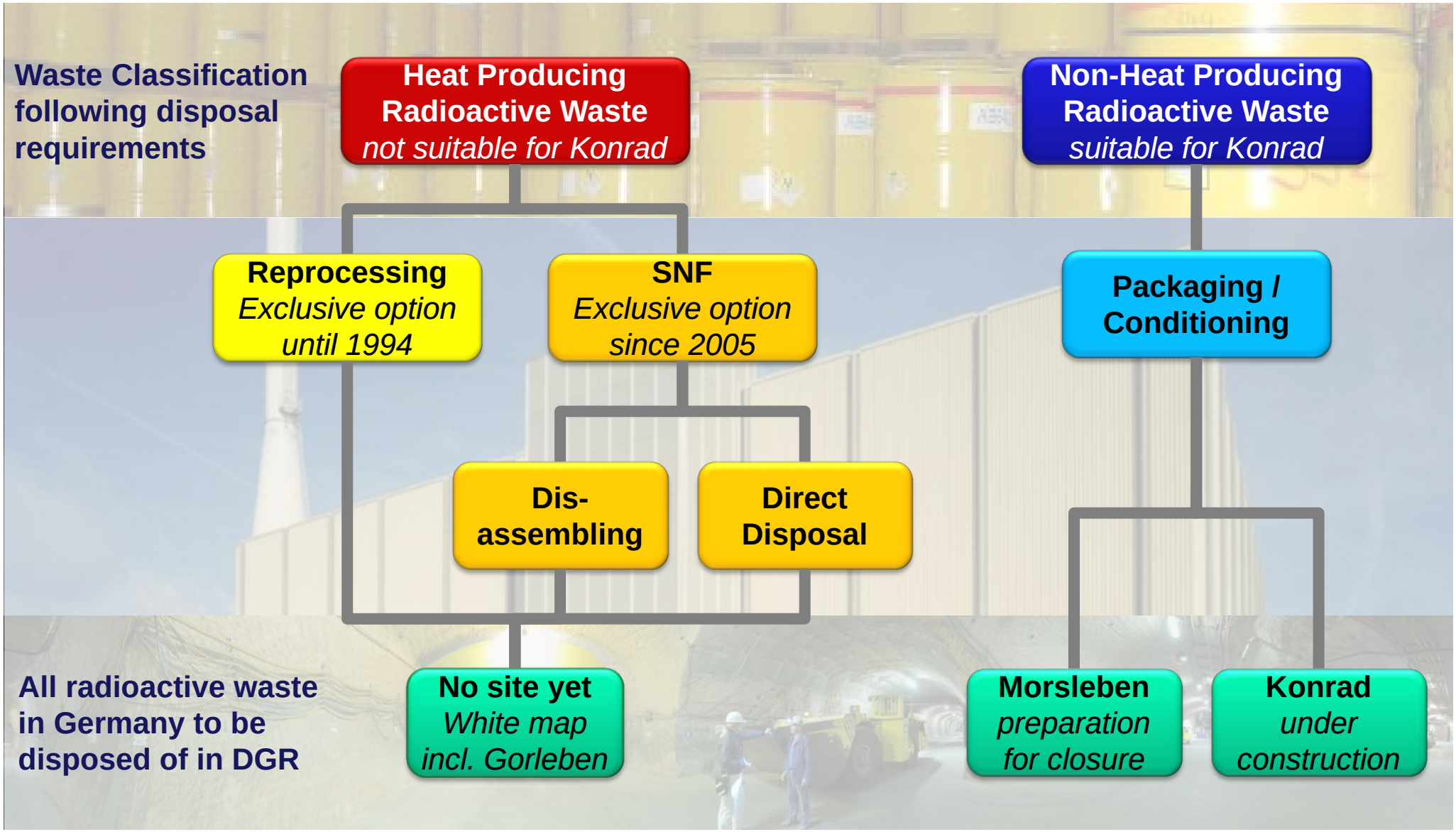
DBE TECHNOLOGY GmbH

Content

- German Repository Projects
- Site Selection Act

Background – Classification and Disposal Routes



Overview on German Projects

- **Operated by Asse GmbH**
  - **Asse mine used as URL only, currently under decommissioning**
- **Operated by DBE:**
  - **Gorleben: Heat-generating waste, underground survey starts 1990's, on hold**
  - **Konrad: Non heat-generating waste, under construction**
  - **Morsleben: Operational Waste (1980's until 1998), planning for decommissioning**

