Detailed study of one-piece Reactor Pressure Vessel removal

One major part of the decommissioning of a Nuclear Power Plant (NPP) is the dismantling of the Reactor Pressure Vessel (RPV) and its internals. There exist two major optional strategies for dismantling of a RPV and its internals:

- Segmentation of internals and RPV.
- One-piece removal of the whole RPV, with or without the RPV internals.

Scanscot Technology carries out, on the behalf of Barsebäck Kraft AB, a detailed study of a one-piece removal of the RPVs, as a basis for a future management strategically decision.

The following three alternatives for one-piece removal are studied in detail

![Lowering inside the reactor containment](image)

![Lifting with a crane](image)

![Removal in horizontal position using tower gantry](image)

For each of the alternatives has been considered following aspects:

- Technical lifting aspects
- Necessary building modifications and demolition
- Radiological consequences
- Cost estimations

Criteria for evaluating of the best alternative:

- Risk and Impact Assessment
- Radiological aspects
- Logistics
- Costs
- Time

Conclusions/recommendations

The conclusion from the study is that the method “lowering the reactor pressure vessel inside the reactor containment” is the most advantageous based on the following:

- Known technology
- Existing ventilation in the containment can be used without modification
- Other dismantling activities outside the containment can run simultaneously with the work inside the containment
- The reactor hall overhead crane is intact during the dismantling project
- Advantageous method from the radiation protection and safety point of view.

<table>
<thead>
<tr>
<th>RPV-Data</th>
<th></th>
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<tbody>
<tr>
<td>Height (m)</td>
<td>20.7</td>
</tr>
<tr>
<td>Diameter (m)</td>
<td>5.5</td>
</tr>
<tr>
<td>Total weight (tons)*</td>
<td>530</td>
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</tbody>
</table>

*without reactor internals

Intake of Reactor Pressure Vessel (RPV) at Barsebäck unit 2 in year 1973