Sample questions for Hearings with SKB as of 30 November, 2011

MONDAY AFTERNOON

Geology, rock mechanics, hydraulic processes, hydrochemistry, (bio)geochemistry, regulatory

Geology

#1. Can SKB support its statement (provided in the answers to the IRT questions) that a greater depth would not contribute to safety (in terms of compliance with the general risk criterion), by systematic argumentation and evidence?

Presenter: #JA

Rock Mechanics

#2. Coupled deformations: As a result of repository excavation, a hydraulic sink (with flow towards the excavations), changes in hydraulic head fields and a reduction in pore pressure at the kilometre scale around the excavations will be created. This can cause significant surface deformations, shearing of pre-existing large scale fractures and seismic activity – even in case of small inflows and neglegible water table drawdown. The surface deformation values described in the SKB answer to question 2.3.1 at the NPP Forsmark are rather low. We would like to discuss these mechanisms and how they have been treated in the reference evolution of the repository in greater detail.

Presenter: #HH

Hydraulic Processes

#3. SKB notes that the particle tracking model finds 23% of the particles exiting through the boreholes. Given that the borehole sealing design has yet to be completed, it may be useful to have a better design to lower the fraction of release through the boreholes. While SKB points out that even if everything came out the boreholes, it would only increase doses by a factor of four, the partial short-circuiting of some of the radionuclide release may be an issue for some. One would expect a much lower proportion of the flow to exit out through the boreholes if the borehole seals were well designed.

Presenter: #JOS

Hydrogeological model

#4. There appears to be little information on the discussion of the appropriateness and conceptual understanding of the groundwater flow system in the region and of the hydrogeological model itself. It is common practice to compare calculated results with pore pressures/hydraulic heads measured in the field to check the model. What is SKB's strategy to understand and support their hydrogeological model?

Presenter: #JOS

Hydrogeology/Detailed characterization

#5. Can SKB present further a practical way to map fractures with several meters to several tens of meters scale, which will be important for hydrogeological DFN, in detail, and show how these data are used to reduce the uncertainties in hydrogeological DFN model? (#6 Hydrogeology questions)

Presenter: #JA

Hydrogeology

#6. It is necessary to develop models which relate the transmissivity and fracture size, and to conduct calibration to find appropriate model. At present, three-correlation models, i.e., correlated, semi-correlaterd, and uncorrelated, are considered and these three models are used as variants for safety evaluation. Thus, the uncertainties of these correlation models penetrate into the uncertainties of the analyzed results of the whole system. Once the construction of the underground facilities starts and data gathering, especially on the hydraulic properties and geological mapping, is conducted, more detailed evaluation on the appropriateness of the correlation models and more proper set up of the fracture properties can be done. Again, it is desirable if SKB can present details how to achieve these objectives during the construction phase. (#7 Hydrogeology questions)

Presenter: #JA

(Bio)Geochemistry

#7. The uncertainty in sulphide content was emphasized as a major issue for hydrochemistry, and is controlled for a large part by microbiology. In P-10-18 SKB states that: "The main task will be to clarify which of the possible [electron] donors: hydrogen, methane, acetate, photosynthetic organic carbon or leached carbon from installations supports the microbial sulphide production process". Can SKB discuss the most recent efforts and latest findings (over and above the findings reported in P-10-18)?

Presenter: #BKa, IPu

TUESDAY MORNING

Canisters and Canister corrosion

#8. The corrosion behaviour of copper under repository conditions is of concern. Although thermodynamics should prevail ultimately (considering the repository lifetime), it is nevertheless important that the kinetic behaviour of the canisters be investigated in detail. What type of experimental data is SKB planning to produce to assess the corrosion behaviour of the container?

Presenter: Fraser King och #CLil

#9. The canister seems to be capable to bear more than twice the original design load (100 MPa collapse load vs. 45 MPa design load), and the safety margin between design load and possible isostatic loads is considered to be small. Can SKB assess whether a stronger commitment towards the capability of the canister to withstand a much higher load could contribute to confidence in the safety case, especially if combined with a demonstration that a higher design load (for example 75 MPa) can be guaranteed by means of adequate QA procedures?

Presenter: #HAR

(Fuel)

#10. According to the information provided so far it seems that currently there is no valid safety assessment for the disposal of PWR spent fuel in the planned repository. Are complementary analyses for the PWR insert planned to fill this gap in the licensing information?

