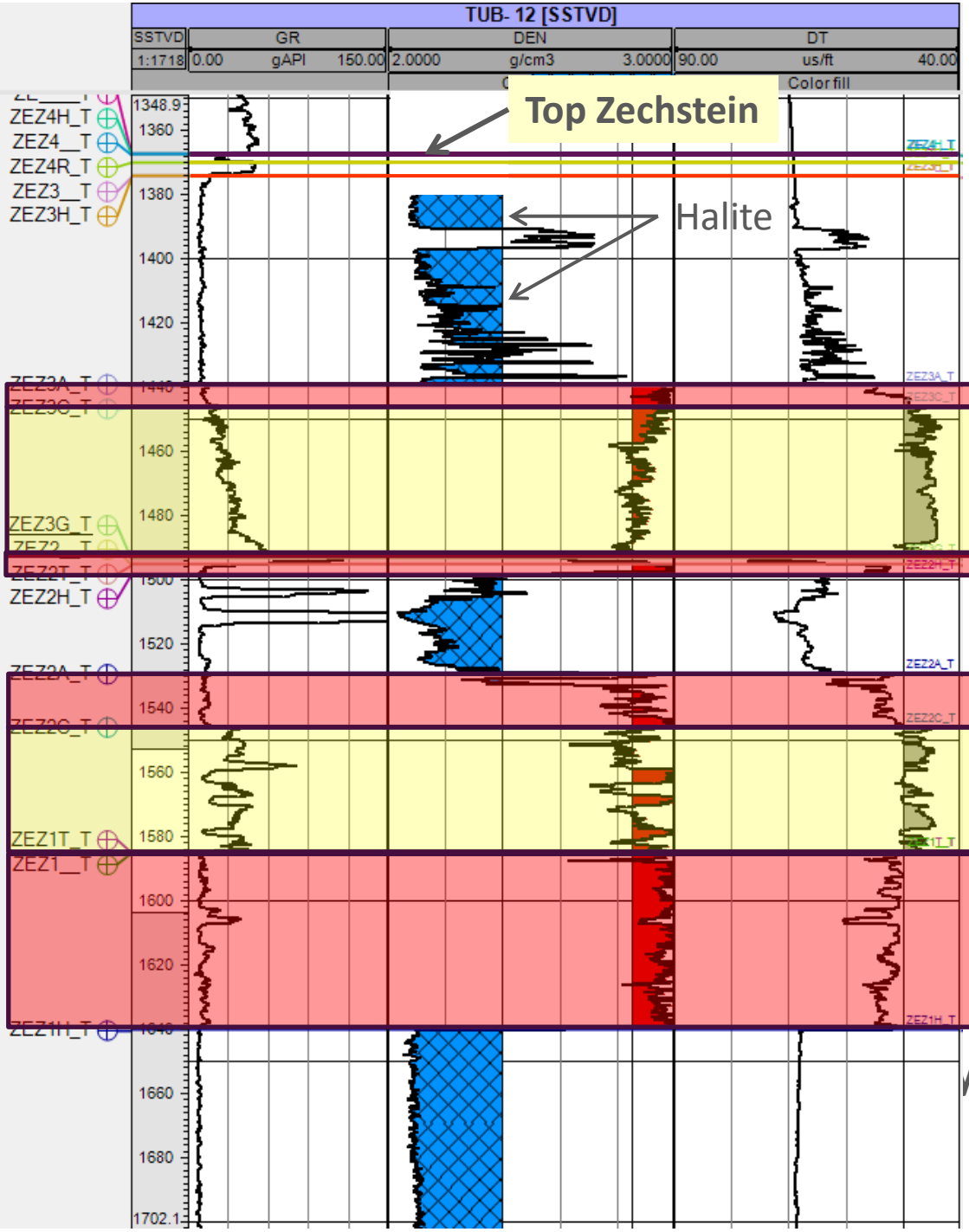


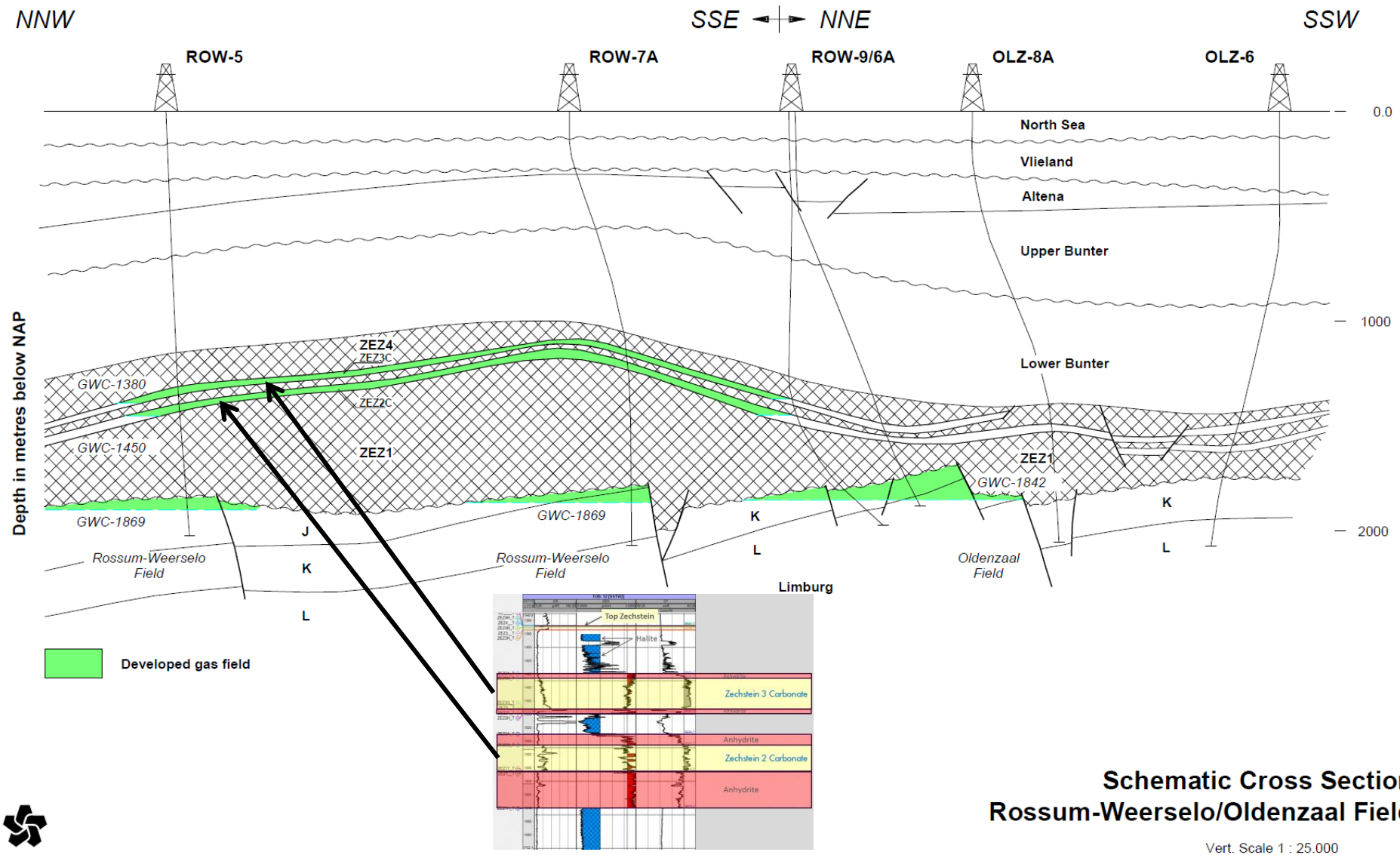
Lithology build-up and layering Zechstein 2/3/4 cycles.

Note the constant thickness of this sequence in Tubbergen and Rossum-Weerselo. Only the thickness of the Z1 Halite (bottom of the display) varies drastically

