Decommissioning of NORM industry in Norway - Oil and gas industry facilities

Director Mette Nilsen
Norwegian Radiation and Nuclear Safety Authority
Overview of presentation

→ Norwegian oil and gas industry
→ Production of oil and gas with NORM
→ Radioactive waste management
→ Decommissioning as part of life cycle
→ Regulation of decommissioning
Norwegian oil and gas industry

→ Major contributor to Norwegian economy
→ About half of the reservoirs are still left
→ Major contributor as a NORM waste producer
→ Major contributor for NORM discharges
Lifetime, cessation and decommissioning

→ About 100 offshore facilities and about 450 subsea facilities

→ Lifetime is based on development of technology, price of oil and gas, facility etc

→ 2-5 years before planned cessation a decommissioning plan is developed

→ Decommissioning plan
  → Disposal part
  → Impact assessment
Decommissioning industry

→ The decommissioning of oil and gas facilities is well regulated and a large industry in Norway

→ Management of all types of hazardous waste combined with decommissioning

→ Radioactive waste with NORM is just one of many types of waste

→ Some companies specializes in managing radioactive waste as part of decommissioning
Cooperation for regulation of NORM industries

- Facilitate dialogue between competent authorities, as well as between the industry and the authorities
- Share best practice and information of common interest
- Harmonise protection approach as far as possible
- Consider joint inspections

Dialogue with relevant industry organizations
Coordination of regulation  
- Consent from regulators

→ Must obtain consent from the regulatory authorities at important milestones in their activities, including decommissioning

→ All regulators within health, safety, security, environment and quality

→ Coordinated by the Petroleum Safety Authority Norway

→ An expression of confidence that the operator is able to execute the activity within the framework of the regulations, and in accordance with the information in the consent application.
Radioactive waste management during normal operations

Offshore waste production

• Waste management Companies
  • Predominantly onshore, but some offshore

Repositories for radioactive waste

• Waste management
  • Cleans contaminated equipments

Final disposal of radioactive waste
Decommissioning of offshore installations I

→ Management of radioactive materials/waste during decommissioning require a licence from DSA

→ 2 Norwegian companies specialises in the decommissioning of offshore installations with NORM
  → AF Decom Offshore and Aker Solutions

Pictures from AF offshore Decom and Aker Solutions
Decommissioning of offshore installations II

Manage according to NORM-guidelines to avoid exposure to workers, public and environment:

1. Measure for radioactivity offshore and mark what parts are radioactive
2. Clean contaminated materials offshore if possible
3. Take installation to shore
4. Remove any radioactive sealed sources
5. Clean contaminated materials during dismantling
6. Disposal of radioactive waste, recycling or disposal of other waste

Pictures from Sunnmørsposten and E24
### Overview of requirements from DSA - Decommissioning

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<tr>
<th>Oil and gas company</th>
<th>Decommissioning company</th>
<th>Waste disposal company/repository</th>
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<td>Measure for NORM before decommissioning</td>
<td>Authorisation for radioactive waste management</td>
<td>Authorisation for radioactive waste management</td>
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<tr>
<td>Hire decommissioning company and send radioactive waste to a company with an authorisation from DSA</td>
<td>Authorisation for radioactive discharges at their site</td>
<td>Authorisation for radioactive discharges at their site</td>
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<td>Authorisation for possible radioactive discharges offshore</td>
<td>Authorisation for radioactive discharges at their site</td>
<td>Authorisation for radioactive discharges at their site</td>
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Disposal of radioactive waste from oil and gas industry

→ Near surface cavern type repository
→ Waste in plastic drums grouted in concrete
→ Opened in 2008
→ License from DSA
→ Run by private company, with state guarantee if company not able to run facility
Final comments

→ Decommissioning of NORM facilities covers many types of waste
  → Radioactive waste/NORM waste only one of many challenges

→ NORM industries are international industries
  → Useful with harmonised best practise and regulation

→ Important to require knowledge of and plans for management of radioactive materials
  → Management of radioactive materials not their main area of knowledge

→ Several regulatory authorities involved
  → Require harmonisation and cooperation
  → Regulatory system which takes care of protection of environment, workers and the public while allowing for the industry to produce oil and gas
Thank you for your attention
Any questions?

mette.nilsen@dsa.no
+47 67 16 26 70
www.dsa.no