Presenter: HAR

#11. The answer to Questionnaire 2 question 2.5.23 states it takes on the order of ten canisters to fail for the regulatory risk criterion to be violated. While ten canisters is about an order of magnitude above SKB's assessment of the mean number of canister failures (0.86), from a perspective of the total number of canisters to be used (~6000) ten canisters is a small fraction. Thus, SKB has to be very confident they have characterized the number of copper canister failures well – or conservatively. Are there any plausible conditions for which the mean number of canisters that would fail could exceed ten?

Presenter: #AHn

Bentonite buffer, backfill and seals

#12. Buffer and colloid release conditions (#4 Buffer questions)

SKB recognizes an incomplete conceptual understanding of the buffer erosion process. As a consequence, and taking a conservative approach, SKB is using pessimistic

hypothesis to deal with this long term process. Can SKB explain the future R&D plans on the issue of colloid formation and erosion?

The answer to Round 2 indicates that no performance confirmation activities related to bentonite piping and erosion are planned. Is this correct? Given the potential importance of SKB's assessment of these properties to overall performance, would it not be prudent that SKB provides multiple lines of evidence regarding their assessment. (#6 Buffer questions)

Presenter: #PS

#13. Can SKB give a comparison of the advantages and disadvantages of buffer materials available, with respect to their hydraulic, mechanical, thermal and geochemical performance?

Comparison of the available buffer materials: advantages and disadvantages related to their hydraulic, mechanical and geochemical performance. (#5 Buffer questions)

Presenter: #PS

#14. The argument that the estimated eroded mass (1640kg) is small compared to the total mass of bentonite in the backfill (>10 tonnes) may not be strong *if* the eroded mass leads to a water pathway. If erosion occurs, then a pathway is likely.

Presenter: #PS

#15. Advantages and disadvantages of increasing the buffer thickness. (#2 Buffer questions)

Presenter: #PS

Industrial Feasibility

#16. While SKB recognizes the importance of QA for the main engineered barriers (canister, buffer), SKB also states that QC of the manufacturing process is not part of the license process, but would be a separate supervised process. However, international recommendations (e.g., IAEA, OECD/NEA) emphasize that the manufacturing process of canister and buffer (the main engineered barriers) and its QA are, in principle, to be included in the safety case/safety assessment to strengthen confidence in the safety case and its completeness. When and by whom will the QA approach reviewed? Can SKB provide an overview of the QA plan?

Presenter: #OO

TUESDAY AFTERNOON

Safety Assessment Methods

Performance assessment

#17. SKB recognizes that the design of the industrial facilities is neither detailed at this stage, nor well stabilized (e.g., canister production, plug design, bottom plate, etc.). However, the safety case presented must be capable of supporting a legal authorization to construct the facility, which is a crucial step, with irreversible implications. Thus, even if it is not realistic to demand a detailed design for the whole facility (given the current lack of information), can SKB assess under what conditions the design might be revised? Can SKB also assess the planning and realization of revisions and how the consequences of these revisions on the safety case will be taken into account?

Presenter: #JA

#18. The uncertainties captured in SKB's probabilistic analysis are of several types. Some uncertainties are due to the current lack of knowledge of the in situ conditions (e.g., the in situ fracture network and on its hydrogeologic properties) and will be addressed further during repository construction. Other uncertainties may remain, even after deposition of the canisters. Can SKB identify the uncertainties that will not vanish upon construction of the repository and explain what will be the maximum consequence of these remaining uncertainties on risk summation?

Presenter: #AHn

Best Available technique (BAT)

#19. SKB's BAT approach specifically excludes consideration of potential hazard increases elsewhere in the waste disposal processes. The interest is only in long-term dose reduction. By adopting some of these BAT techniques to lower long-term doses, could present-day hazards increase?

Presenter: #OO

Societal Interactions

#20. According to international recommendations (IAEA) and recent research a safety case ought, in addition to technical arguments supporting the safety, also pay attention to socio-political, organizational and management aspects which might affect the safety of a repository. Has SKB considered and documented how it will assure that competent personal and financial resources and the knowledge about the facility are available until the repository is closed properly? Who will review this part?

Presenter: #OO

Regulatory

#21. Before deciding whether or not to authorize construction, the regulator should be satisfied that SKB has in place a comprehensive program of testing and monitoring such that SKB will be able to confirm that the planned repository will work as planned. Can SKB discuss with the IRT what it plans to include in this comprehensive testing and monitoring program?

Presenter: #OO