

Raising the standard of well integrity for high-temperature geothermal wells

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Motivation – Improved well integrity

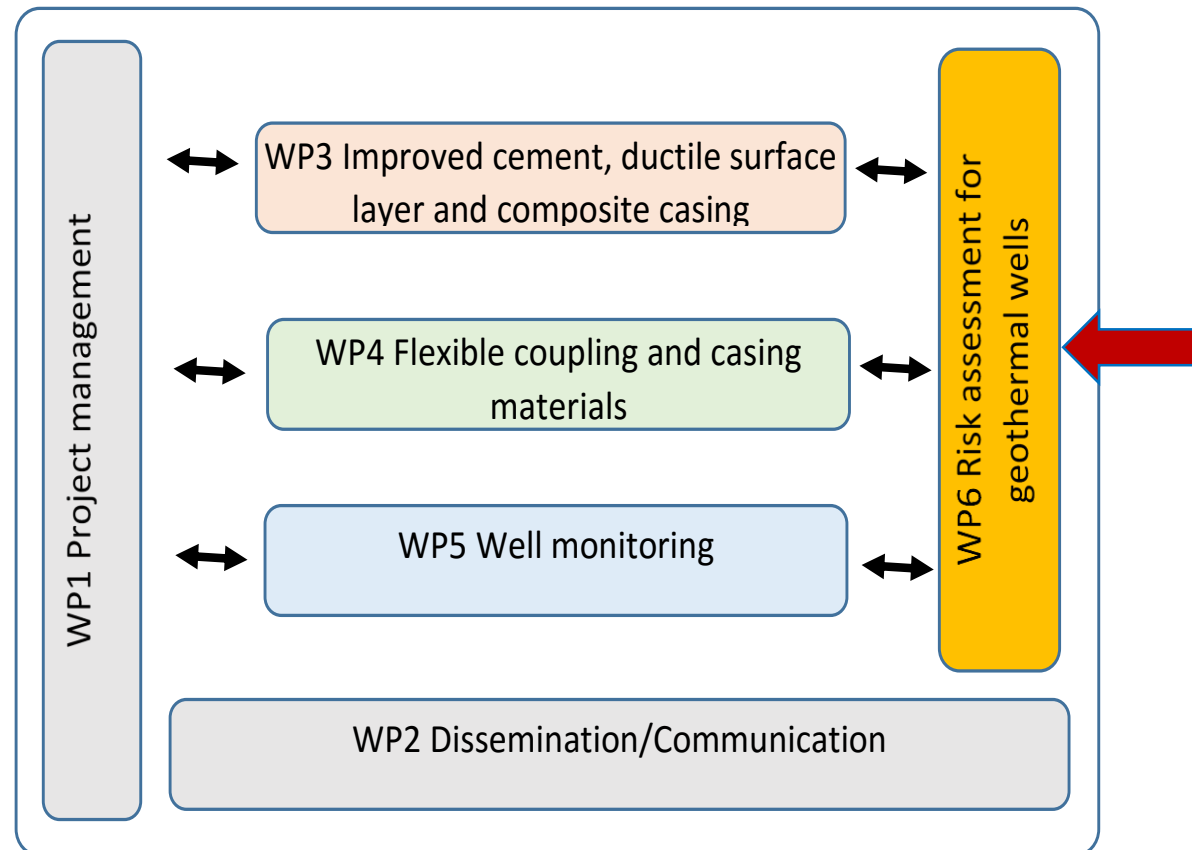
- Challenges
 - High temperatures and aggressive nature of geothermal fluids (casing and cement)
 - High thermal strains on casing and cement
 - High investment and maintenance costs of geothermal wells
- Identified needs
 - Innovative **casing technology** and optimised **cementing** procedures
 - Novel casing **materials** and innovative material combinations
 - **Monitoring** of well integrity
 - Solutions for extended **lifetime** of geothermal wells

