



Managing Drilling Hazards: Geo-Drilling Events Database

Exploration Day 23.11.2017

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ebn

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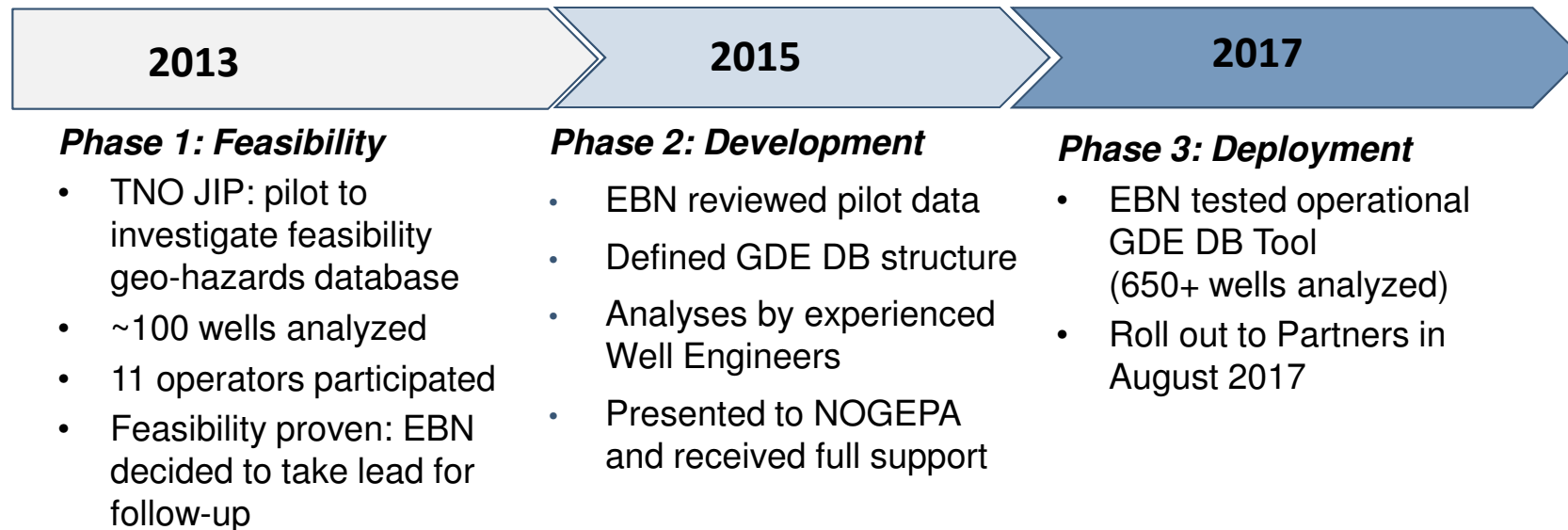
- Background
- Project Scope
- Database in a nutshell
- Tool Demo (Aalderik Baud)
- Questions

Background

Why are we doing this?

- Improving **well safety** and **well cost** related to Geological Drilling hazards: reducing NPT
- Providing a better understanding of geological drilling hazards in NL
- Learning from past geological incidents encountered by all operators by sharing information
- Using offset well data efficiently to optimize well design