ype Log Zechstein Tubbergen Well TUB-12

Cop

Restricted



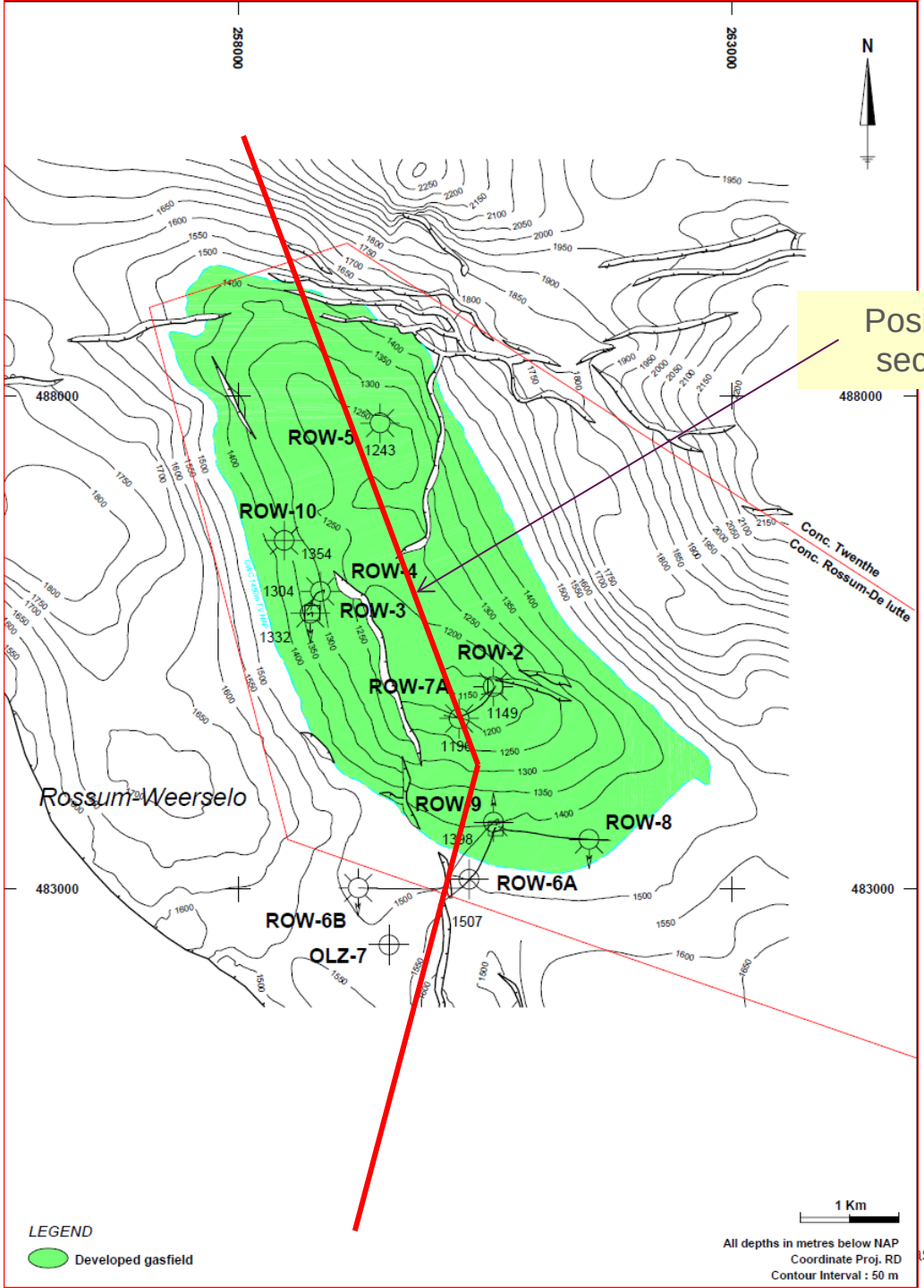
Schematic Cross Section Rossum-Weerselo/Oldenzaal Field