URL Asse

- 1901 – 1964: Industrial operation of Asse
- 1906: Sinking of Shaft Asse II
- 1908 – 1925: Production of potash
- 1916 – 1964: Production of rock salt
- 1965 – 2009: Helmholtz-Zentrum Munich becomes mine operator
- 1967 – 1978: (Experimental) Radioactive waste disposal
- 1967 – 1992: Research and Development work
- 1988: Brine solution access discovered
- 1995: Proposal for closure
- 1995 – 2004: Backfilling of southern part
- 2007: Licence application for final closure closure of mine
- 2009: BfS becomes mine operator
- 2010: Decision of BfS to retrieve waste to ensure long term safety
- Since 2010: In-depth inquiry of facts (trial phase)

URL Asse: Current Activities

- **Comparison of different decommissioning options:**
  - **Retrieval of waste:**
    → Recovering of waste and underground re-packaging
    → Off-site interim storage and conditioning of waste
  - **Relocation of waste inside mine:**
    → Mining of new cavities
    → Underground re-packaging and transport to new cavities
  - **Complete backfilling of mine:**
    → Waste remains untouched
- **With view to long term safety of the Asse mine it was decided that the 'retrieval of waste option' shall be the preferred one.**
- **Current activities are thus underway:**
  - **Trial phase:** Determine status of selected chambers by trial drills
  - **Emergency planning:** Construction of flow barriers*
  - **Securing operability:** Refurbishment of spiral gallery
    Refurbishment of shaft Asse 4*

