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Whitten Ranch Sinkhole

Case Study: Evaporites and out of formation waters and their potential for sinkhole development

NYSE: DVN
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Oil Conservation Division
Case No
Exhibit No 6

Whitten Ranch Sinkhole

Reference Map

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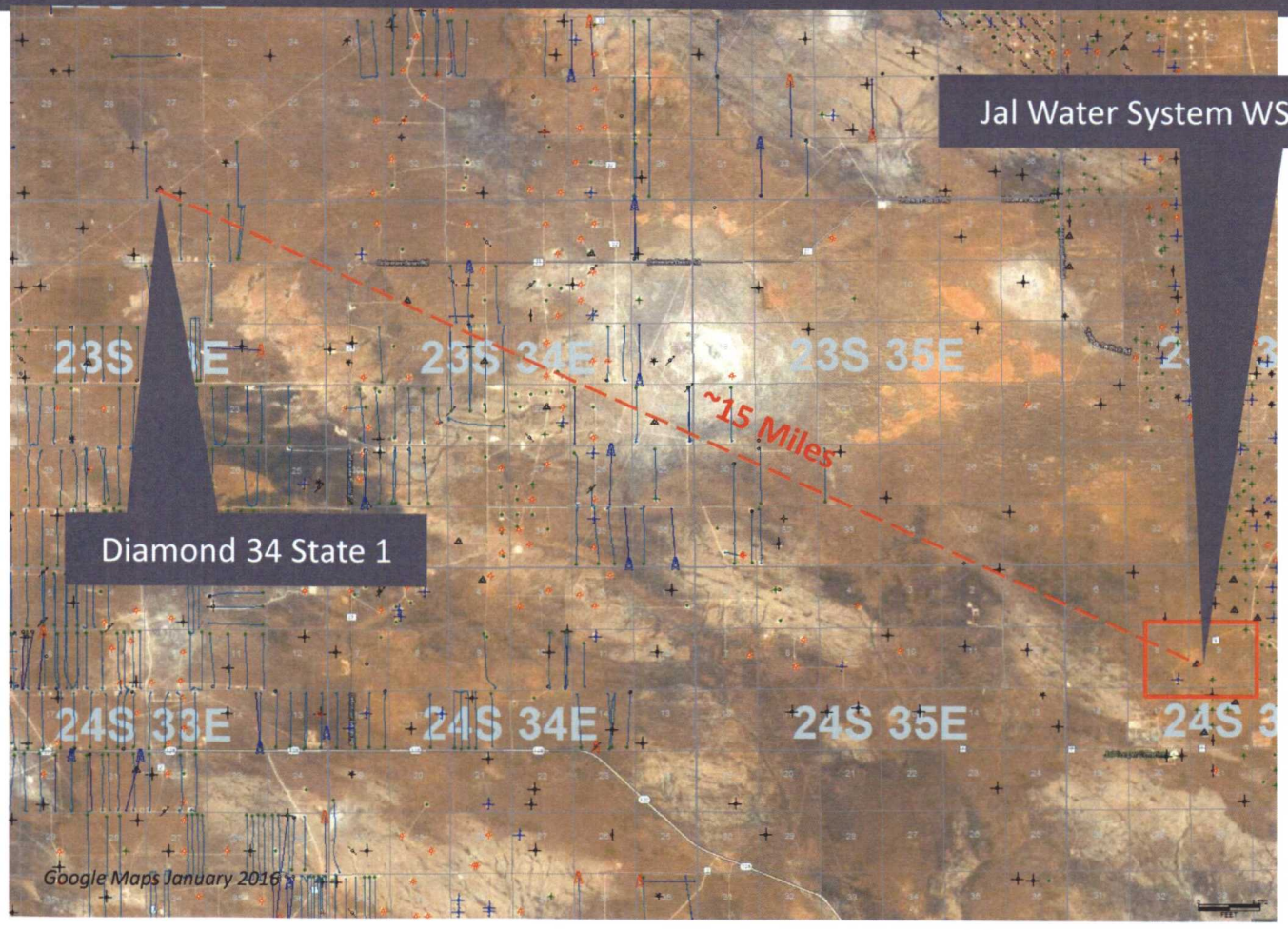

