ANNUAL
TECHNICAL
FORUM

October 13-14, 2025
8 a.m. to 5 p.m.

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AGENDA:
DAY 1 - ROTARY STEERABLES
DAY 2 - WELLBORE POSITIONING

Oxy Tower 1201 Lake Robbins Dr. Spring, TX 77380

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API RP78 & ISCWSA UPDATE

Jonathan Lightfoot – Oxy

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WPTS, ISCWSA, OWSG & RP78 TASK GROUP

- **Industry Steering Committee on Wellbore Survey Accuracy**
  - Produces, maintains, and publishes standards for the industry
  - Promotes a collaborative understanding of issues associated with wellbore surveying
  - Formed in 1995; 30 Years
  - SPE 67616-PA Accuracy Prediction for Directional MWD; Hugh S Williamson
  - 62 General Meetings
  - Two Key eBooks
    - Introduction to Wellbore Positioning
    - Wellbore Intercept Sub-Committee eBook
  - Online Training Course

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OWSG & RP78 - PROGRESS

- 2012 - OWSG Formed
- 2015 - SPE-178843-MS OWSG Std Survey Error Model Set
- 2016 - API DRILLING & PRODUCTION OPERATIONS (DPOS) RP 78 Task Group
- 2017 – SPE WPTS / ISCWSA QA/QC Text Reduction for Magnetic-Gyro-Depth
- 2018 – SPE Well-Collision-Avoidance Management and Principles SPE-184730-PA
- 2019 – BSEE Report on Surveying
- 2019 – SPE Well-Collision-Avoidance Separation Rule PA Paper SPE-187073-PA
- 2020 – Combined 1st Build of RP78 Document – Pete Clark (Chevron)
- 2021 – API Template Working Draft by Ben Coco (API)
- 2022 – Technical Writing & Editing
- 2023 –AADE National Technical Conference & Exhibition (NTCE) Paper
  - Introduction to API RP 78, Wellbore Surveying and Positioning (Lightfoot/Tank-Oxy & Coco-API)
- 2024 – Final Ballot Preparation
- 2025 – Ballot (Concensus)
- 2025 – Ballot Comment Resolution – (In Progress)

KEY REFERENCES

OWSG Standard Survey Tool Error Model Set for Improved Quality and Implementation in Directional Survey Management $

S. J. Grindrod; P. J. Clark; J. D. Lightfoot; N. Bergstrom; L. S. Grant

Paper presented at the IADC/SPE Drilling Conference and Exhibition, Fort Worth, Texas, USA, March 2016.
Paper Number: SPE-178843-MS

JOURNAL PAPER | NOVEMBER 20 2018

Well-Collision-Avoidance Management and Principles $

S. J. Sawaryn; H.. Wilson; W. T. Allen; P. J. Clark; I.. Mitchell; J.. Codling; A.. Sentance; B.. Poedjono; R.. Lowdon; J.. Bang; E.. Nyrnes

