



OWSG GENERAL MEETING

August 9, 2022

8:00 am CDT Start Time

Jonathan Lightfoot
Sub-Committee Chair



AGENDA

- OWSG Mission & Anti-Trust
- API RP-78 Update
- Advanced Trajectory Design
- Open Discussion Session



Introductions

- Name
- Company Affiliation
- Most Interesting Talent



Attendees – August 9, 2022

Name	Email
Heather Vannoy	Heather_Vannoy@eogresources.com
Lightfoot, Jonathan D	Jonathan_Lightfoot@oxy.com
Clark, Pete J	peterjclark@chevron.com
Deliu, Dalis	Dalis.Deliu@conocophillips.com
Karimi, Ali	Ali_Karimi@oxy.com
Allen, William T	William.Allen@bp.com
Marianne Houbiers	mhou@equinor.com
Robertson, Nicholas	nicholas.robertson@uk.bp.com
Hans DREISIG	hans.dreisig@totalenergies.com
Fauzia Waluyo	fauzia.waluyo@aramco.com
Marc Willerth	Marc.Willerth@hpinc.com
Baker, David	David.Baker@conocophillips.com
Knut Ness (ADNOC Offshore - DRILLT)	kness@adnoc.ae



OWSG Mission

To promote practices that provide confidence that reported wellbore positions are within their stated uncertainty.



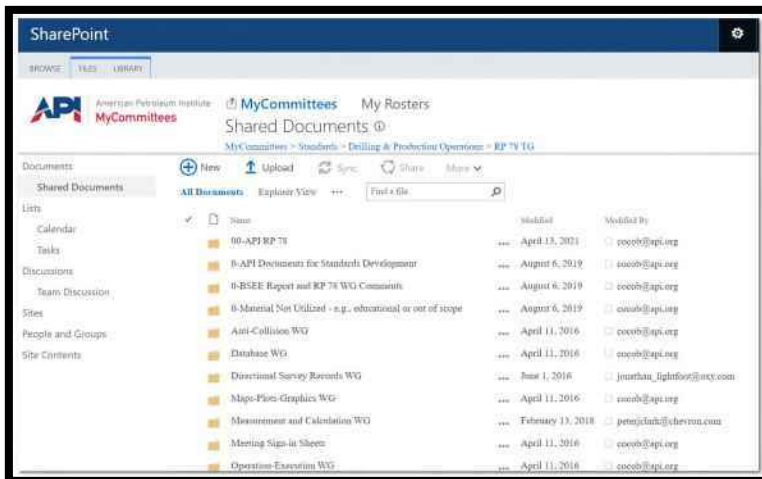
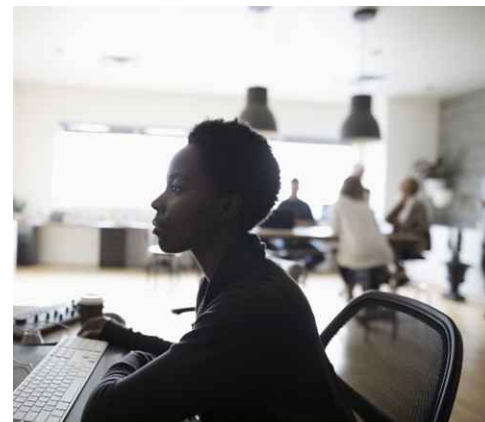
OWSG Anti-Trust

We are meeting to help develop and promote good practices in wellbore surveying necessary to support wellbore construction which enhance safety and competition.

The meeting will be conducted in compliance with all laws including the antitrust laws, both state and federal. We will not discuss prices paid to suppliers or charged to customers nor will we endorse or disparage vendors or goods or services, divide markets, or discuss with whom we will or will not do business, nor other specific commercial terms, because these are matters for each company or individual to independently evaluate and determine. We are meeting to help develop and promote good practices in wellbore surveying necessary to support wellbore construction operations which enhance safety and competition.

