

MINUTES

IADC Geothermal Committee Meeting, 9 January 2024

Present at the meeting were

Scott Farmer, H&P; Fredrik Meyer-Lampe, Odfjell Tech.; Kevin Gray, Black Reiver; Anthony Pink, Black Reiver; Allen McIntosh, NOV; Darren Moure, TSC; Hani Abraham, Independent; Eric Gonzalez, Thermaprime; Erik Roesen Larsen, Innargi; John Beswick, Marriott Drilling; Ashok Santra, Aramco Americas; Shaun Toralde, Weatherford; Bruce Gatherer, Iceland Drilling; Michael Strauss, Ensign; Oumer Tahir, Hunting; Collin Crist, Kenai Drilling, Bill Krull, IADC; Mike Dubose, IADC; Lars Nydahl Jørgensen, IADC (minutes).

1. Minutes of December 2023 Meeting

There were no comments to the minutes.

2. New attendees

Scott introduced Eric Gonzalez – Thermaprime Drilling Corporation, Hani Ibrahim – Independent, and Riaz Israel – BP.

3. IADC Drilling Manual 13th Edition

Bill Krull explained the activities of the Technical Publications Committee of IADC, which this year includes the publication of the 13th edition of the IADC Drilling Manual. The status is currently that previous contributors had been asked if they were interested in also contributing to the 13th edition. Many had answered positively. This committee was then asked if we would contribute a chapter on geothermal drilling.

Lars explained that this topic had been discussed in the committee several times in recent months to determine what the exact status of the *Geothermal Well Drilling Guideline* should be among the other IADC guideline / standard setting documents.

Bill explained that in his view, the Geothermal Well Drilling Guideline would fit right in as a chapter in the IADC Drilling Manual. This would not prevent that the document could also exist as a guideline in its own right. In fact, many customers for the IADC Drilling Manual buy individual chapters that are important to them.

After some discussion, it was agreed that this would be the right way forward.

As the Guideline will not be completed in time for the deadline for contributions to the 13th edition of the Drilling Manual, a full incorporation of the Guideline into the Drilling Manual cannot take place until later. For this year, a smaller contribution will be made, possibly comprising the Geothermal Well Classification with an introductory chapter explaining the overall role of geothermal drilling and the importance of the well classification in that regard.

Eric Gonzalez called for attention to work currently done under the United Nations Framework Classification of Resources (for Geothermal Energy). Please refer to the document here: [United Nations Framework Classification for Geothermal Energy: Pilot applications in the Caribbean, Ethiopia and Indonesia \(irena.org\)](https://www.irena.org/en/resources/publications/2023/04/United-Nations-Framework-Classification-for-Geothermal-Energy-Pilot-applications-in-the-Caribbean-Ethiopia-and-Indonesia).

There was then a discussion about a concern raised by Kevin Gray on the fact that, in parallel with all this work, an IADC book (Elsevier sponsored) on geothermal drilling is being prepared.

The views expressed in the discussion were:

- that some effort had to be made to avoid that any recommendations made in the two spheres were not directly contradictory, and
- that it was problematic if a person present at the committee meetings had a direct personal commercial interest in using work presented in the meetings. It was pointed out that much of this work would be done by committee members in their own free time.

As the two issues were difficult to resolve, it was agreed to continue this discussion outside the committee and report back at the next meeting.

4. Geothermal Well Drilling Guideline / IADC Geothermal Well classification

At our December 2023 meeting a concept was introduced whereby key definitions and coding of geothermal wells needed to be given prominence in the work with the guideline. These aspects therefore needed to be prepared early in the process as they would be critical for everything else.

As the number of participants in the December meeting had been limited, Scott wanted to ensure that the larger group present at today's meeting was in agreement. His proposal is:

- The first section of the guideline will be developed into an IADC Classification of geothermal well types. Well archetypes that had previously been discussed would form the basis for this classification.
- The classification system will feed a risk- and difficulty matrix to provide information for potential investors.
- This section will initially be delivered as a standalone document, and will be completed before work on other sections begins (in line with what was agreed under point 3 above).
- It is the ambition to deliver this work in the first half of 2024.

There was some discussion about whether bodies like IGA should have an endorsement role, and whether other bodies should be approached (e.g. Geothermal Rising). However, all agreed that it was a good idea to hear the views of others.

Following confirmation that this was the right way forward, Scott went on to present the concepts behind the classification work, as follows:

IADC Geothermal Well Classification

- Purpose: Provide an international coding system for Geothermal Well construction that shall reflect the practicalities of “putting a hole in the ground” and the risk/difficulty associated with the initial construction and long-term operation of the well
- Classification will inform a risk/difficulty rating to facilitate communication with non-drilling professionals – Finance, Geology, Regulators etc
- Endorsement will be sought from other geothermal associations – IGA, GGA, EGEC, etc

- Initial classification proposal has been developed further:
 - Temperature Class
 - Geometry Class
 - Integrity/Corrosion Class
 - Rock/Drilling Class
 - Well Control Class
 - ...others?

John expressed a possible concern that these classes could not readily be seen to consider the fact that many issues relating to geological, hydrogeological and geomechanical aspects tend to create serious problems in geothermal drilling. Scott’s responded that the ambition was that the classification, while applying drilling jargon, would also take into account the geological aspects.

5. Working Session in Pau

To progress the classification work, an in-person working session has been proposed to be held in Pau, France (H&P Office) on the 13th of February. If members would like to participate, please contact Scott as soon as possible.

6. AOB

There being no further business, the meeting was adjourned.