SPE Drill & Compl 33 (04): 335–350.
Paper Number: SPE-184730-PA

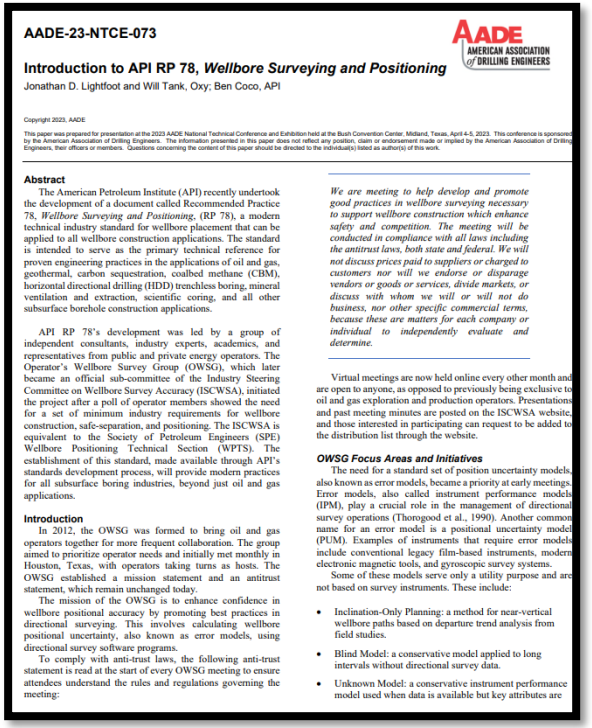
JOURNAL PAPER | MARCH 21 2019

Well-Collision-Avoidance Separation Rule $

S. J. Sawaryn; H. Wilson; J. Bang; E. Nyrnes; A. Sentance; B. Poedjono; R. Lowdon; I. Mitchell; J. Codling; P. J. Clark; W. T. Allen

SPE Drill & Compl 34 (01): 01–15.
Paper Number: SPE-187073-PA

AADE-23-NTCE-073 Introduction to API RP78, Wellbore Surveying and Positioning



AADE-23-NTCE-073

AADE AMERICAN ASSOCIATION of DRILLING ENGINEERS

Introduction to API RP 78, *Wellbore Surveying and Positioning*

Jonathan D. Lightfoot and Will Tank, Oxy; Ben Coco, API

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Abstract

The American Petroleum Institute (API) recently undertook the development of a document called Recommended Practice 78, *Wellbore Surveying and Positioning*, (RP 78), a modern technical industry standard for wellbore placement that can be applied to all wellbore construction applications. The standard is intended to serve as the primary technical reference for proven engineering practices in the applications of oil and gas, geothermal, carbon sequestration, coalbed methane (CBM), horizontal directional drilling (HDD) trenchless boring, mineral ventilation and extraction, scientific coring, and all other subsurface borehole construction applications.

API RP 78's development was led by a group of independent consultants, industry experts, academics, and representatives from public and private energy operators. The Operator's Wellbore Survey Group (OWSG), which later became an official sub-committee of the Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA), initiated the project after a poll of operator members showed the need for a set of minimum industry requirements for wellbore construction, safe-separation, and positioning. The ISCWSA is equivalent to the Society of Petroleum Engineers (SPE) Wellbore Positioning Technical Section (WPTS). The establishment of this standard, made available through API's standards development process, will provide modern practices for all subsurface boring industries, beyond just oil and gas applications.

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.

Introduction

In 2012, the OWSG was formed to bring oil and gas operators together for more frequent collaboration. The group aimed to prioritize operator needs and initially met monthly in Houston, Texas, with operators taking turns as hosts. The OWSG established a mission statement and an antitrust statement, which remain unchanged today.

The mission of the OWSG is to enhance confidence in wellbore positional accuracy by promoting best practices in directional surveying. This involves calculating wellbore positional uncertainty, also known as error models, using directional survey software programs.

To comply with anti-trust laws, the following anti-trust statement is read at the start of every OWSG meeting to ensure attendees understand the rules and regulations governing the meeting:

Virtual meetings are now held online every other month and are open to anyone, as opposed to previously being exclusive to oil and gas exploration and production operators. Presentations and past meeting minutes are posted on the ISCWSA website, and those interested in participating can request to be added to the distribution list through the website.

OWSG Focus Areas and Initiatives

The need for a standard set of position uncertainty models, also known as error models, became a priority at early meetings. Error models, also called instrument performance models (IPM), play a crucial role in the management of directional survey operations (Thorogood et al., 1990). Another common name for an error model is a positional uncertainty model (PUM). Examples of instruments that require error models include conventional legacy film-based instruments, modern electronic magnetic tools, and gyroscopic survey systems.