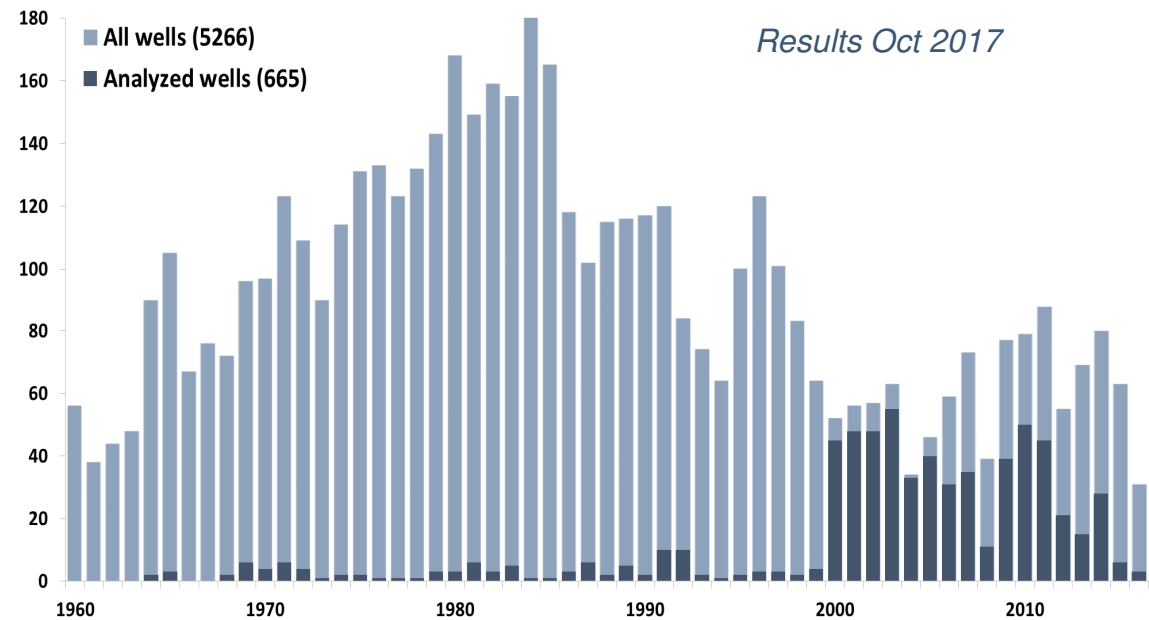
GDE DB* Project background



*: Geo Drilling Events DataBase

Resources & Results

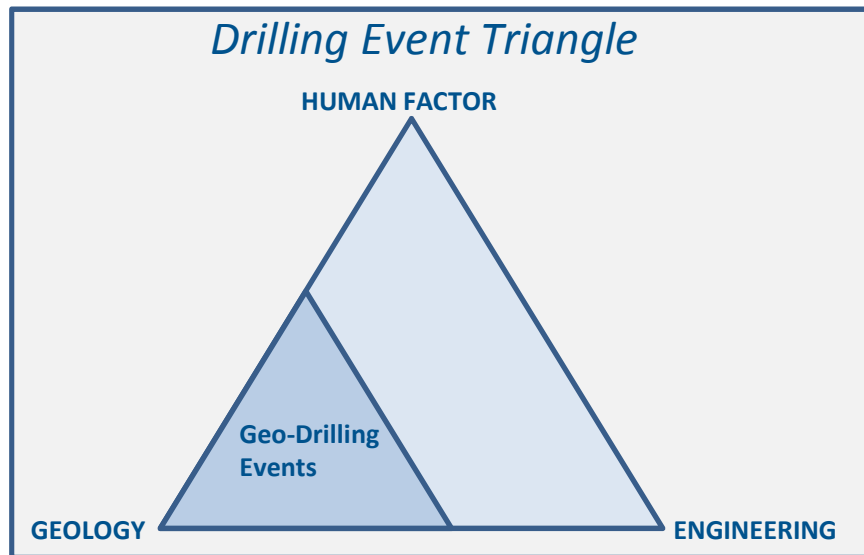
- Building on 2013 JIP learnings (NOGEPA, EBN, TNO)
- Analyzed by Experienced Well Engineers
- Public data NLOG (well reports, DDRs, etc.)
- EBN data (for wells <5 yrs)
- Data available via EBN hosted Spotfire project (secure environment)



[illegible]

1. Generic well data
2. Geo-Drilling Events (*facts*)
3. Geo-Drilling Hazards (*interpretations*)
4. Reference

What Drilling Events are captured?



Drilling Events can have one -or more- causes!

- *Geo-Drilling Events have a significant geological component in the cause.*
- *„ „ require geoscientists for understanding.*
- *„ „ can often be avoided by doing geological homework.*

Results To Date*

- Number of wells analyzed
- Number of boreholes analyzed
- Wells with Geo-Events
- Number of Geo-Events
- Wells with Insufficient data

