Knowledge Transfer within the Wismut Environmental Rehabilitation Project

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Was something going on there back in the days??

Active re-use of the area of the former Lichtenberg open pit
Presentation outline

- Introduction, history
- Size and duration of the remediation project
- Approach and technical solutions for knowledge management
- Structures and contents, case demonstration
- Lessons learned
Legacies and radioactive residues (1945 – 1990)

- 5 Mines ($\leq 1800$ m depth)
- 1 Open pit (240 m depth)
- 60+ Waste rock dumps, low grade ore ($\Sigma 325$ Mm³)
- 2 Processing plants
- 7 Tailing ponds (6 km² area with $\Sigma 178$ Mm³)
- Material from clean-up areas
A landscape is changing its face ...
In-situ remediation of waste rock dumps

Dump #366, Schlema site

1994 1998

2000 2003 2012

Good to know about:

- Proof of the remediation success
  Comparison with the remedial goals

- Remaining re-use restrictions after coverage of contaminated material

- Long term experience, transfer of know-how

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During a long time of remediation …

Tailings

Dumps

Product from Smelting

Kinds of Information

- (1) Contaminated material will remain in the covered underground to a high extend
- (2) Information will be forgotten within a short period,
  *if the access isn't an easy one.*

1993: 6,800 employees
2018: 1,000 employees

... 30 years later ...?
Access - Initial Approach

1. Technical Data Base „AL.VIS/W“

Multidisciplinary Information system with GIS-Components

- For daily work
  (emission control, remediation tasks, creating reports …)
- For long term information about the objects
- For preservation of remediation know-how

2. Archive

Assembling of documents after finishing the remediation object

- Collect information shortly after their generation
- Gather it in a technical data base on a common platform
- Link the different issues to each other
- Create „assistants“ for a simple and efficient search
Access - Revised Approach

1. Technical Data Base „AL.VIS/W“

Multidisciplinary Information system with GIS-Components

- Collect information *shortly after* their generation
- Gather it in a technical data base on a common platform
- Link the different issues to each other
- Create „assistants“ for a simple and efficient search

For daily work
(emission control, remediation tasks, creating reports …)

For long term information about the objects

For preservation of remediation know-how

2. Dual Archive (Paper + File)

- Establishment of a standardized RD
- Well defined storage rules
- Linked to AL.VIS/W
- Swiftly compilation of historical docs
- Ongoing import during remediation
Final Aim
for each of the 400 complex remediation documentations (RD)

1 physical available **Original** (or a copy), well sorted at the final archive in Chemnitz

1 **Metadata Record** inclusive an exact storage notation

1 **Electronic Document** of the physical specimen
  - complete
  - true
  - long-term valid (pdf/A)
  - appropriate for full-text search (→ OCR)
  - performant searchable (size!)

**Intuitive user-friendly Interface** (Archiving is not an end in itself !)

*Documents, embedded within the original context*
Standardized Content (electronic + paper)

Hierarchic structure

- DIC
  - Chemnitz
  - Crossen
  - Gittersee
  - Königstein
    - Factory areas
    - Mining fields
    - Waste rock dumps
    - Water treatment plants
    - Special objects
  - Pöhl
    - Ronneburg
      - Factory areas
      - Mining fields
      - Waste rock dumps
      - Open pit
      - Tailings management facilities
      - Water treatment plants
      - Special objects
    - Schlema-Alberoda
    - Seelingstädt

1. General information, vita
2. Planning and application documents
3. Administrative decisions
4. Self management reports/history
5. Internal supervising reports
6. External supervising reports
7. Reports from subcontracted services
8. Mine surveying documents / mine plans
9. Protocols
10. Photo documentation
11. Legally binding building acceptance
12. Examiners reports
13. Planning maintenance /after care
14. After care / long term management
15. Final certificate
16. Final documentation
17. Miscellaneous

Provided folder architecture ↔ Standardized issues

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Department of Information Management (DIM)

- Definition of achievable, but sophisticated goals (content, technical realization, personal conditions)
- Study experiences at similarly running projects (US-DOE, CAN, FRA…)
- Analysis of the existing portfolio in Wismut, developing of solutions

1. Establishment DMS-properties + folder structure ✓
2. Definition workflow + instruction …
   - Consolidation photo and document stocks
   - Implementation scan hubs
   - Pdf/A-software
   - Staff training
   - Rules for QS
   - Tap of new generated documents
3. Link to user interface AL.VIS/W ✓
4. Execution !!

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How does it look like - User Interface ALVIS/W

Overview access
- Object search
- Site search
- Semantic search

Map access: Object geometries, Maps, Topography, web map service, web file service...
- Ronneburg
- Seelingstadt
- Crossen
- Aue
- Pöhla
- Gittersee
- Königstein

Environmental data base
- Groundwater
- Surface water
- Soil, Solids
- Air
- Climate
- UDB Data Agent
- Local dose rate
- Experimental part
- Column experiments
- GEO-Tech
- CPT v2
- Probes

More applications
- Properties
- Remediated areas
- Pictures
- Licences
- Engineering reports

Oracle – DB (master data, records, geometries...)

E. Kreyßig et al: Remediation of a former Uranium Mining and Milling area and its Knowledge Management

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Map Access

Geometry-related issues

Jump to object app and more information
Object Access

Covering Structures

Use restriction determined to parcel numbers:

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<tr>
<th>RegNr</th>
<th>Gemarkung</th>
<th>Flurstück</th>
<th>Status</th>
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<td>453/1</td>
<td>historisch</td>
<td>WISMUT</td>
</tr>
</tbody>
</table>

- Mining residuals
- Radiation protection
- Other contamination

Permits, environmental measurements
Map Access → Information system for legacy management
Summary, lessons learned…

- Environmental remediation projects cover a wide range of issues over a long period (Wismut: 2045 ff)
- There will partly remain contaminated material covered in the underground → Legacy management necessary!
- Preservation of knowledge and know-how in a dual way: paper work + intelligent and easy accessible electronic system
- Look with the perspective of future user generations.
- Begin early …
- Don‘t underestimate the efforts, which are necessary!
  (Workflow organization, quality assurance, maintenance of technical standards, soft skills… )
Was something going on there back in the days?

Many thanks for your attention!