Some of these models serve only a utility purpose and are not based on survey instruments. These include:

- Inclination-Only Planning: a method for near-vertical wellbore paths based on departure trend analysis from field studies.
- Blind Model: a conservative model applied to long intervals without directional survey data.
- Unknown Model: a conservative instrument performance model used when data is available but key attributes are

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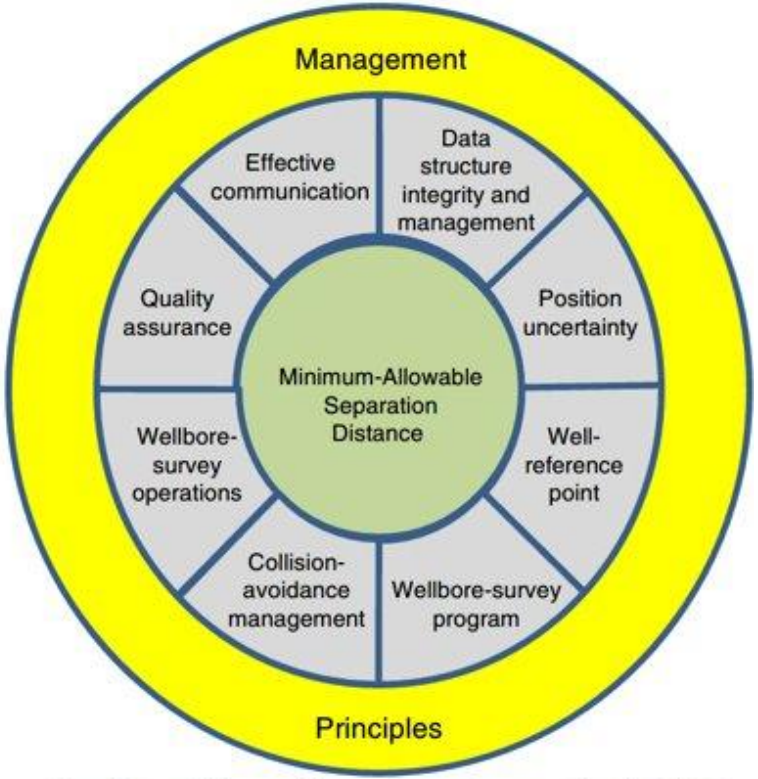
MASD – MANAGEMENT PRINCIPLES



The eight collision-avoidance elements supporting the MASD

- Minimum Allowable Separation Distance (MASD)
- Maintain a Safe Separation Distance Between Wells Being Drilled and Subsurface Hazards
- 8 Core MASD Elements

SAFE SEPARATION

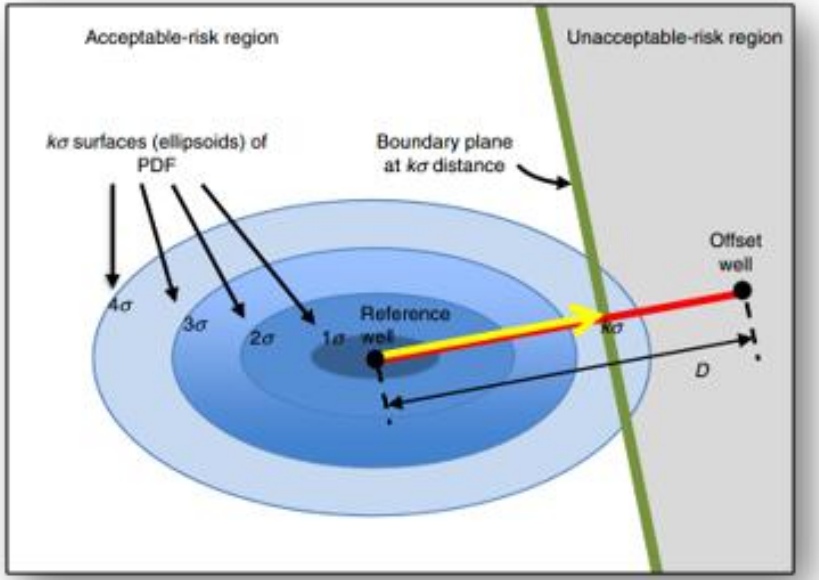
The Wellbore Positioning Technical Section (WPTS) Rule