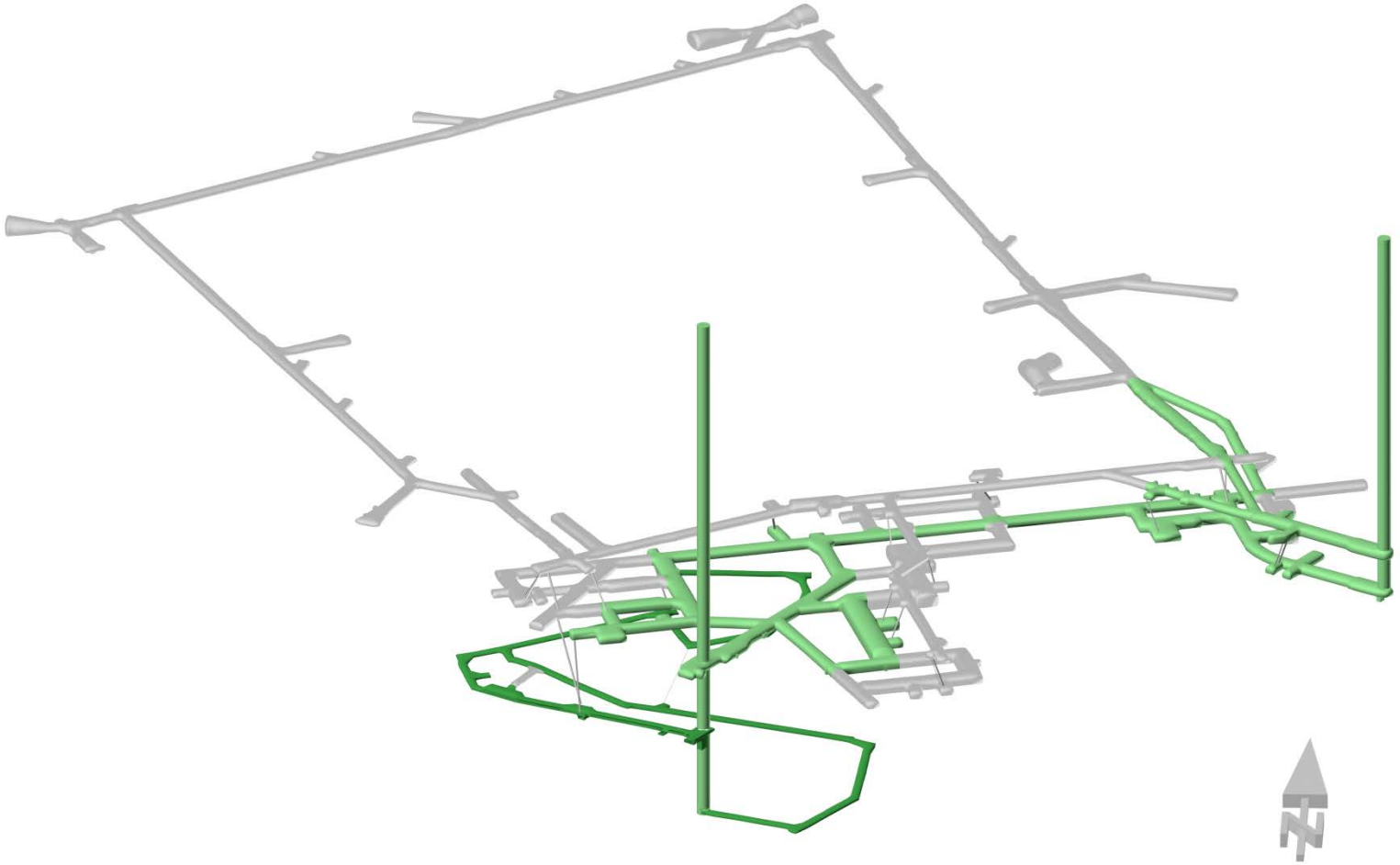
BfS

* With substantial support from DBE TECHNOLOGY GmbH

Heat Producing Waste: Gorleben

- 1970ies: Site selection process on Federal and Laender level
- 1977: Site designation Gorleben
- 1979: Start of Surface designation
- 1980/81: Four deep boreholes
- 1983: Comprehensive suitability statement (PTB)
- 1986: Ground braking shaft 1
- 1996: Communication between Shaft 1 and 2 (840-m-level) established
- since 1996: Excavation of infrastructure area
- since 1996: Characterisation of Exploration Area 1
- 2000: 1st Gorleben moratorium (stand-by operation only)
- 2010: Continuation of site exploration
- 2012: 2nd Gorleben moratorium
- 2013: Site selection act
- 2013: Presentation of VSG results
- 2014: 'Putting Chain before Gorleben'

Heat Producing Waste: Gorleben – Maintaining Current State



Non-Heat Producing Waste: Konrad

- 1965 – 1976: Production of iron ore
- 1975: Following staff‘s initiative preliminary survey as candidate site
- 1982: Site Suitability statement
- 1982: License Application submitted
- 1992 – 1993: Public hearing (75 hearing days)
- 2000: Consensus Agreement (i. a. Finalisation of licensing process)
- 2001: Radiation protection ordinance amendment
- 2002: Licence granted
- 2002 – 2008: Litigation
- 2008 – 2010: Start of repository construction
- 2013/14: First planned commencement of operation date
- 2014: Complaints of BfS about imprecise planning of DBE
- 2019: Current formal commencement of operation date
- ≥ 2022: Current officially announced commencement of operation date

Non-Heat Producing Waste: Konrad – Main Activities

- **Underground facilities**
  - Refurbishments of shaft 1 (for conventional transport / ventilation inflow)
  - Refurbishment of shaft 2 (for waste transport / ventilation outlet)
  - Refurbishment and upgrade of infrastructure facilities
  - Erection of new repository
- **Aboveground facilities**
  - Refurbishment of shaft tower of shaft 1 (industrial monument)
  - Replacement of buildings and equipment at shaft 1
  - New build of buildings and equipment at shaft 1
- **Infrastructural measures**
  - Construction of connections to public infrastructure
  - Security fence
  - Precaution measures (eg. water pollution control, World-war 2 remnants)

Non-Heat Producing Waste: Konrad – Current Status

- **Ongoing progress of repository construction, e. g.:**
  - **3rd Emplacement Chamber finished**
  - **Penetration of two drifts to later control area realised**
  - **Connection to public transport infrastructure progressed**

- **New formal estimation of begin of operation**
  - **DBE estimates the construction schedule on the basis of boundary conditions defined and approved by BfS**
  - **New formal estimate for begin of operation is 2022**
  - **BfS: Estimate of DBE is associated with high uncertainties and the BfS is bound to DBE by so-called ‘Kooperationsvertrag‘ between Germany and DBE**

