

IEA - ECES

THE 50th EXCO MEETING IN OTTAWA, MAY 2001

May 8, 2001

ANNEX 13

DESIGN, CONSTRUCTION AND MAINTENANCE OF UTES WELLS AND BOREHOLES

PROGRESS REPORT 7

1. General information

Annex 13 cover aspects of testdrilling, well and borehole design, construction and maintenance of wells and boreholes for UTES applications. The main target is set upon aquifer and borehole systems (ATES and BTES).

The final goal of the Annex is to work out a set of guidelines covering the following subtasks.

- How to gain information of the underground properties by testdrilling (Subtask A)
- How to design well or borehole systems properly (Subtask B)
- How to construct wells or boreholes cost effective, safe and properly (Subtask C)
- How to keep the storage systems functional during operation (Subtask D)

A second goal is to identify items or areas that need further research and development.

The annex was planned during 1997 and eventually approved by the 43rd EXCO Meeting in Paris 4-5 of December 1997.

Prior to the EXCO meeting there was an Annex Preparatory Workshop to review and correct the annex proposal.

The workplan takes into consideration that a number of participating countries will contribute to the further development of the annex following the task shearing principle. The target is set to finalise the work at the end of year 2001.

2. Previous events

The Annex started with a minor Workshop in Stockton, March 18, 1998 and continued with a first Expert Meeting in Giessen, June 15-16, 1998.

During these meetings the over all workplan was established and the project was consolidated in its working forms.

As was reported on the 44th EXCO Meeting in Chester, June 22-24 1998 most participating countries were still in a starting stage, trying to form national "working teams", and looking for financial resources for their work. Nether the less, a lot of valuable state of the art information was presented as the first input to the state of the art report.

The 2nd Expert Meeting took place in Malmö, Sweden, October 12-13 1998 and the results were reported to the 45th EXCO Meeting in Albuquerque, December 7-10. A general conclusion from this meeting was that there are still problems with organising and financing the work in several participating countries and that this will delay the progress of the work. However, a lot of useful information was presented for the benefit of the scope of the annex.

The 3rd Expert Meeting took place in Appenzell, Switzerland, March 17-19 1999 and the results were reported to the 46th EXCO Meeting in Luleå, June 14-16. At this meeting it was stated that several countries have delays in forming national teams and to find financial support for the work. For this reason, it was concluded that the state-of-the-art stage would be delayed. It was also concluded that the most essential material have been obtained, to start the process of identifying areas or subjects for further research and development and to start preparing most of the state of art reports.

The 4th Expert Meeting took place in Westerville, Ohio, USA, October 6-8, 1999 and the results were reported to the 47th EXCO Meeting in Berlin, November 1-3, 1999. At this meeting it was stated that seven countries formally had joined the Annex, but there were still problems with fundings and forming of national teams. It was also found that recently activated countries must be given time to forward country specific information for the state of the art reports. To speed up the progress of work it was agreed to add simple questionnaire surveys to the input that is obtained by presentations.

The 5th Expert Meeting was held in Edmonton, Canada, April 10-11, 2000 and the results were reported to the 48th EXCO Meeting in Adana, Turkey, May 24-25, 2000. At this meeting it was approved to extend the time schedule to finalise the work at the end of year 2001. It was also announced that Germany would formally join the Annex and take over the subtask C leadership after the withdrawal of Switzerland. At the expert meeting it was concluded that the future work would be focused on finalising the state of the art reports and to screen the information with respect to guidelines and items that need further research and development.

The 6th Expert Meeting was held in Mol, Belgium, October 16-17, 2000 and the results were reported at the 49th EXCO Meeting in Tokyo, November 6-7 2000. At the expert meeting Norway participated as an observing country with the aim to become a formal member by signing the ECES IA. Most of the meeting time were used for group work to state guidelines and areas for further R and D. Two of the State of the Art reports were announced being delayed. However, a full set of reports were expected to be in draft form to the 7th Expert Meeting.

3. Results from the 7th EM

3.1 General

The 7th Expert Meeting was held in Nijmegen, Netherlands, May 26-27 2001.

The proceedings were held at the Hotel Mecure with Guido Bakema, IF Technology as a personal host.

The meeting was coordinated with the Annex 12 Expert Meeting (May 24) and a special study tour (May 25).

3.2 Participants and countries represented

The meeting was attended by 15 experts, representing nine different countries. These were, number each country in ()

- Belgium (1)
- Canada (2)
- Germany (2)
- Japan (1)
- Netherlands (2)
- Norway (1)
- Sweden (3)
- Turkey (1)
- USA (2)

Norway appeared for the second time as an observer. According to the representative, Norwegian Geological Survey is working on having Norway to sign the ECES implementing agreement.

3.3 Current status each country

The current situation when it comes to forming national working teams, financial status and level of participation as expressed at the meeting is shown in table 1. Compared to the situation at the 6th meeting, Norway is still an observing country. Furthermore, the necessary funding and organisation issues seem to be at hand to finalise the annex even if some countries now have limited fundings.