Vert. Scale 1 : 25.000

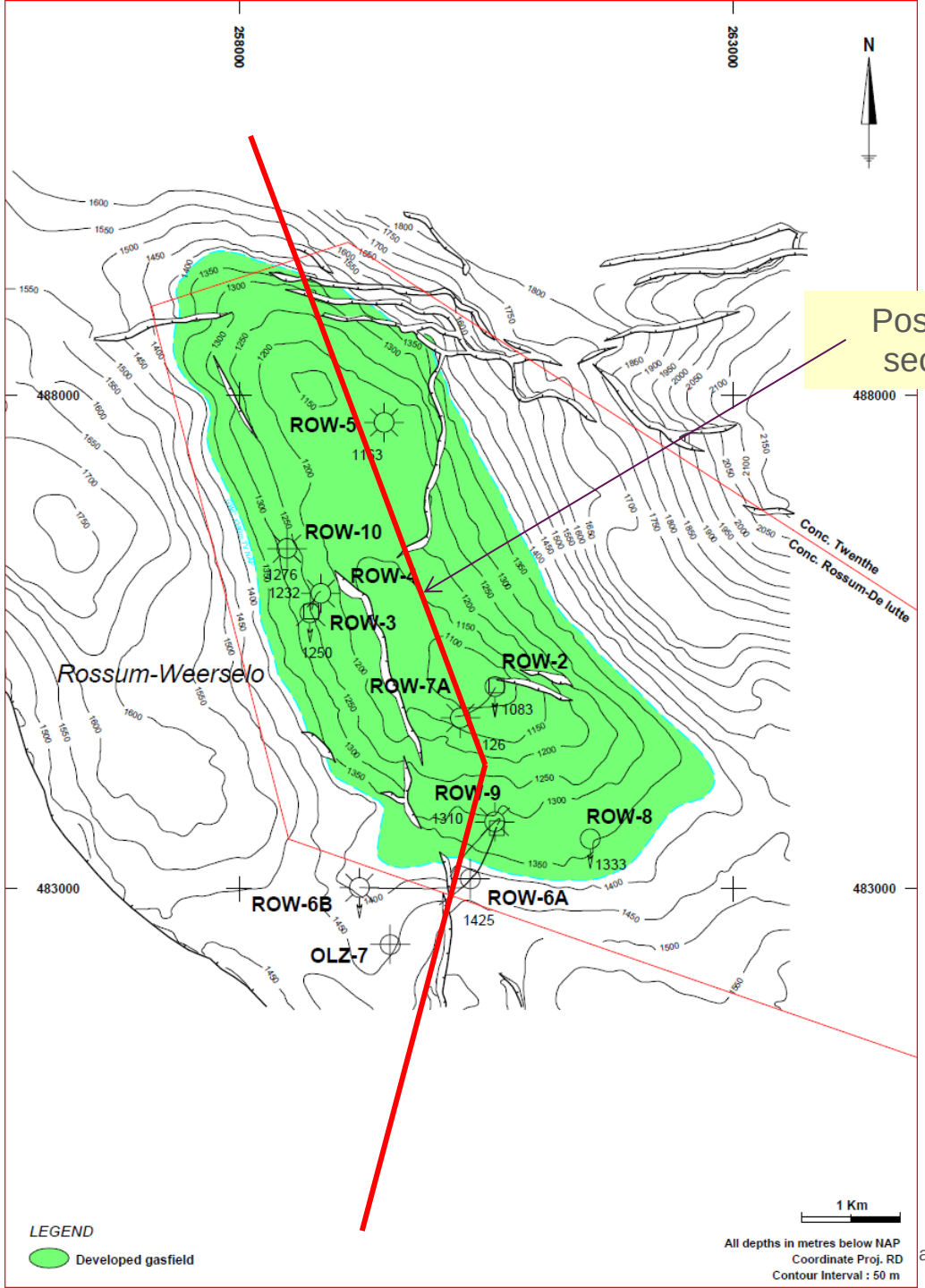
0 2000 m.

NAM

ARPR Draw. nr.: EP200811233554004



Rossum-Weerselo Structure Contour Map Top Zechstein 2 Carbonate



