Case Study
Project Management and Project Planning
Decommissioning Project Greifswald
Axel Bäcker
Contents

- project strategy/planning
- project implementation
- project management/controlling
Project strategy / planning (main issues)

- project analysis
- key decisions
- licensing strategy/project planning
- project planning/technical concept
Basic tasks and objectives

- investigation of scenarios for the company strategy
- timely sequence of main tasks
- planning of the necessary personnel (qualification measures)
- evaluation of alternatives (technical, personnel)

- definition of the company strategy (decommissioning main goals)
- WBS creation (part projects definition)
Steps

**system analysis**
- definition of the overall strategy

**detailed analysis for main issues**
- technical strategy
- personnel development
- cost development
Main considerations

• (fuel management)
• Material (waste) management & mass flow logistic
• dismantling strategy
• post operation
• personnel strategy
• site reuse options

- define main dependencies between activities
- define milestones and overall project life time
- prepare key decision plan (with arguments)

HOW to do it??
Practical realisation

Basis for the decision making process (system analysis)

DECISION TREE
Decision tree dismantling

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Project strategy / planning (main issues) – Project analysis

Decision tree waste management
Overall decision tree EWN

Fuel elements → Operational waste → Dismantling material → Dismantling → Post operation → Personnel strategy → Site reuse

Energiewerke Nord GmbH

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Project strategy / planning (main issues)

- project analysis
- **key decisions**
- licensing strategy/project planning
- project planning/technical concept
♦ Direct dismantling no Safe Enclosure

♦ Introduce project organization

♦ Project realisation by own staff instead of contractors

♦ Erect major interim store on-site for fuel, waste and treatment

♦ Reuse of site for industrial and energetic uses
Project strategy / planning (main issues)

- project analysis
- key decisions
- licensing strategy/project planning
- project planning/technical concept
Project strategy / planning (main issues) – Licensing strategy/project planning

-step by step procedure

- basic documents for dismantling project
  - explanatory reports on
    - fire protection
    - dismantling
    - radiation protection
    - remote dismantling
    - waste management
  - operation manual
    - procedures of operation systems
    - radiation protection ordinance
    - decommissioning and dismantling ordinance

- application for dismantling license
  - technical planning:
    - which parts should be dismantled
    - which parts should be remained

- issue of dismantling license
  - authority of the country
    - Mecklenburg-Vorpommern

- pre checking documents
  - authorised expert
    (technical control organisation, experts of fire protection, site safety)

- VPU 0

- VPU 1

- VPU 2
Project strategy / planning (main issues)

- project analysis
- key decisions
- licensing strategy/project planning
- project planning/technical concept
main decommissioning and dismantling steps
- dismantling principles
- operational waste management
- categorisation of systems/buildings/areas by radiological classes
- inventorisation
- mass flow logistic (from dismantling)
- main items of necessary plant adaptations
- main items of investments (new equipment, new installations)
- special dismantling and disposal concept for highly activated components
- safe post operation, evaluation of the residual life time of old equipment
- possibilities to reduce costs (alternatives)
Project strategy / planning (main issues) –
Technical concept – dismantling principles

- dismantling planning on system basic, execution on room basis
- start in unit 5; low contamination / radiation dose
- from low to high contamination / radiation dose
- use market equipment
- in situ decontamination only for dose reduction
- whole components / parts as possible for decay or treatment in interim storage
Project strategy / planning (main issues) –
Technical concept – material categorisation

Radiological classes

category I unrestricted material from the monitored area which is not subject to the release measurement procedure

category II suspected material (an eventual contamination cannot be excluded) from the monitored area, mainly from the turbine hall

category III contaminated material
Project strategy / planning (main issues) – Technical concept – inventory issues

- inventory of buildings, rooms and equipment (only so deep as necessary!!)
- radiological classification of components, systems, buildings, areas
- dose rate situation in rooms
- waste inventory from operation

Planning tasks to be solved on this basis:

- planning of
  - working hours per room / dose estimation
  - preliminary actions as decontamination for dose reduction before dismantling

- planning of possible mass flow intensity and of containers for storing of dismantled material and waste

- determination of material for further conditioning and treatment

- determination of necessary buffer storages and treatment possibilities
NPP Greifswald
1 800 000 Mg

Category 1
~ 1 235 000 Mg

Plant parts
TH 1 - 6, CA 6
~ 50 000 Mg

Building structure
~ 1 185 000 Mg

Radioactive material
Category 2 and 3
~ 565 000 Mg

Plant parts
TH 1 – 5, IH 1 - 5
~ 68 000 Mg

Building Structure and concrete
~ 497 000 Mg
Project strategy / planning (main issues)

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- project strategy/planning
- project implementation
- project management/controlling
Project implementation – Main items

- project definition (WBS)
- project execution
- registration of actual data
Definition of main projects – as basic for the WBS (example EWN) all in all 6 Projects:

- decommissioning and dismantling of unit 1 – 6 KGR
- decommissioning and dismantling of KKR-unit
- refurbishments (plant adaptation and new facilities)
- construction of the new interim storage
- waste management
- site reuse preparation
Project implementation – Project definition
Work breakdown structure EWN
Project implementation – Main items