EU – GeoWell

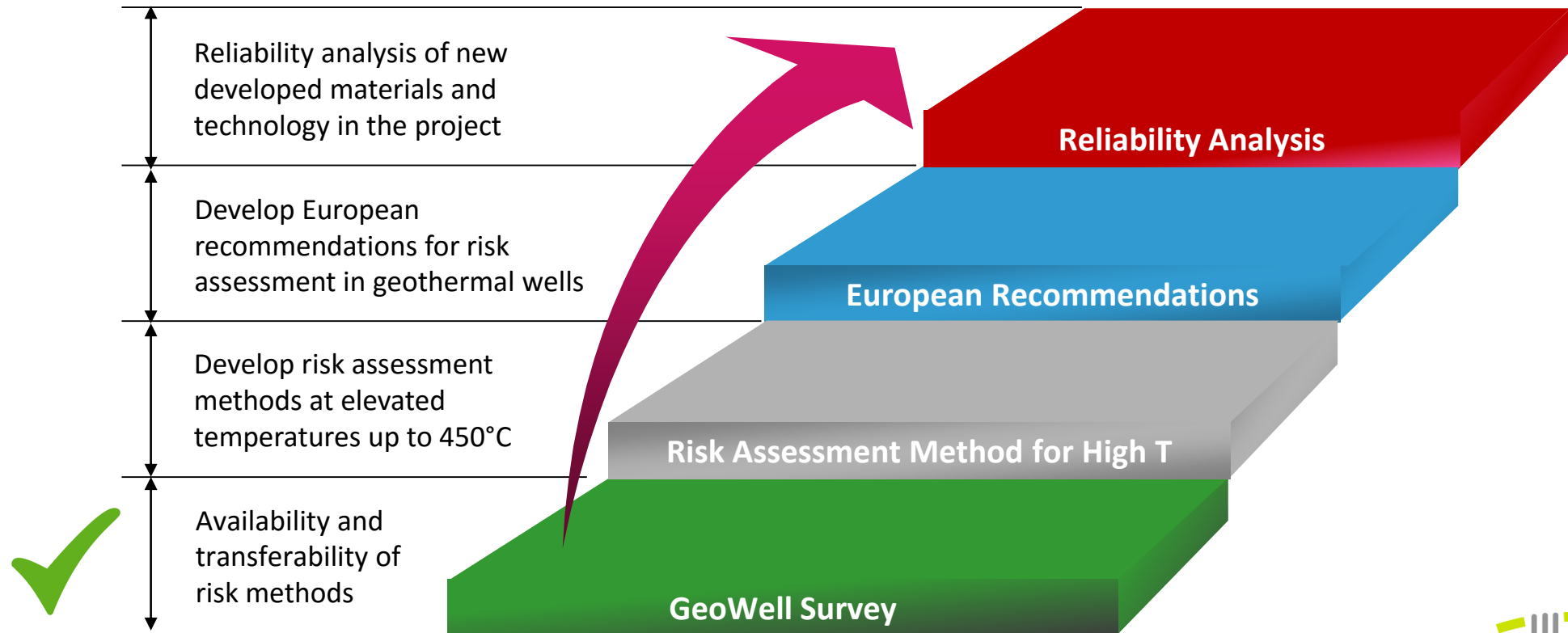
Reliable, cost effective and environmentally safe technologies
for
Design, completion & monitoring of high-temperature geothermal wells

GeoWell - Innovative materials and designs for long-life high-temperature geothermal wells

EU – GeoWell



Approach – Risk assessment



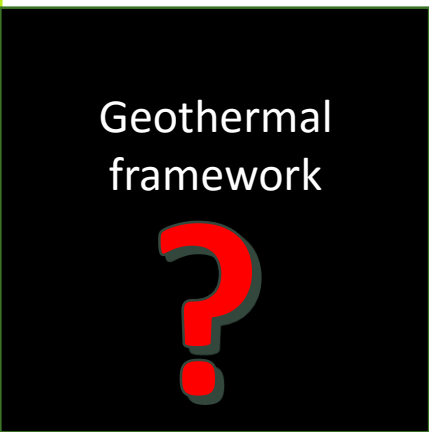
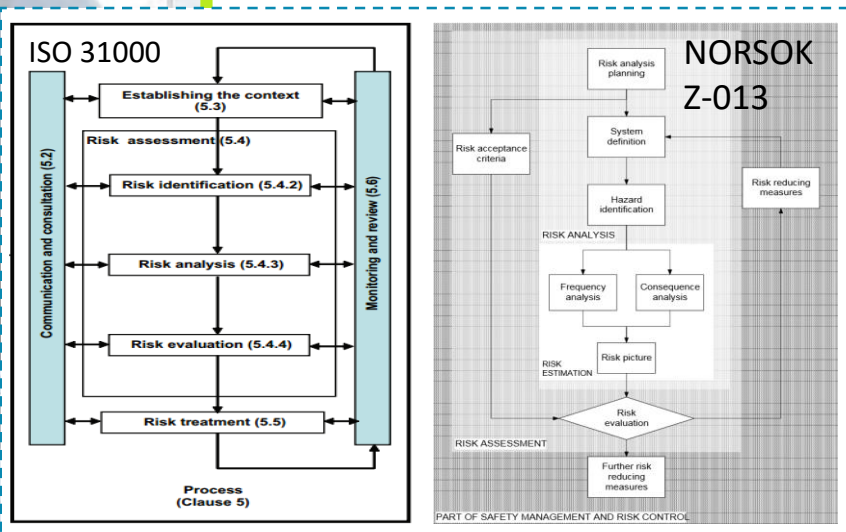
Literature survey and a questionnaire

- Provided background for the focuses of the publications/responders, and generic types of methods that are commonly covered/used
- The risk type most addressed in the literature is related to project/financial risk (using monetary indices method).
- Only 11% of the publications cover well integrity as a topic addressed.
- A lower focus on barriers amongst the geothermal responders, and a lower use of methods associated with assessment of barriers.