API RP-78

- TECHNICAL WRITER
- MASTER DRAFT BUILD & EDIT IN PROGRESS



DPOS: RP 78 TG - Wellbore Positioning

Department: Standards Development
Coordinator: Benjamin J Coco
Parent Committee: Standards Committees
Term Email: rp78tg@listserve.api.org
Start Date: 03/02/2016
End Date:
Director: Benjamin J Coco

	Member Name	Company
1.	Abe King	Shell USA, Inc.
2.	Adrian Ledroz	Gyrodatta Incorporated
3.	Alba Arroyo	Schlumberger
4.	Alexey Ruzhnikov	Schlumberger
5.	Alton Payne	Bureau of Safety and Environmental Enforcement
6.	Aniy Sentance	DigitalGlobe

cocob@api.org



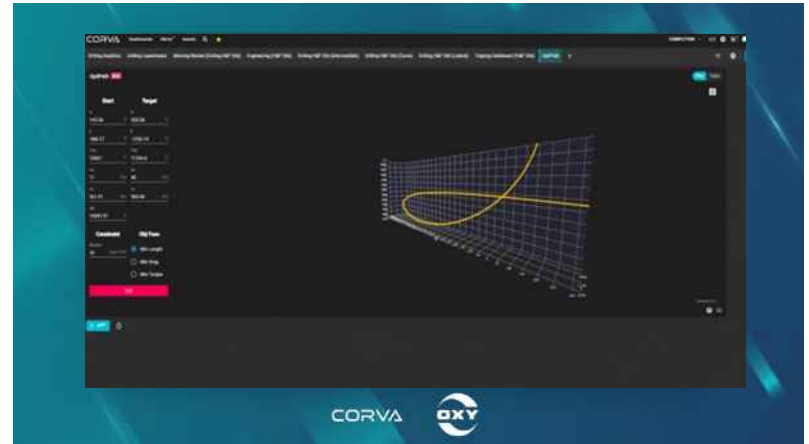
Advanced Trajectory Designs

- 3D Step-Out Horizontal Multi-Well Pad Trajectory Designs
 - Traditional 2D Curve – S-Shape above 2D Curve
 - 3D Curve: Slant above a 3D Curve
 - Optimum Align (Curve – Hold – Curve)
 - Optimum Align (Curve-Curve)
 - Optimum Align (Balanced)
 - Catenary Curves
 - Bezier Curves
 - Spline-in-Tension
 - Other Options

Guest Presentation Introduction



Best Execution – Ali Karimi



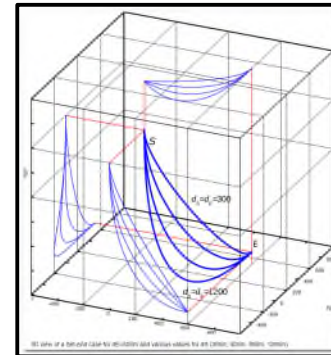
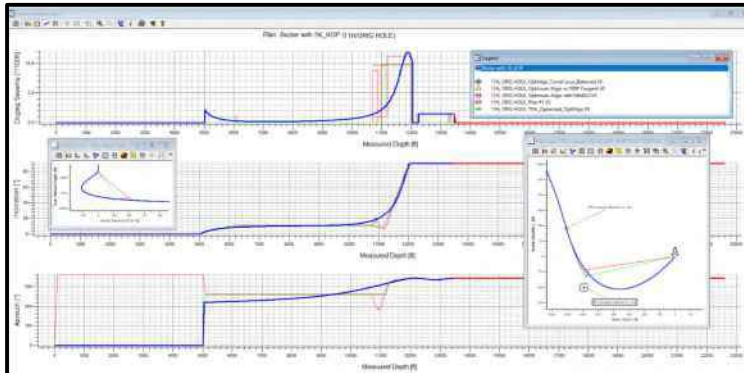
Cracking the Energy Code: Corva's 2022 Hackathon Wrap-Up

Bézier Curve

- A **Bézier curve** ([/ˈbɛz.i.ɛɪ/ BEH-zee-ay](#))^[1] is a [parametric curve](#) used in [computer graphics](#) and related fields.^[2] A set of discrete "control points" defines a smooth, continuous curve by means of a formula. Usually the curve is intended to approximate a real-world shape that otherwise has no mathematical representation or whose representation is unknown or too complicated. Bézier curve is named after [French](#) engineer [Pierre Bézier](#), who used it in the 1960s for designing curves for the bodywork of [Renault](#) cars.^[3] Other uses include the design of computer [fonts](#) and animation.^[3] Bézier curves can be combined to form a [Bézier spline](#), or generalized to higher dimensions to form [Bézier surfaces](#).^[3] The [Bézier triangle](#) is a special case of the latter.
- In [vector graphics](#), Bézier curves are used to model smooth curves that can be scaled indefinitely. "Paths", as they are commonly referred to in image manipulation programs,^[note 1] are combinations of linked Bézier curves. Paths are not bound by the limits of [rasterized](#) images and are intuitive to modify.