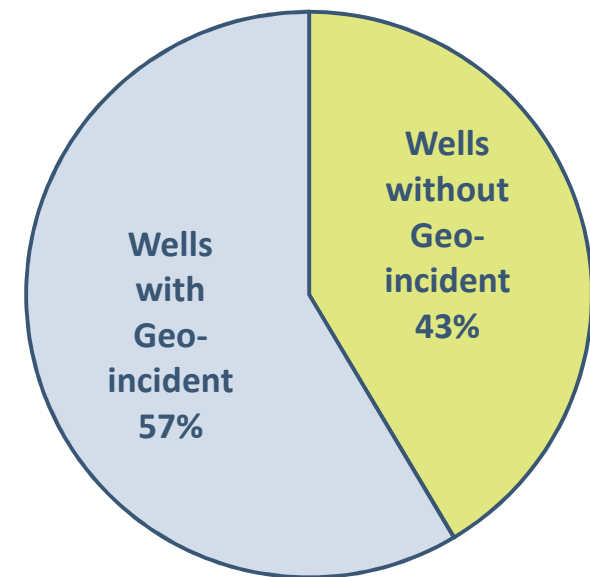
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944

378

663

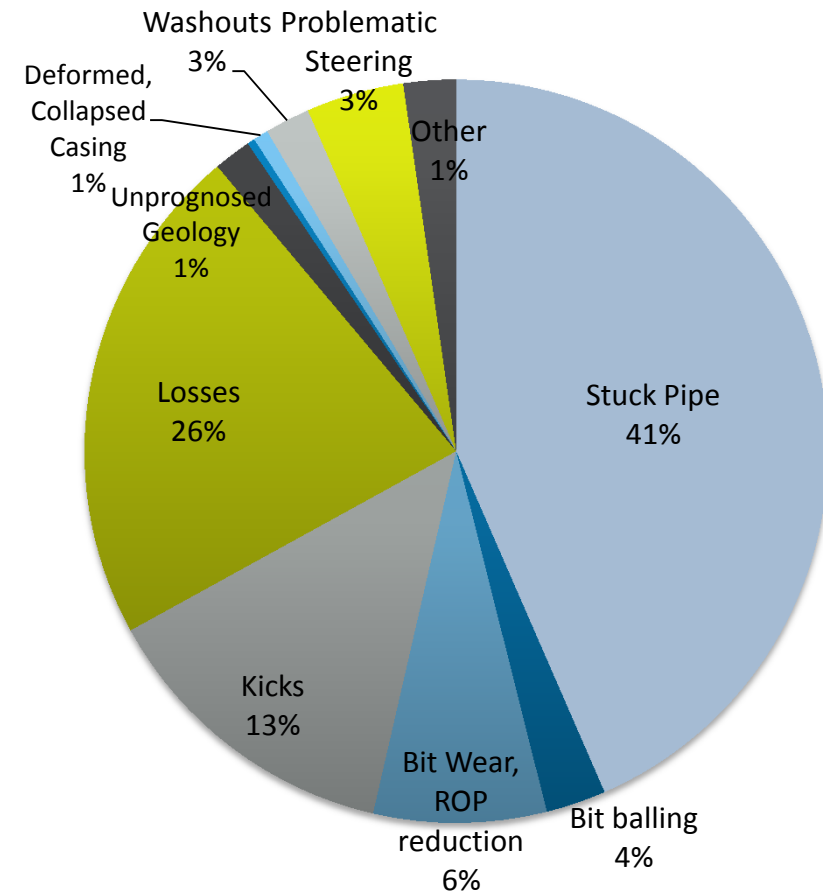
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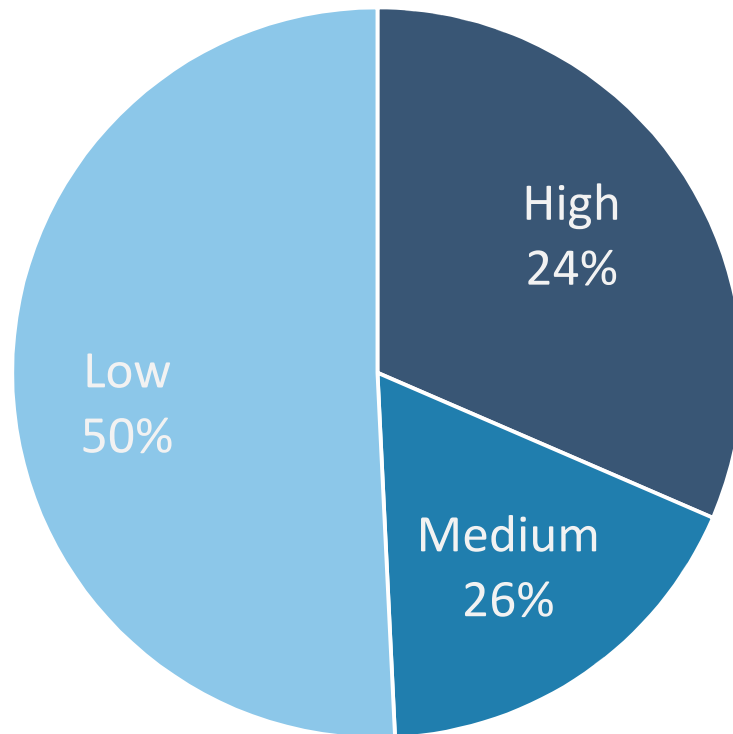
*statistics as per nov 2017

