

Summary of the IOGP, Cementing Workgroup meeting

Teleconference, March 30th and 31st, 2020

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Participants

Cristiane Richard de Miranda:	Petrobras	Fabio Parozza	ENI
Laurent Delabroy:	AkerBP	Therese Karlbom:	Equinor
Roger Tonnessen:	Equinor	Helge Olsen:	Standards Norge
Torbjørn Vrålstad:	SINTEF	Larry Todd:	Omnova
Shen Yijun:	CNPC	Gunner Lende:	Halliburton
Emmanuel Theron:	BP	Heiko Plack:	Dyckerhoff
Julian Chancelier	Storengy	Michael Prohaska	Univ. Loeben
Bipin Jain	Schlumberger	Simon James:	CS8 Consulting

Introduction

The list of participants above may not be complete and as the meeting was via teleconference not everyone attended all the time.

The IOGP workgroup meetings allow technical modifications of ISO cementing procedures to be discussed and proposed without the presence of members from embargo countries. Since the divorce of the API and ISO workgroups in 2010 there have been several significant updates of API procedures which have not been mirrored by changes in the corresponding ISO procedures.

The plan for procedure modifications within IOGP/ISO is to make a supplement referencing the relevant API document and bringing new or corrected information via the supplement. The supplement will generally be a few pages long.

There has been an agreement between API and ISO on who owns several of the documents within ISO/TC67/SC3. However, no decision has been made on ISO10426-3, -4, -5 and -6.

The main technical discussion points I noted are summarised below, not necessarily in the order of presentation.

ISO 10426-1 (API SPEC 10A): Cements and materials for well cementing

Heiko Plack presented suggestions to make an ISO supplement to the API document. The main changes related to the sampling requirements. The current document requires samples to be taken and tested to represent the product as produced. However, once produced the product could be stored for some time before being shipped to a customer. The change proposed was to give an option to manufacturers to test the product just prior to shipping rather than just after manufacturing. Enforcing manufacturers to test before shipment was not considered acceptable for manufacturers shipping small batches of product.

Fabio Parozza (ENI) raised the question of how to do chemical analysis locally. They had tried XRD but did not have a suitable program for Rietveld analysis. Heiko said loss on ignition tests

were useful to look for cement aging. He also said that Dyckerhoff had an internal test to check the performance of cement batches with a lignosulphonate retarder at 85°C.

Heiko will keep collecting comments on 10426-1 until June and then there will be a decision on what to do after the API meeting.

ISO 10426-2 (API RP10B-2): Cements and materials for well cementing – Part 2: Testing of well cements

It is doubtful that the suggested changes to this document are enough to justify a supplement. The new API revision already contains some of the suggestions. The group will continue to look for new normative changes. Gunnar Lende suggested including a method for stop-go testing during the thickening time tests to look for unwanted consistency increases during stationary periods.

ISO 10426-4 (API RP10B-4): Preparation and testing of foamed cement formulations at atmospheric pressure

Simon James presented resolutions to the comments received, from James Heathman (Shell) at the last meeting related to curing foam cement in a pressure vessel to determine foam cement stability above 88°C. The plan is to revise the annex based on the presentation and circulate within WG2 for comments and then to send to James for feedback. James Heathman will be the next chairman of API SC10.

ISO 10426-5 (API RP10B-5): Determination of shrinkage and expansion of well cement formulations at atmospheric pressure

The main activity on this was the presentations from Gunnar Lende and Frank Ruckert summarised later. Shen Yijun (CNPC) gave a reference to a [paper from Total](#).

Presentations – Gunnar Lende (Halliburton)

Gunnar gave an update on the large-scale annular sealing tests that they are performing in collaboration with Equinor. The project started 2 years ago, and the third test is ongoing (the test has been running for over 3 months). In this test a high concentration of expanding agent has been used, giving an estimated radial expansion stress of 5 MPa on the inner casing and 7 MPa on the outer casing. If the cement was unconfined the concentration of expanding agent used would have caused the cement to fail. Once a leak has been created it has been impossible to completely seal the leak, although the leak rate is very low.

Presentations – Frank Ruckert (Shell)

Frank presented ongoing work, some of which has already been reported in SPE184640. The importance of expansion for sealing was again highlighted. One new equipment development is to include a flush diaphragm piezo-electric pressure transducer in the wall of an UCA cell. One test result presented showed that a stress of 15 bar over the pore pressure was generated with expansion. The downside of this modification is that the pressure limit of the cell is reduced to 40 MPa. Shell is in discussion with equipment manufacturers to determine whether they are interested in making the equipment.

Proposed document ISO10426-7 (no API equivalent): Laboratory test method for long-term sealing capacity of materials for well abandonment

Large-scale laboratory tests are not suitable for ISO standardisation. Possibly a smaller laboratory test, such as the modified UCA, described by Frank Ruckert could be used. This would require equipment manufacturers to become involved.

Presentation – Larry Todd (OMNOVA)

Larry gave a presentation on hydrocarbon swelling tests on different polymer particles. They used a pressure cell with sight glass to observe the swelling and contacted different particles with either propane or n-butane. N-Butane caused more swelling than propane in most cases and there were clear differences between polymer particles. Larry asked about composition of gases (concentration of C2 and higher hydrocarbons) as they haven't found anything that swells in methane.