WIKIPEDIA
The Free Encyclopedia



Recent Publications

Designing 3D Directional Well Trajectories Using Bezier Curves

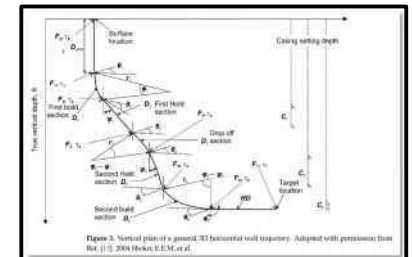
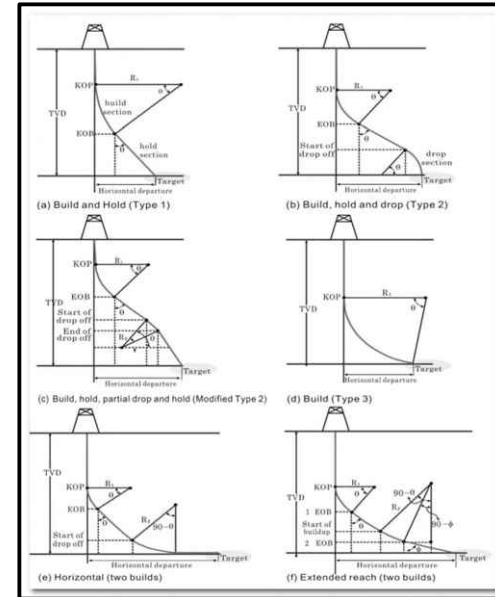
Sampaio Jr, Jorge. (2016). Designing 3D Directional Well Trajectories Using Bezier Curves. Journal of Energy Resources Technology. 139. 10.1115/1.4034810.

Method of suspender line trajectory design

Supported by the National Science and Technology Major Project (2016ZX05060-014); PetroChina Major Science and Technology. Project (ZD2019-183-005). [https://doi.org/10.1016/S1876-3804\(21\)60103-9](https://doi.org/10.1016/S1876-3804(21)60103-9) Copyright © 2021, Research Institute of Petroleum Exploration & Development, PetroChina. Publishing Services provided by Elsevier B.V. on behalf of KeAi. Communications Co., Ltd.

Multi-Objective Optimization of Drilling Trajectory Considering Buckling Risk

Jeong, J.; Lim, C.; Park, B.-C.; Bae, J.; Shin, S.-c. Multi-Objective Optimization of Drilling Trajectory Considering Buckling Risk. Appl. Sci. 2022, 12, 1829. <https://doi.org/10.3390/app12041829>





Upcoming Technical Events

- [OWSG SC Mtg. 20](#) September 27 Virtual Teams Mtg.
- [IADC/SPE APDTC&E](#) Aug 9-10 Bangkok Thailand
- [SPE ATCE 2022](#) October 3-5 George R. Brown Conv. Ctr., Houston
- [WPTS / ISCWSA #56](#) October 5/6 The Laura Hotel, Houston TX
- [OWSG SC Mtg. 21](#) November 22 Virtual Teams Mtg.
- [IADC/SPE Intl Drlg C&E](#) Mar. 7-9, 2023 Stavanger, Norway



Upcoming Industry Events

- [IADD Rig Contractor Automation](#) Aug. 25 Landry's Seafood House
- [Geothermal Rising Conference](#) August 28-31 Reno, NV
- Bridging the Gap Between Geothermal and Oil & Gas (On-Demand Webinar)
[*SPE Online Education: SPE Live: Bridging the Gap Between Geothermal and Oil & Gas*](#)
- Utah Forge: Engineering an Enhanced Geothermal System Oct. 17 SPE Webinar
[*SPE Online Education: Utah FORGE: Engineering an Enhanced Geothermal System*](#)