Geo-Drilling Events

1	Stuck pipe (incl Overpull, Torque)	272
2	Bit balling	27
3	Bit Wear, ROP reduction	39
4	Kicks	87
5	Losses	172
6	Unexpected Geology	8
7	HC (unexpected)	2
8	H2S (unexpected)	5
9	Deformed, Collapsed Casing	6
10	Washouts	17
11	Problematic Steering	20
12	Other	8



Geo-Drilling Events: severity*

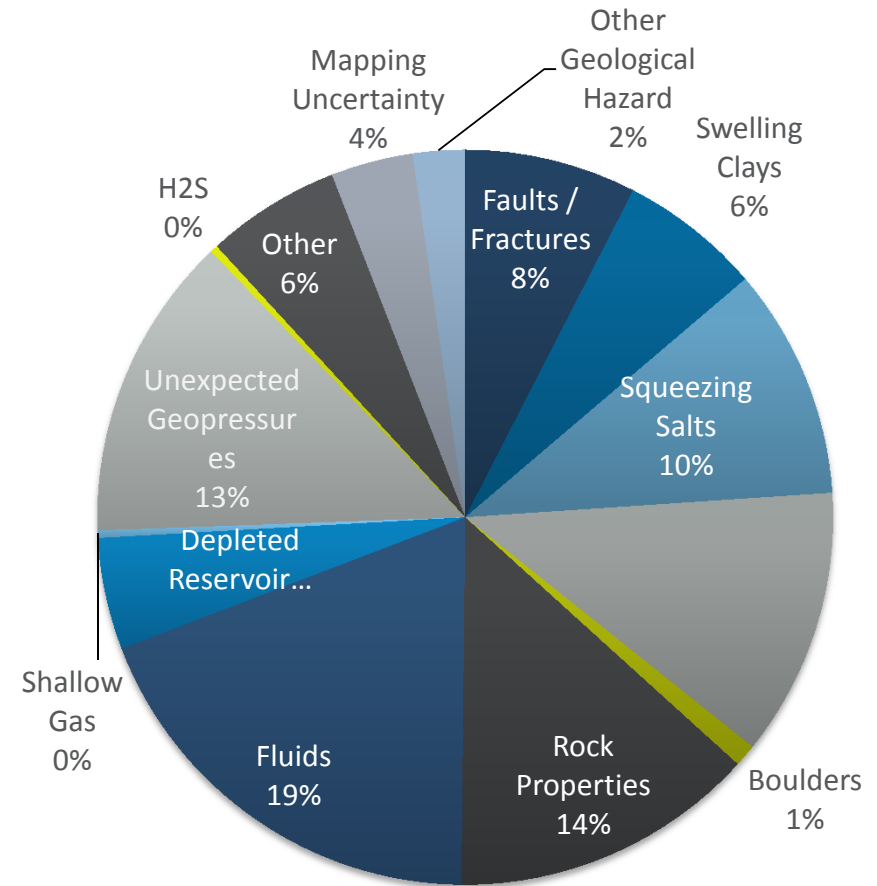


Severity of incident:
Semi-quantitative classification
based on NPT and (potential) impact.