Separation Factor = Ratio of Separation Distance and Uncertainty

Numerator / **Denominator** = **Distance** / **Uncertainty**

$$SF = \frac{D - R_r - R_o - S_m}{k\sqrt{\sigma_s^2 + \sigma_{pa}^2}}$$

$$\sqrt{\sigma_r^2 + \sigma_o^2} \qquad k\sqrt{\sigma_s^2 + \sigma_{pa}^2}$$



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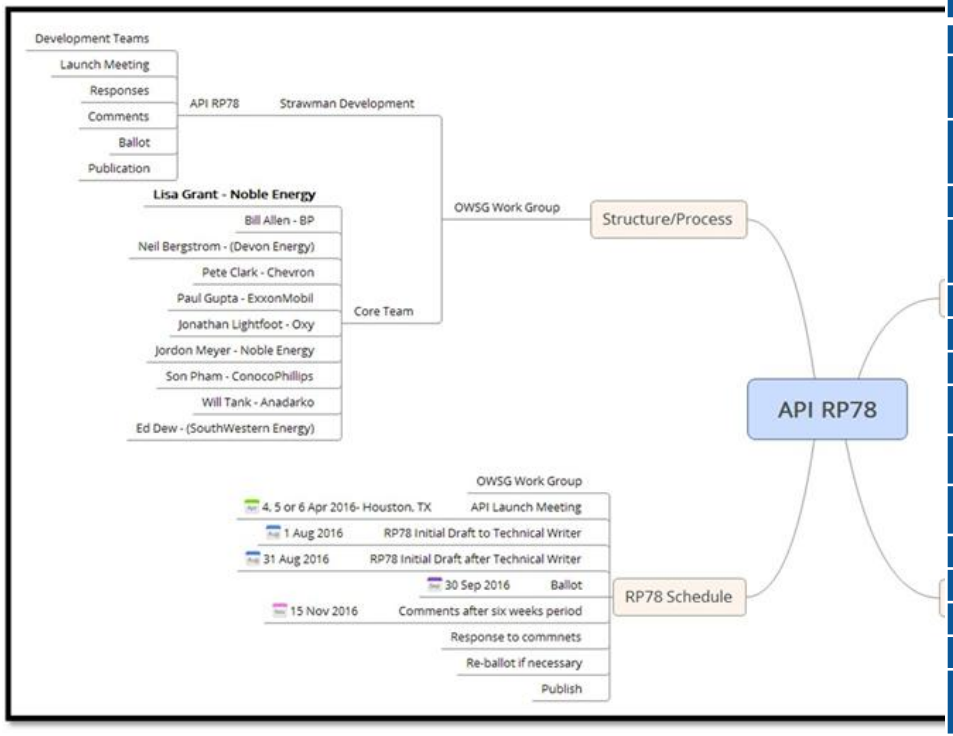
API RP78 – MIND MAP



Section	Leader	Technical
Anti-Collision	Steven Sawaryn	Pete Clark
Database	Jordon Meyer / Mary Malihpour	Maria French
Directional Survey Records	Jonathan Lightfoot	Michael Long
Glossary	Son Pham	Maria French
Maps, Plots and Visualization	William Allen	Kevin McClard
Operation / Execution	Ed Dew	Benny Poedjono
Planning / Engineering	Pete Clark	Julie Cruse
Purpose and Scope	Ben Coco	Jonathan Lightfoot
QA/QC Depth	Roger Goobie	Harold Bolt
QA/QC Gyro	Roger Goobie	Adrian Ledroz
QA/QC Magnetic	Roger Goobie	Andy Brooks
Software	Bill Allen	Stuart Sargent
Survey Mathematics	Pete Clark	Chad Hanak
Survey Program	Lisa Grant	Ross Lowdon
Transition / Handover	Will Tank	Benny Poedjono
Well Origin / Surface Location	Bert Kampes	John Connor