Geothermal Technical Section

The screenshot shows the homepage of the Geothermal Technical Section. At the top, there is a navigation bar with links for 'SPE Home', 'Contact Us', and 'Settings'. Below this is a dark header with the 'SPE International' logo and the text 'Geothermal Technical Section'. A secondary navigation bar includes 'Home', 'SPEConnect', 'About Us', 'Directory', 'Events', 'Resources', and 'Join Now', along with a search bar. The main content area begins with a 'Welcome!' heading, followed by a paragraph explaining the section's purpose. It then lists the types of energy sources and the benefits of geothermal energy. A bulleted list outlines the section's goals, such as knowledge exchange and career opportunities. At the bottom, a note states that professional members without discussion posts will see a 'no data found' message and provides a link to join.

Welcome!

The Geothermal Technical Section is for members with a common interest in geothermal energy and its potential to transform generation of electric power and direct heating and cooling across the globe.

Geothermal energy is the only "green" energy source that has the potential to provide grid baseload power at scale. It is in many ways, the closest energy source in terms of required skills to the upstream oil and gas industry.

Geothermal and the oil and gas industry have been learning from each other for decades and are currently well placed to transfer technology and practices that can accelerate the drilling and completion of geothermal wells, reduce costs and revolutionize reservoir monitoring practices.

This Technical Section seeks to:

- Collect, disseminate, and exchange technical knowledge concerning geothermal energy, and demonstrate its proximity to more traditional oil and gas disciplines.
- Introduce opportunities to grow careers and businesses by knowledge and skills transfer.
- Establish collaboration across industry and promote industry best practices

If you are a professional member and your discussion post says "no data found," you are not a member of this community yet. [Click here](#) to Join.

The image is a vertical calendar titled 'SPE GTTS 2022 EVENTS'. It features a background image of a geothermal landscape. The events are listed in colored rounded rectangles:

- Apr 14** (green): Geothermal Digital Twins SPE Webinar
- May 18** (grey): Blockchain for ESG Strategies SPE LIVE
- Jun 16** (green): Towards Autonomous Operations SPE Webinar
- Jul 13** (grey): Low Carbon Digital Twins SPE LIVE
- Sep 1** (green): Holistic Oil/Gas and Geothermal SPE Webinar
- Oct 3** (yellow): SPE ATCE Annual Conference

Department of Energy

DOE to Invest Up to \$165 Million to Advance Domestic Geothermal Energy Deployment

JULY 28, 2022

Energy.gov • DOE to Invest Up to \$165 Million to Advance Domestic Geothermal Energy Deployment

DOE to Build a Consortium of Experts to Expand Geothermal Deployment by Leveraging Knowledge, Technologies, and Skills from the Oil and Gas Industry

WASHINGTON, D.C. — The U.S. Department of Energy (DOE) today announced up to \$165 million to expand U.S. geothermal energy deployment. The Geothermal Energy from Oil and Gas Demonstrated Engineering (GEODE) initiative will provide \$10 million to form a consortium of experts to develop a roadmap for addressing technology and knowledge gaps in geothermal energy, based on best practices used within the oil and gas industry. DOE will then use that roadmap to fund up to an additional \$155 million in research to address those gaps. This funding opportunity supports President Biden's priorities to deploy clean energy sources to combat climate change, strengthen our energy independence, and create good-paying jobs.

"The U.S. has incredible, untapped geothermal potential beneath our very feet, which can be harnessed to meet our energy demands with a round-the-clock, clean renewable resource," said U.S. Secretary of Energy Jennifer M. Granholm. "Leveraging the extensive knowledge, technology, skill, and experience of the oil and gas sector is the perfect way to tackle barriers to geothermal deployment while also giving fossil-fuel-based communities and workers a role in the transition to clean energy."

An award of up to \$10 million will be used to select the entity to run the GEODE effort and create a roadmap for subsequent years' research and outreach initiatives.

Any awards beyond the first year are dependent on future Congressional appropriations.

Applications for GEODE are due by October 28, 2022. To learn more and access the full Funding Opportunity Announcement, [read DOE's summary web page](#).



Open Discussion Any other Business?

Questions?



Thank you

Questions?