Position of cross-section (slide 2)

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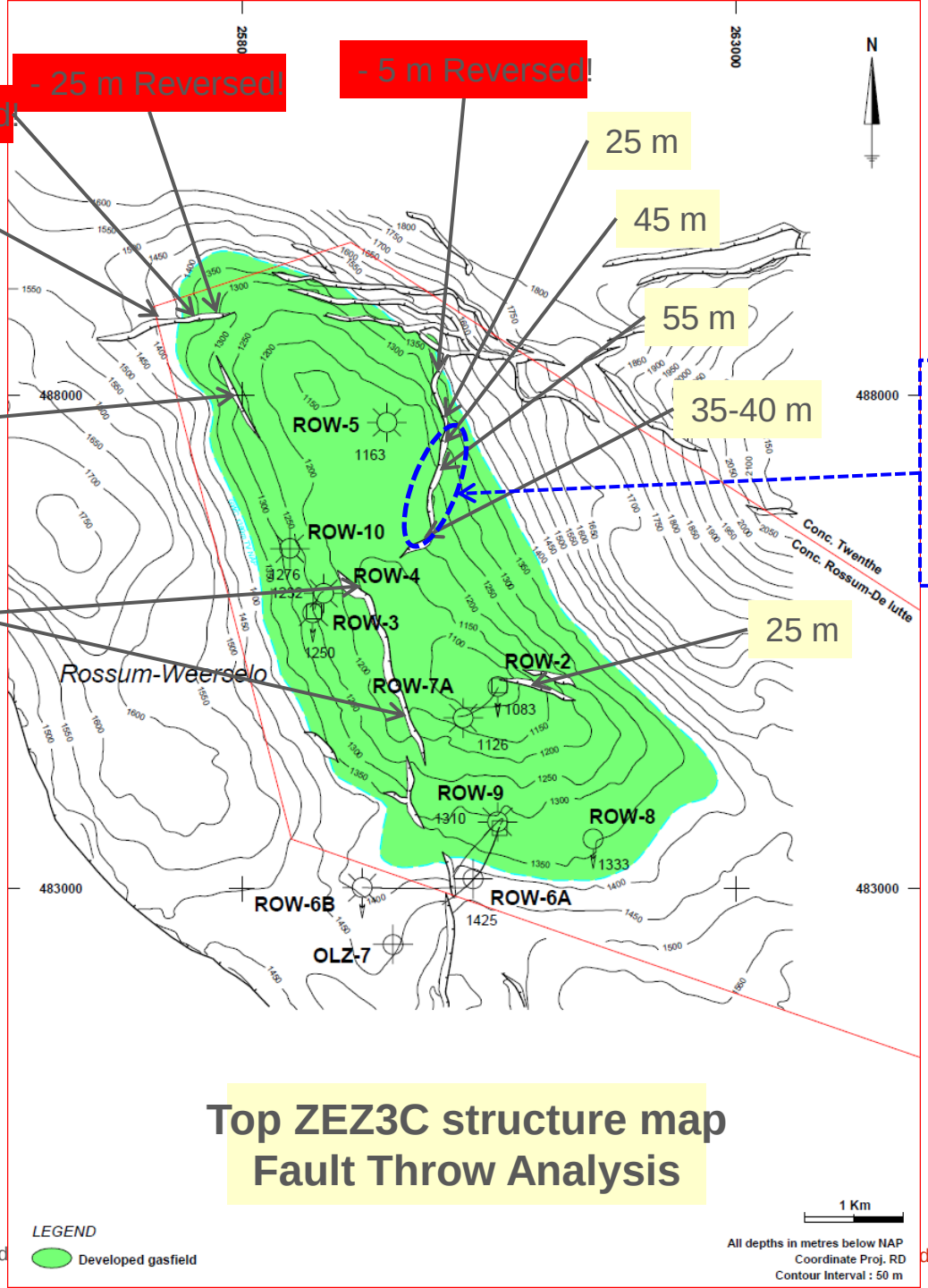
Rossum-Weerselo Structure Contour Map Top Zechstein 3 Carbonate