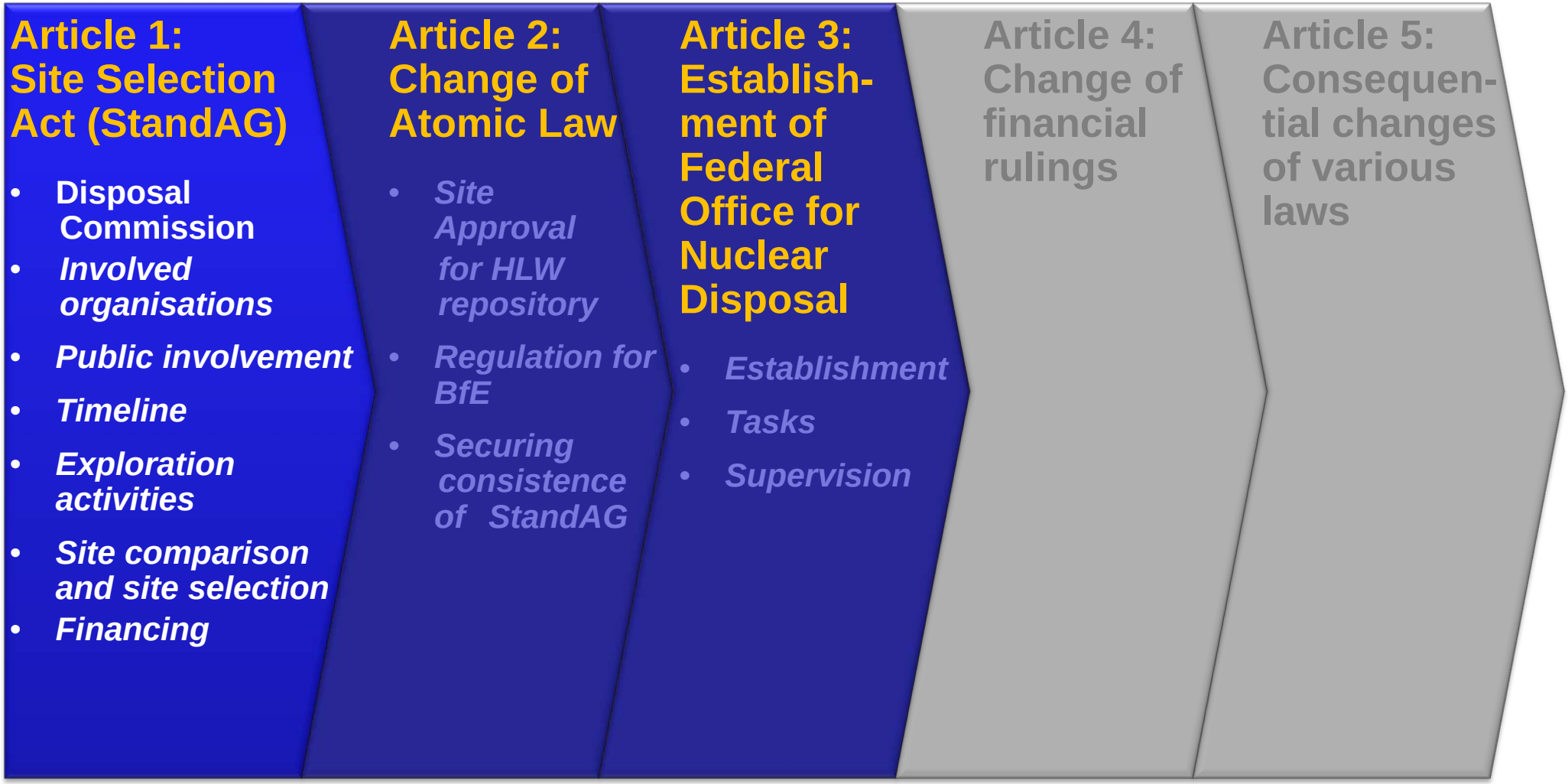
German Projects – Morsleben: History

- 1897 – 1912: Production of potash
- 1912 – 1969: Production of rock salt
- 1937 – 1945: Military usage (fabrication of ammunition)
- 1959 – 1984: Hen fattening
- 1971: Approval for experimental LILW disposal
- 1981: Temporary licence for LILW disposal
- 1986: Permanent licence for LILW disposal
- 1990: Federal Facility under BfS, operated by DBE
- 1990 – 1991: Disposal stopped by court decision after reunification
- 1994: Restart of waste acceptance
- 1997: BfS applies for mine closure as ordered by Federal Government
- 1998: Disposal stopped by court decision
- 2001: Final decision of BfS to definitely not restart waste acceptance
- 2011: Public hearing