API RP78 BALLOT UPDATE

API Ballot Summary Sheet

Ballot: BALLOT: RP 78 Wellbore Surveying and Positioning **Ballot ID:** 6610

Start Date: 2/13/2025 **Closing Date:** 3/27/2025 **Associate:** Jose Godoy

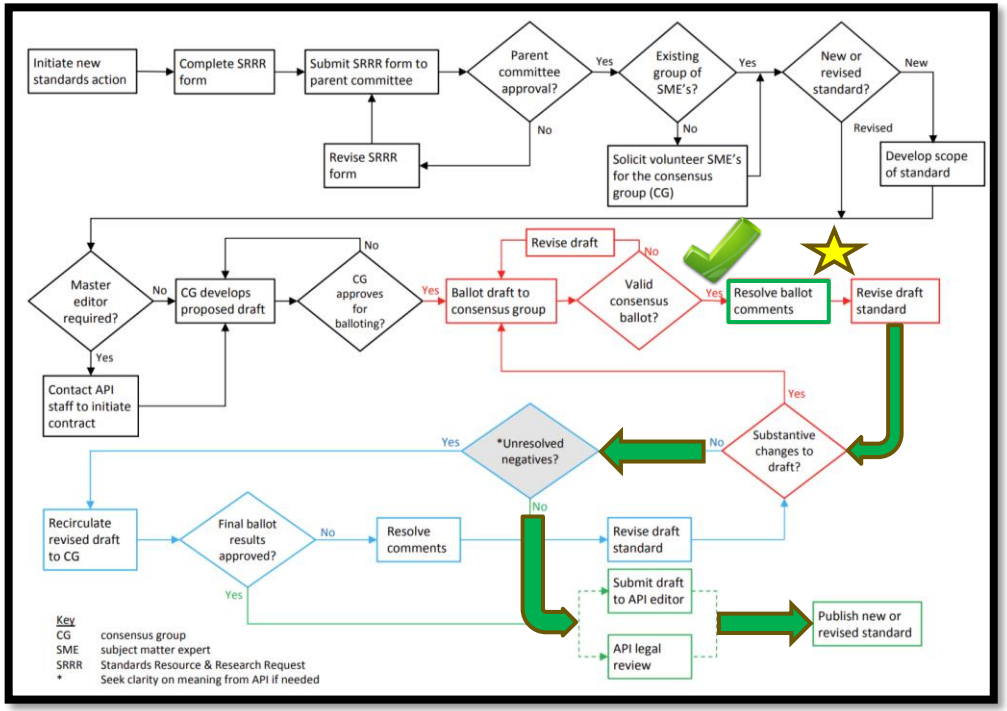
Coordinator: Jose Godoy

Proposal Review and comment on the first ballot for RP 78

Affirmative	Negative	Abstain	Did Not Vote
20	2	0	20

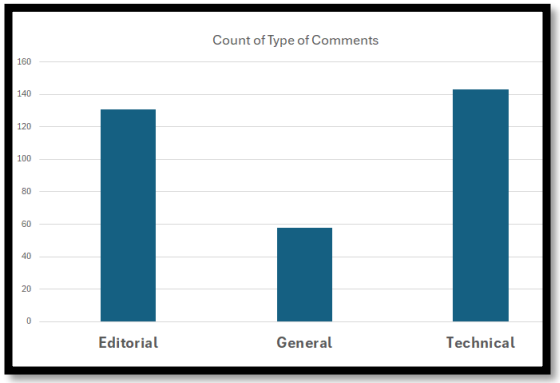
Total Responses:	**22**	
Total Ballots:	**42**	
Response Rate= ((Affirmative + Negative + Abstain) / Total Ballots):	**52.38%**	Must be > 50%
Approval Rate = (Affirmative / [Affirmative + Negative]):	**90.91%**	Must be >= 66.67%
Consensus:	**YES**	

API RP78 BALLOT UPDATE



Final Steps for the Comment Task Group

- Address Ballot Comments (332)
- Finalize the Ballot Draft Copy
- Final Version Review Task Group
- API Legal / Editor Final Prep
- Publish
- Establish Maintenance Workgroup



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