Geothermal Committee
General Meeting – 09/01/24

Agenda

- Validation of MoM of previous meeting
- New Members
- IADC Drilling Manual – 13th Edition
- Geothermal Well Drilling Guideline
- IADC Classification
- Proposed Way Forward

New Members

- ThermaPrime – Eric Gonzalez
- Independent – Hani Ibrahim
- BP – Riaz Israel

IADC Drilling Manual – 13th Edition

- Bill Krull
- Mike DuBose

IADC Geothermal Well Drilling Guideline

- E-mail sent on 14/12/23 seeking support for change

As you will see in the MoM, that were distributed by Lars today, there was an important change proposed for the proposed IADC Geothermal Well Drilling Guideline. I would like to illicit member's feedback regarding this change and offer the opportunity for different views to be heard and discussed. I proposed change is as follows:

- The first section will be developed further into an IADC Classification of Geothermal Well Types.
 - The well archetypes that we had discussed will form the basis for this classification
- The classification system will feed a risk and difficulty matrix, that can provide additional information for potential investors in geothermal projects
- This section will initially be delivered as a standalone document and shall be completed before work begins on the other sections of the guideline (Well Design, Rig & Equipment, etc)
- We will seek support/endorsement of the classification system from other industry bodies such as the IGA and EGEC
- We will aim to deliver this piece of work in the first half of 2024, by starting the work in a smaller group that will seek endorsement from the rest of the committee

I have attached the slides that were presented during the last meeting. I am seeking the support of the committee members for this change and will bring this point to attention at the next meeting. In the meantime, please consider this and provide a comment via e-mail or via the dedicated document I have created in the sharepoint: [IADC Classification](#).

IADC Geothermal Well Classification

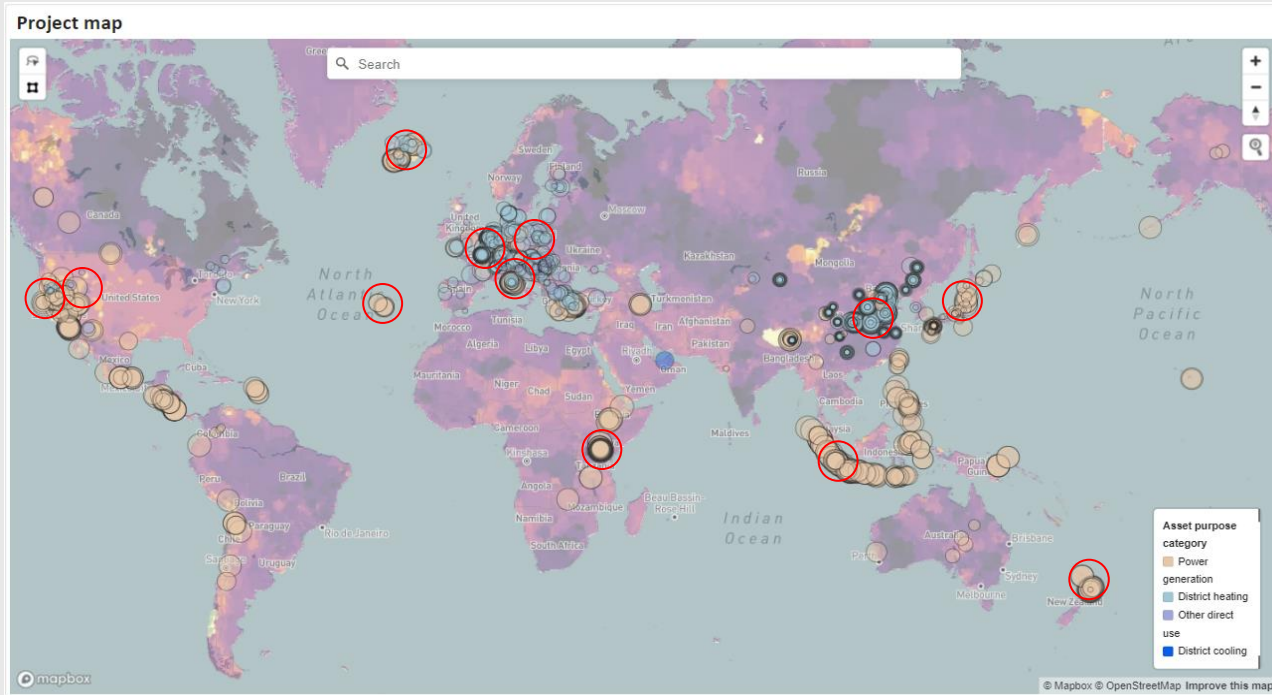
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IADC Geothermal Well Classification

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 - Well Control Class
 - ...others?
- Expanded upon in dedicated file

IADC Geothermal Well Classification

- Classification to be tested against prominent areas/types of wells



1. California – Geysers
2. Nevada – Fervo?
3. Azures
4. Iceland
5. France, Paris – Dogger
6. France, Upper Rhine Graben
7. Italy
8. Germany – Eavor Loop
9. Kenya
10. China
11. Indonesia
12. Japan
13. New Zealand
14. ...

Proposed Way Forward

- Dedicated group to elaborate the classification further
 - Potential for an in-person meeting in Pau, France – in early February
- Aim to define the first draft of classification in Q1 2024
- Q2 2024 refine classification, documentation and begin endorsement (meeting during IADC Galveston?)
- End Q2 – Abstract submitted for IADC Madrid – Present Committee and progress
- End Q3 deliver IADC Classification
- Q4 – Launch other section of IADC Geothermal Well Drilling Guideline