• • • • Table 1 Current country status

Country	Joinment	Financial support	Working team
Belgium	Formal	Limited	Developed
Canada	Formal	Limited	Developed
Germany	Formal	Fully	Formed
Japan	Formal	Fully	Formed
Netherlands	Formal	Limited	Formed
Norway	Observer	NA	NA
Sweden	Formal	Fully	Formed
Turkey	Formal	Fully	Formed
USA	Formal	Limited	Formed

4.

4. **Presentations**

Except for the six subtask report presentations, there were some additional information given. These presentations were

- Summary of the TRT in Mol, *Burkhard Sanner*
- Comparing the results from TRT using U-tube and Concentric BHE, *Frank Cruickshanks*
- Results from the first TRT in Turkey, *Bekir Turgut*
- New well design criteria, *Nick Buick*
- Information on some Norwegian UTES projects, *Helge Skarphaagen*
- Format for the drilling cost survey, *Olof Andersson*
- Potential BTES failures, *Manfred Reuss*

4.

4. **Discussions**

Part of the meeting was scheduled for discussions with the objective to screen the subtask reports into

- Statements of knowledge that can be used for guidelines, manuals and equal
- Identification of technical items that can not be used to state guidelines and therefore need further consideration

The results of discussions is going to be incorporated to the next versions of subtask reports.

4.

4. Conclusions and agreements

The current information status, survey material excluded, is shown in table 2. A general conclusion at the closing of the meeting was that the country specific state of the art material now is completed.

• • • • Table 2 Current information obtained from different countries

	Number of presentations that cover			
Country	Subtask A	Subtask B	Subtask C	Subtask D
Belgium	1	-	-	1
Canada	4	3	3	1
Germany	2	1	-	2
(Denmark) ¹	-	1	-	-
Japan	2	1	2	2
Netherlands	1	1	1	6
Norway ²	1	1	-	-
Sweden	6	9	8	7
(Switzerland) ¹	-	-	1	-
Turkey	3	1	2	-
USA	5	-	-	-
Total	25	18	18	19

¹) Withdrawn from formal participation

²) Observing Country

The current status of the subtask reports is shown in table 3.

Table 3 Current status of state of the art reports

Subtask	Report title Subtitles if sections Author(-s)	Status
A	UTES Site Investigations by Testdrillings and Thermal Tests	
Section I	“Test drilling for UTES Applications”, <i>F Michel, Canada</i>	1 st draft May 2001
Section II	“Thermal Response Tests for BTES Applications.” <i>J Spittler, USA</i>	2 nd draft May 2001
B	UTES well and Borehole Design	
Section I	“ATES Well Specification and Design” <i>O Andersson, Sweden</i>	1 st draft May 2001
Section II	“Borehole Heat Exchangers. Configurations and Thermal Efficiency” <i>G Hellström, Sweden</i>	2 nd draft May 2001
C	Drilling and Construction of UTES Wells and Boreholes, <i>O Andersson, Sweden and B Sanner, Germany</i>	1 st draft May 2001
D	Well and Borehole Failures and Cures in UTES Systems, <i>G Bakema, Netherlands</i>	2 nd draft May 2001

The survey that delayed the Subtask A report, section I, is now completed and will be worked into the next version.

A drilling cost survey shall be added to the subtask C report, 2nd draft.

Regarding Subtask D, the missing failures on BTES applications are now reported and will be added to the final version of this report.

The expert meeting agreed that all draft reports shall be made generally available on the IEA-ECES homepage. They also agreed that each report shall have a specific cover and a preface describing the Annex.

It was finally concluded that on the next meeting the group work for discussion of guidelines and subjects for further research and development must be given two full days.

4. **Workplan till next meeting**

The experts agreed on finalising the reports and other issues according to the time schedule below.

Subtask Reports	Date (2001)
Subtask A, Section I	
<ul style="list-style-type: none">• 2nd draft• Review• 3rd draft	Aug 15 Sept 15 Oct 15
Subtask A, Section II	
<ul style="list-style-type: none">• 3rd draft• Review• Final	Aug 15 Sept 15 Oct 15
Subtask B, Section I	
<ul style="list-style-type: none">• 2nd draft• Review• 3rd draft	Aug 15 Sept 15 Oct 15
Subtask B, Section II	
<ul style="list-style-type: none">• 3rd draft• Review• Final	Aug 15 Sept 15 Oct 15
Subtask C	
<ul style="list-style-type: none">• Response drilling cost survey• 2nd draft• Review• 3rd draft	May 30 Sept 15 Oct 15 Nov 15
Subtask D	
<ul style="list-style-type: none">• 3rd draft• Review• Final	Aug 15 Sept 15 Oct 15
Guidelines	
	Oct 15

- 1st draft
- Review

Nov 15

Further R and D

- 1st draft
- Review

Oct 15
Nov 15

Preface

- Draft for review
- Final

June 15
Aug 15

Cover for reports

- Draft for review
- Final

June 15
Aug 15

5. Next meeting

The 8th Expert Meeting will take place in Turkey, November 28-30, with Cukurova University as a host. The place for the meeting is not yet decided.

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