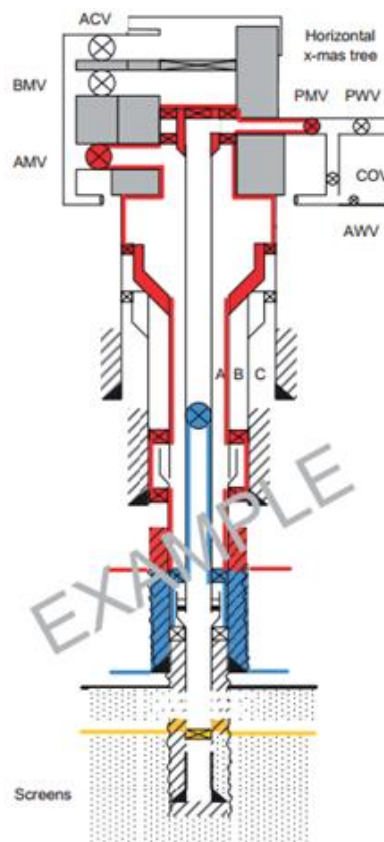
On-going activities

- I. Develop risk assessment methods at elevated temperatures up to 450°C
 - Establishment of barriers
 - Study current risk management practices for barrier elements
 - Development of a framework for a quantitative approach
 - Delivery of probabilistic risk assessment methods for selected phenomena
- II. Develop European recommendations for risk assessment
 - Requirements and structure check for a set of European recommendations
 - Evaluation of Norwegian NORSOK-standards and other EU regulations
 - Establishment of a procedure for implementation of these recommendations
- III. Reliability analysis of new developed materials and technology in the project
 - Identification of failure modes of the new developed materials in the project
 - Evaluation of failure probability and consequences

Schematic

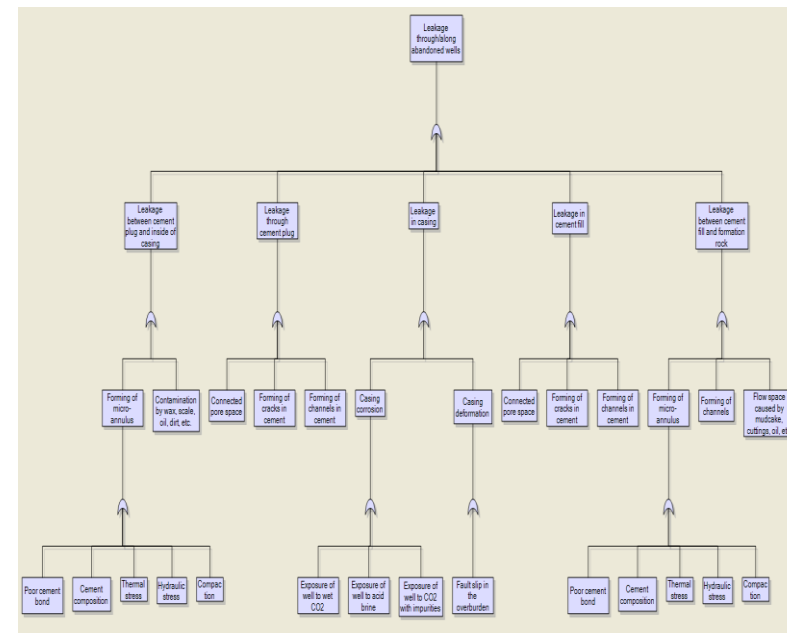
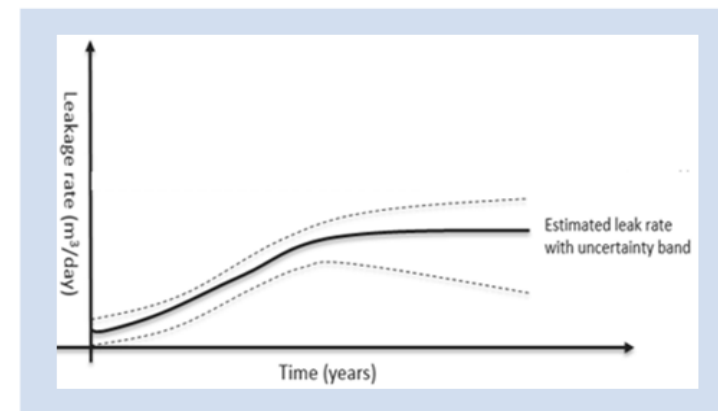


Implementations



Well barriers and potential breaches/failure modes

Consequence analysis



Probability analysis



Thank you for your attention!

For more information about the project and public reports:

Visit the website: <http://www.geowell-h2020.eu/>

or

Contact us at: geowell@iris.no