Top ZEZ3C structure map
Fault Throw Analysis

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Explanations to the illustrations:

Slide 1: Type log (TVD Display) of the Zechstein 2 and 3 reservoir sequence, with detailed layering and lithology indications. The type-log is from the Tubbergen field, and is well representable for the Rossum-Weerselo field

Slide 2: Schematic cross section through the Rossum-Weerselo field. The scale does not permit the representation of the lithological detail, therefore the little inset with the type log of slide 1 has been added. It should be noted that all the indicated layers in slide 1 are well correlatable and seen in all wells penetrating the Zechstein in both Rossum-Weerselo and adjacent Tubbergen field, and therefore, the inset in slide 2 represents the layering.

Slide 3: Top structure contour map of the Zechstein 2 Carbonate reservoir with the position of the section (slide 2), as well as the correct well positions, indicated.

Slide 4: Top structure contour map of the Zechstein 3 Carbonate reservoir with the position of the section (slide 2), as well as the correct well positions, indicated. Slide 5 shows the juxtaposition analysis

Discussion on the quoted pressure communication between Zechstein 2 and 3 carbonate reservoirs:

In several internal NAM documents, a communicationbetween these reservoirs is postulated and based on “reservoir performance”. It appears that these quotes are based on earlier quotes, and no direct evidence could be found. It appears that at least 3 wells produced co-mingeled from both reservoirs, and one well experienced a THP increase, after the Z3 reservoir was perforated, whilst z2 was already producing.
The only possible contact between the two reservoirs would be via fault juxtaposition, with a fault throw definitely larger than 38m, as this is the average distance betwee the top of the Z2 reservoir and the base of the Z3 reservoir. As such, the faults are recognisable on seismic, and hence are shown on the maps (hence no small scale, invisible faults can be made responsible for such a contact
Finally, given that the reservoirs and their surrounding anhydrite layers, are on their tops and bases surrounded by salts (see slide 1) it is expected that salt will almost immediately into the fault planes and provide a seal to pressure communication and flow. We have evidence from cores, which demonstrates this happening (see next slide).
From the lacking evidence of Z2-Z3 reservoir communication, in combination with the strong likelihood of salt flow into the fault planes, we believe that a Z2-Z3 reservoir communication is not existing on a geological time scale and that, should there be any communication, that this is the result from co-mingeled production and cross-flow, and hence a man-made phenomenon.

Slide 7: Salt (Halite) filled fracture from the well Tubbergen-7.

Tubbergen-7, 1490.8m AH ZEZ2A. Halite filled fracture in Anhydrite.

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