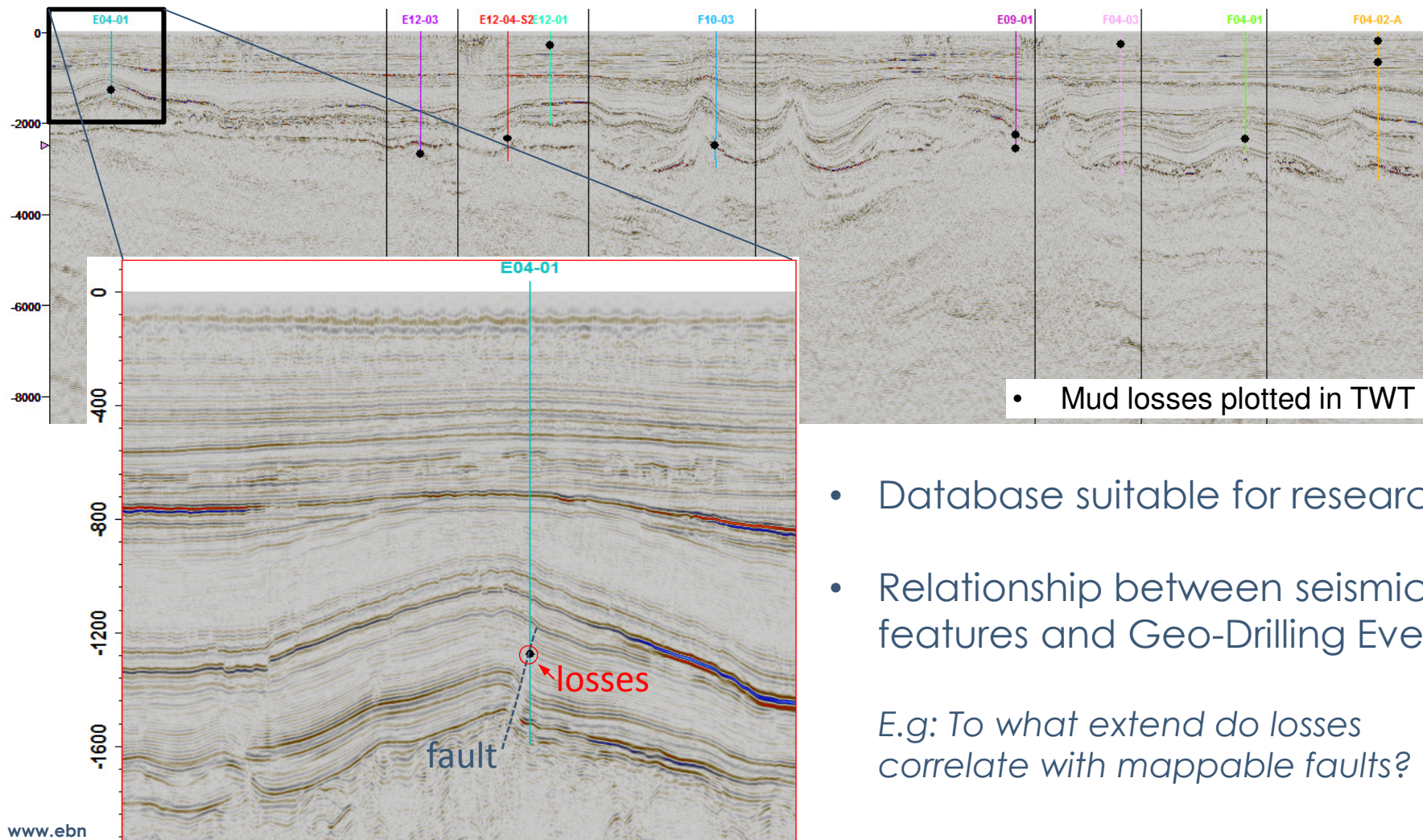
*statistics as per nov 2017

Geo-Drilling Hazards

Rocks		462
F	Faults / Fractures	55
C	Swelling Clays	153
S	Squeezing Salts	75
W	Weak Formations	102
B	Boulders	4
R	Rock Properties	73
Fluids		110
D	Depleted Reservoir	18
E	Shallow Gas	4
G	Unexpected Geopressures	84
H	H2S	4
Other		91
M	Mapping Uncertainty	15
Z	Other Geological Hazard	76



Demo GDE DB Tool





GDE DB Tool access: www.ebn.nl/partners

Questions?

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