

Long-term subsidence study in the Wadden Sea Region

Bestuur

Prof. dr. Pavel Kabat (voorzitter)
Prof. dr. Jos Bazelmans
Prof. dr. Jouke van Dijk
Prof. dr. Peter Herman
Dr. Hessel Speelman

To: NAM, Steering Committee (SC) members, SSM
From: B. Orlic
Date: 03 December 2013
Subject: Minutes of the Telecon held on 2 December 2013 10:30 CET

Filename: [01-Minutes-telecon-2Dec2013-public.docx](#)

Legend: => Action points NAM

Distribution list:

NAM: Antony Mossop, Pieter van de Water, Dirk Doornhof, Ruud van Boom, Hermann Bähr, Harry Piening, Wim van der Veen

Steering Committee (SC) Members: Hessel Speelman, Ramon Hanssen, Patrick Baud, Robert Zimmerman, Ryszard Hejmanowski, Rune Holt, Adrian Houtenbos, Bogdan Orlic

State Supervision of Mines (SSM): Hans de Waal, Annemarie Muntendam-Bos

Wadden Academy: Klaas Deen

Attendance:

NAM: T. Mossop, R. van Boom, A. van der Linde, S. Hol, H. Bähr

SC: H. Speelman, R. Zimmerman, R. Hejmanowski, R. Holt, A. Houtenbos, B. Orlic

SSM: A. Muntendam-Bos, H. de Waal

Absent: P. Baud could not join due to technical problems with teleconferencing.

R. Hanssen was unable to join due to involvement in a PhD thesis defence.

Material distributed before the meeting:

Two documents with a detailed description of the test program were distributed 4 days before the meeting.

Action points from the previous meeting (the 2nd SC meeting held in October 2013 in Leeuwarden) relevant to this teleconference:

=> *Rock mechanics test program*

NAM is requested to prepare the test program proposal for the first part of the rock mechanics tests and make it available to the SC members and the SSM before the telecon scheduled for the 2nd December 2013.

The test program proposal was updated and distributed before the meeting. This action point can be closed.

Meeting objectives

- **The telecon** was held to discuss the Rock mechanics test program proposal describing the first part of the rock mechanics tests to be performed by NAM.

Agenda

- Reaction to the test program proposal distributed before the meeting
- Any other business
- Questions and closure



Meeting highlights

- The initial version of Rock mechanics test program already contains adjustments based on the comments made during the 2nd SC meeting in October 2013 in Leeuwarden.
- The standalone test cell is ready while the quad test cell will be ready for use in a few weeks (both at Shell Rijswijk). Tests on the Ten Boer caprock in the single test cell are now under way.
- It is recommended to check that the samples, at least within each part of the experimental program, are indeed very similar. This can be done by systematic measurements of porosity, CT and Vp on each sample
- It is recommended to conduct a set of ordinary triaxial tests to obtain short-term Mohr-Coulomb failure parameters.
- It is recommended to introduce hold periods at different stress level in order to investigate stress-dependence effects.
- It is recommended to consider executing rate-type tests with variable loading rates within the same test. However, the difficulty in interpretation of these tests is in separation of stress-dependence from strain-dependence effects.
- It is recommended to investigate the effects of low axial stresses due to stress arching effects.
- It is recommended to characterize the long-term deformation behaviour of the Ten Boer caprock (mixture of shale material and sandy streaks) as this may be the source of time-dependence.
- It is recommended to optimize the order of experiments of different type in order to maximize the output from experiments.
- It is recommended to search the internal Shell library and collect the relevant information from earlier rock mechanics tests on the Rotliegendes reservoir formation and the Ten Boer caprock.
- There is a general agreement that first two types of tests, with some minor modifications, should be executed first in the coming 3-4 months (1. aqueous vs. non-aqueous tests and 2. temperature tests).
- More detail needs to be provided on type 3. stress-path dependence tests. These tests can only be successful if the samples to be tested are very similar, which needs to be checked by systematic measurements on each sample, as already stated above.
- It is recommended to consider conducting stress-rate dependence tests (type 6.) after completion of the first two test types (1 and 2) or three test types (1, 2 and 3).
- It is recommended to design the remaining types of tests at a later stage, after the results of the initial testing phase become available. Plans for the remaining tests will be discussed and reviewed at the 3rd SC meeting

scheduled for 3 and 4 April 2014.

- Experimental results obtained from the first 2 to 3 test types will also be evaluated and reviewed at the 3rd SC meeting in April 2014. The timing for this meeting fits very well in the timeline of planned experiments.

Requests and Action points NAM

=> **Rock mechanics test program update**

The initial version of Rock mechanics test program needs to be updated taking into account the remarks and suggestions given by the SC during the telecon. The updated version will be made available to the SC and SSM by the 16th of December 2013.