Whitten Ranch Sinkhole
Satellite Imagery

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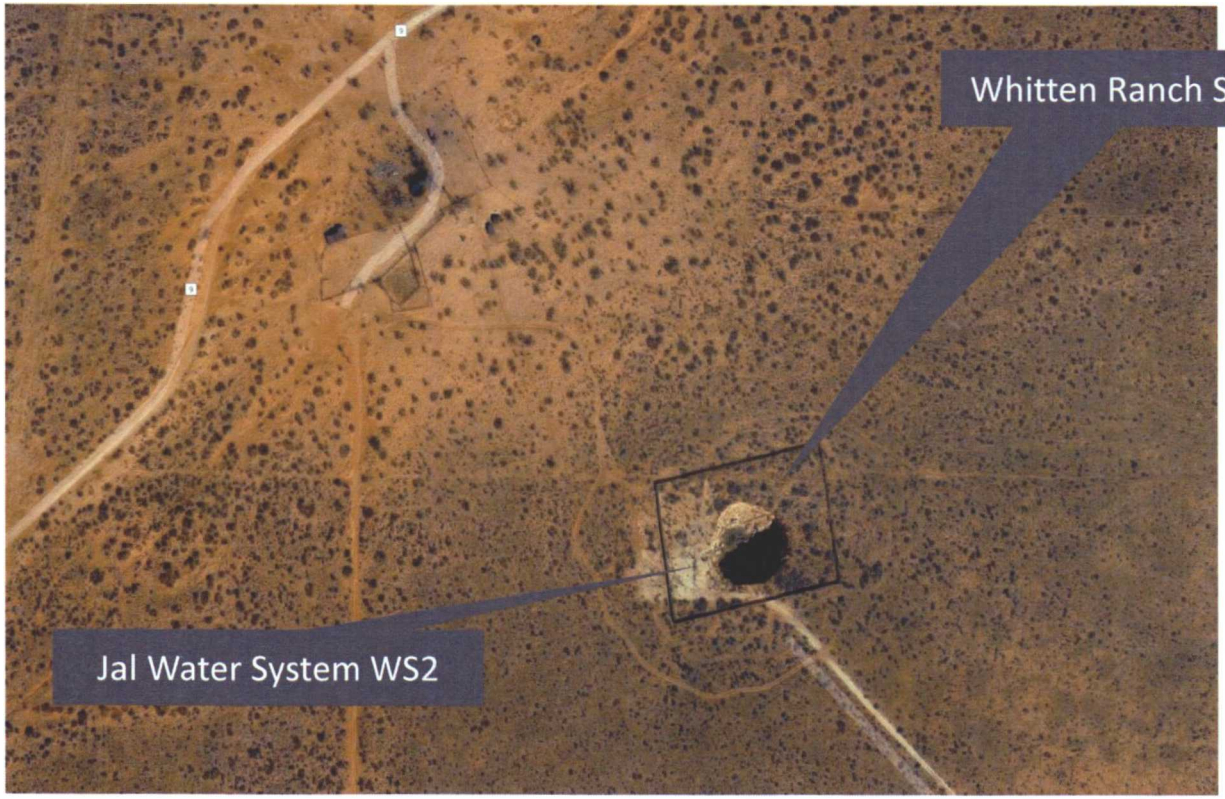
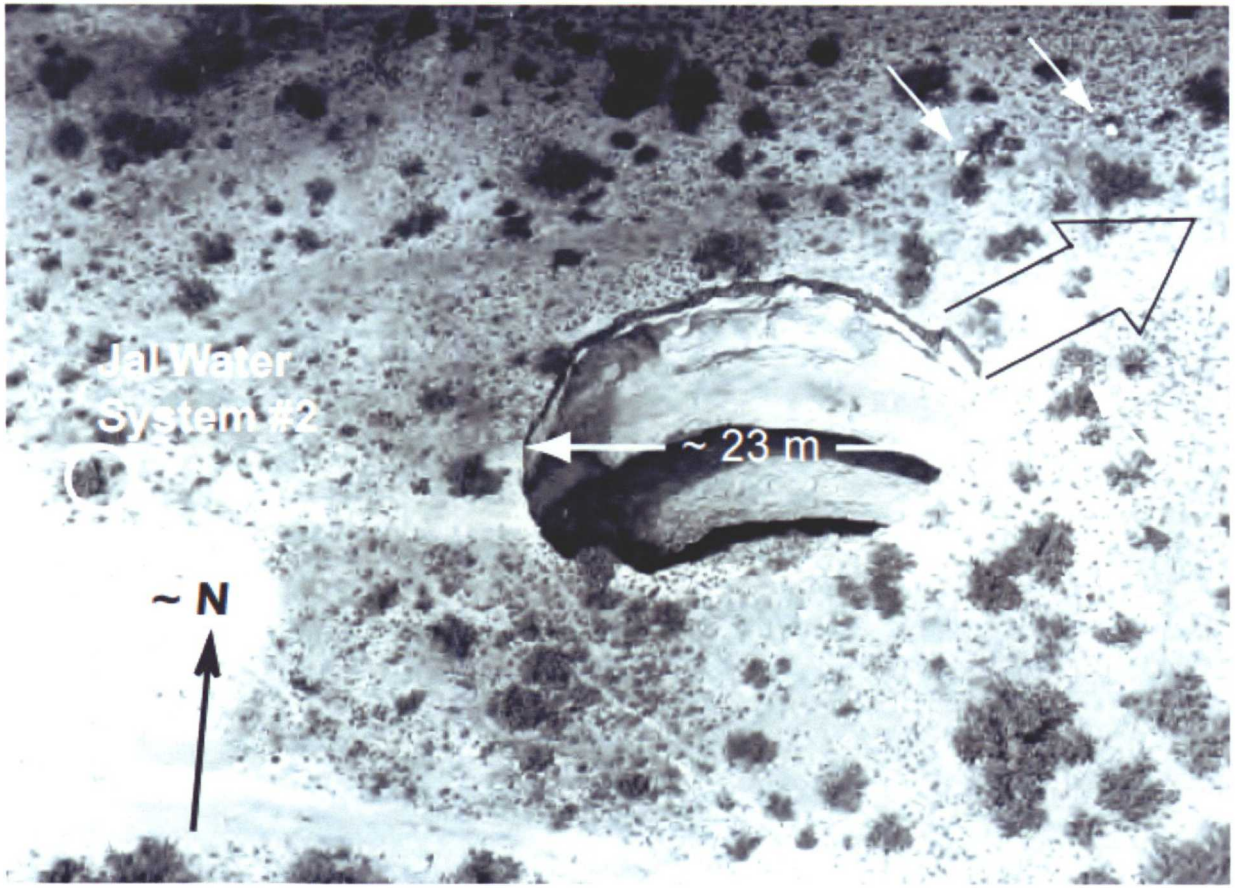


Google Maps January 2016

Lea County
NM
32.230172, -103.276206

Whitten Ranch Sinkhole

Oblique aerial photograph



http://www.wipp.energy.gov/information_repository/cra/CRA-2014/References/Others/Powers_2000_Evaporites_Casing_Requirements_Water_Floods.pdf

Whitten Ranch Sinkhole

Interpretation of Formation

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- Sinkhole formed in a catastrophic collapse in late 1998
- Sinkhole developed above deeper Ochoan evaporite sequence
- Locally modest casing requirements through the evaporites and water-flood operations with out-of-formation waters increase risk of karstification
- Jal #2 water system #2, drilled in 1967 and had a series of collapsed casing issues throughout its life which could have provided a conduit for shallow or deep water reservoirs to transport to the evaporites and result in dissolution of the
- Natural origin cannot be ruled out, but circumstantial evidence favors faulty wellbores as a significant causal agent for water migration

Evaporites Casing Requirements Water floods and Out of formation Waters Potential for Sinkhole Developments Dennis Powers
http //www wipp energy gov/information_repository/cra/CRA 2014/References/Others/Powers_2000_Evaporites_Casing_Requirements_Water_Floods pdf