- project definition (WBS)
- project execution
- registration of actual data
clarification of content and scope of technical planning documents (PCD 0,1&2)

execution planning (pre-checking documents)

issuing of dismantling licence

licensing procedure
**Project implementation - Project execution**

**Detailed planning**

- "Pre-checking document " (PCD, German abbreviation VPU), requirement of authority before starting of any decom. work

- PCD’s are to be submitted to the authorized experts to check these documents regarding the licence and technical rules

- PCD in connection with KGR decommissioning (VPU 0, VPU1, VPU2)

- PCD in connection with storage of residual materials

- PCD in connection with adaptation of systems, refurbishment, new equipment, wall opening
**PCD 1 (content)** – Execution of cutting points between Systems to be dismantled and operation systems

- Description of tasks
- **List of systems to be decommissioned**
- **Catalogue of the mechanical, electrical and instrumentation cutting points**
- Adaptation of P&I flow sheets to show parts to be dismantled
- Preconditions (removal of media, cleaning, decontamination, removal of hot spots)
- Step by step working plan
- **Dismantling instruction to realize the cutting points**
PCD 2 (content) – Dismantling execution

- List of systems to be dismantled
- List of remaining systems
- Kind of material,
- mass per system and room (**inventory database**)
- Preconditions for dismantling (wall opening, changing of remaining systems, new airlocks)
- Step by step working plans
- Dismantling instructions
- Plan for dose assessment (>25 mSv)
Principle of decommissioning

- §7 facility - category IV
- VPU 1
  - Free release through authorized expert
  - Sign of cutting points
  - Realisation of cutting points
  - Confirmation of cutting points
- VPU 2
  - Emptying cleaning
PCD 1 implementation example - Electrical cutting point
Project implementation - Project execution
Detailed planning

PCD 1 implementation example - Cutting points of reactor
Project implementation – Main items

- project definition (WBS)
- project execution
- registration of actual data
Claiming of working orders

Registration of dismantled material (mass flow supervision)

Invoice of contractors (services)

Time consumption

Used manpower

kg

Direct costs

Schedule/milestones

Checking period: bi-weekly / monthly

Checking level: working package (activities)
Project implementation – Main items

- project definition (WBS)
- project execution
- registration of actual data
Contents

- project strategy/planning
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Project management / controlling – Controlling level working packages

Top-down:
- Basic time schedule
  - Estimated costs
- Detailed time schedule
  - Nominal costs

Bottom-up:
- Working package
  - Detailed project controlling
- Activity
  - Project
- Part project
- Program
- Action
  - Task
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Project management / controlling – Basic time schedule

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<th>Nr.</th>
<th>Proj.-Code</th>
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<td>A 1101</td>
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<td>24</td>
<td>A 88</td>
<td>Standortverwertung</td>
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Legende:
- Solldaten
- Istdaten
- Meilenstein Soll
- Meilenstein Ist
time schedule planning by Project Engineers

- based on
  - mile stones and dependencies
  - different project structure levels
  - licensing conditions
  - basic time schedule and budget

supervision of realisation by Project Managers (Controlling)

- continuous inquiry of actual data and comparison with nominal data (planned or calculated)
  - mass (kg)
  - manpower (mh)
  - costs (€)
  - time consumption (d)
- calculation of actual cost specific factors and correction factor
actual controlling by PM (controlling department)

- assessment of differences between actual and nominal data
- adaptation of cost specific factors and correction factors
- control of manpower capacity (mh) and dismantling productivity (kg/mh)
- feedback of correlated factors into the planning tool of the DeManS (decommissioning management system)
- shifting of working packages outside the critical path on time (smoothing of capacity peaks)
Project management / controlling – Actual controlling

Year

Employees
0 100 200 300 400 500 600 700

- Dismantling
- Health and Safety
- Engineering
- Post operation
- Maintenance
- Conv. Disposal
- Conceptual planning
- Licensing
- Project management
- Project management
- Others
- Project management
- Others
reports on actual status of project performance

estimation of project performance (forecast)

preparation of management decisions in advance to the project revision (to change the project strategy)

preparation / justification and issue of a new revision of the project performance (each two years)
Optimisation of the whole decommissioning process

Practical results - dismantling of big components and decay storage reactors (part 1), SG, pressurizers:

- Shorten project time – ca. 3 a
- Decrease of overall cost – ca. 15%

(apr. 250 Mill.€) by:
- shorter remaining operation phase
- optimisation of container costs
- minimisation of final storage volume
- easier treatment condition due decay time
- lower personnel costs

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<tr>
<th>Decommissioning Costs KGR</th>
<th>Mio. €</th>
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<td>Licensing (ca. 4%)</td>
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<td>Project controlling (ca. 1%)</td>
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<td>Dismantling monitored area (ca. 3%)</td>
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<td>Remote dismantling (ca. 7%)</td>
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<td>Dismantling controlled area overall dismantling (ca. 4%)</td>
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<td>Refurbishing (ca. 7%)</td>
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<td>Material (Waste) Management (ca. 25%)</td>
<td>386.82</td>
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<tr>
<td>Remaining operation (ca. 50%)</td>
<td>833.00</td>
</tr>
<tr>
<td></td>
<td>1,653.0</td>
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</tbody>
</table>
Project management & planning

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Thank you for your attention!