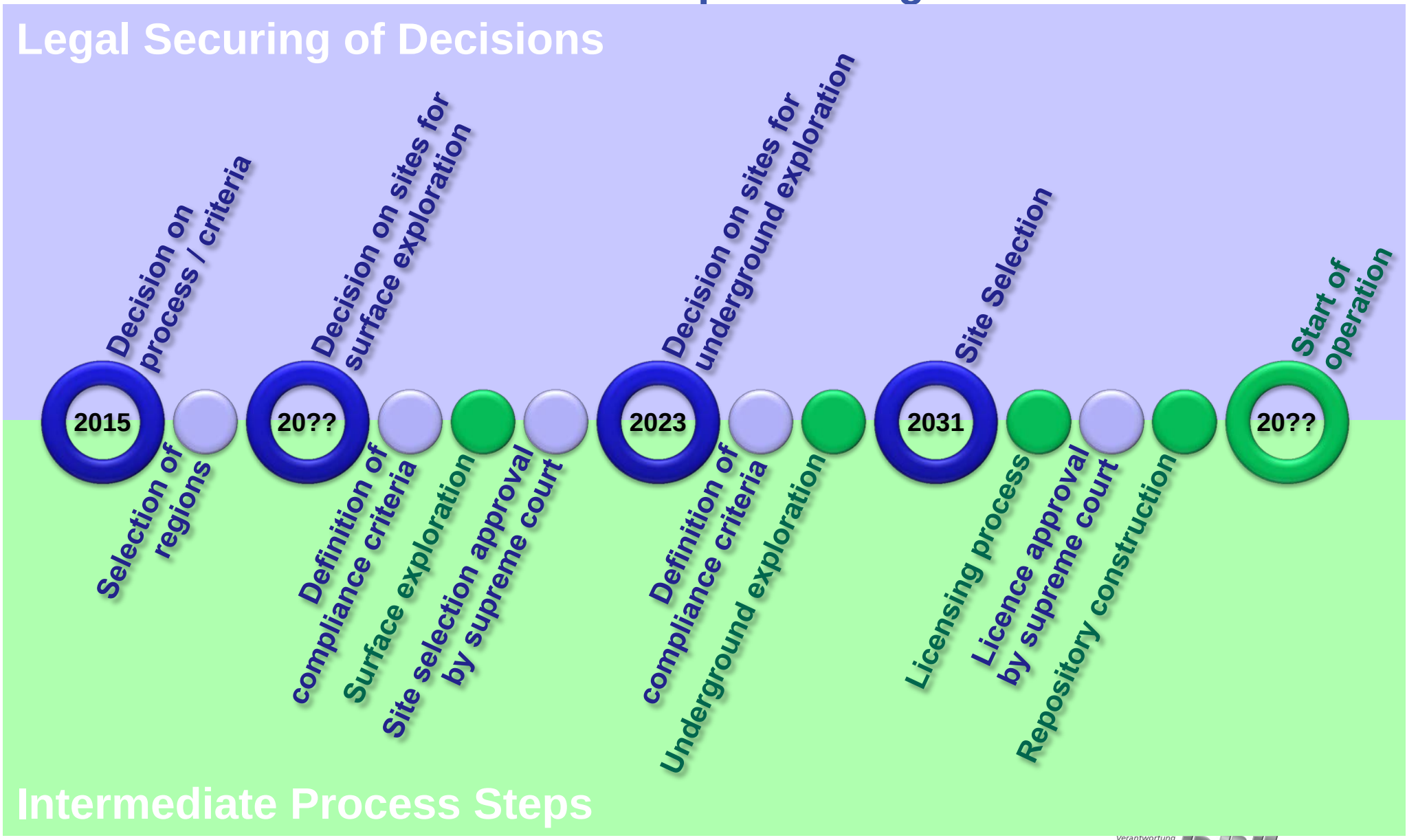
Non-Heat Producing Waste: Morsleben

- New planning assumptions on the basis of the assessment of the statement and recommendations of the Commission on Waste Management (end of January 2013)
- Successive work on requirements will last until 2019
- Especially requirements on backfill and sealing have tightened
  - Water access to the entire mine has to be mitigated (not only to relevant parts)
  - Currently, 1 water access to mine (12 m^3/a)
  - Construction measures to prepare sealing won‘t start before 2016
- Plan Approval Process
  - Start in mid 2017
  - Execution at least 8 years

Site Selection Act – Main Rulings



Site Selection Act – HLW Disposal Programme Timeline



Vielen Dank für Ihre Aufmerksamkeit!