

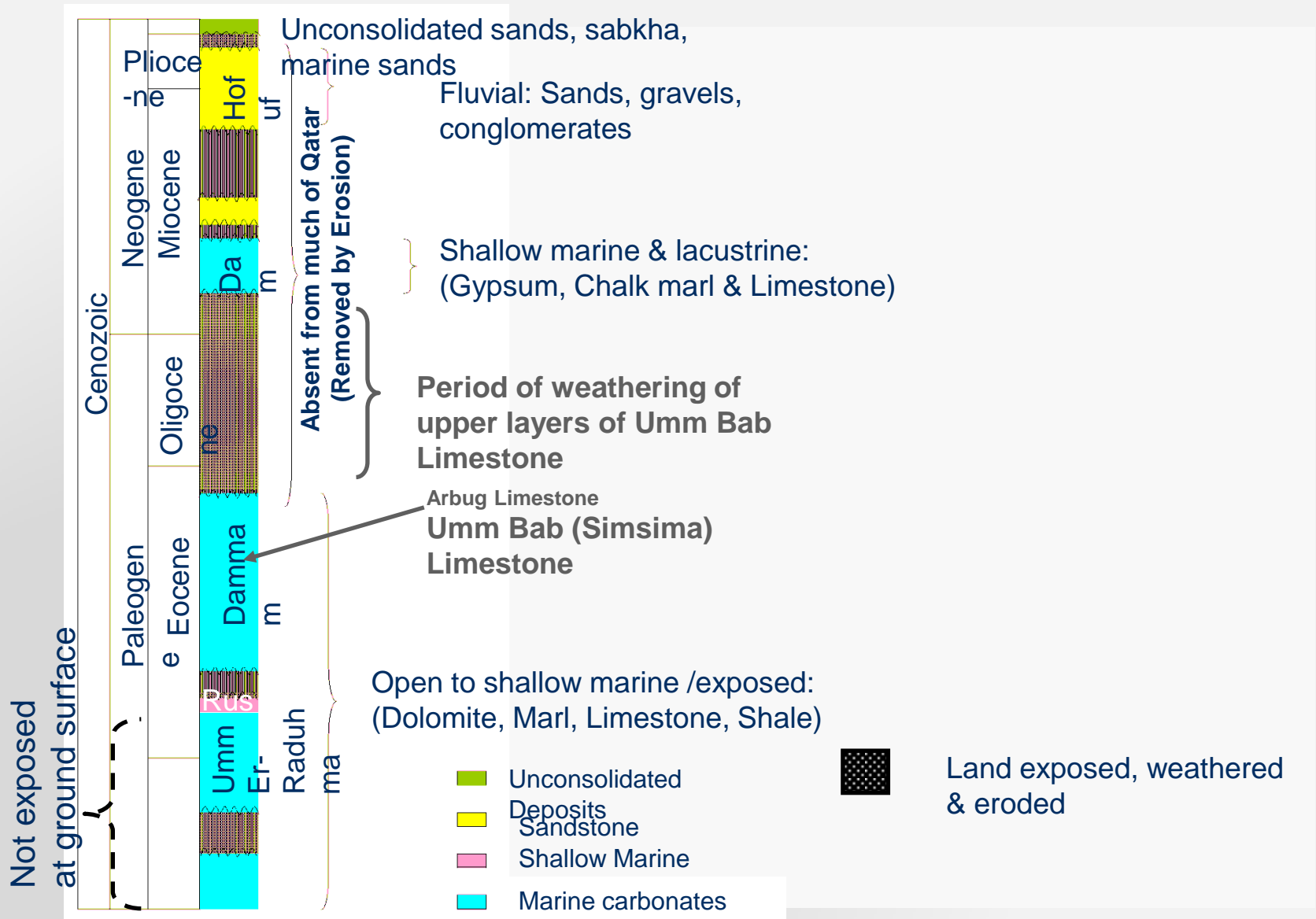
Variations in the Rus Formation

The Need for Consistent Core Logging

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Halcrow / CH2M Hill

7 Nov 2012- TIME



After Sharland et al 2004 & Sadique & Nasir 2002

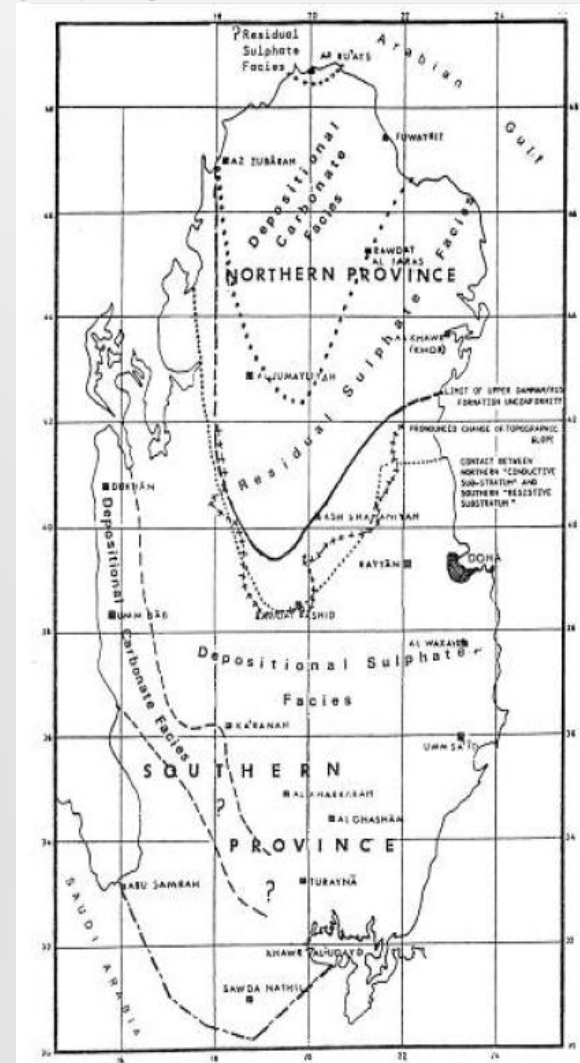
Stratigraphic Sequence



Rus Formation

Doha and environs falls within the depositional sulphate Facies

Deposition of gypsum and anhydrite deposits



Rus Fm in Literature

Described as having three main facies:

1. Chalky Limestone interbedded with Claystone
2. Limestone with some gypsum and clayey layers
3. Massive crystalline gypsum

Rus Formation – in core samples

Three Main Facies (not including Khor Limestone)

1. Weak Limestone with calcisiltite, marl and chalk in thin horizontal beds



Rus Formation – in core samples

2. Rus Clay Facies – very weak to stiff/soft silt and siltstone / claystone – generally very poor recovery.



Rus Formation – in core samples

2. Rus Clay Facies -(continued)



Rus Formation – in core samples

3. Crystalline Gypsum – generally massive, strong, sometimes with interbeds of limestone and/or calcisiltite





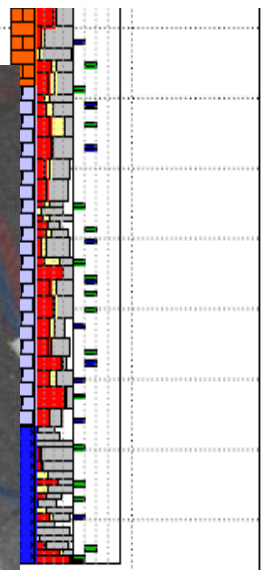
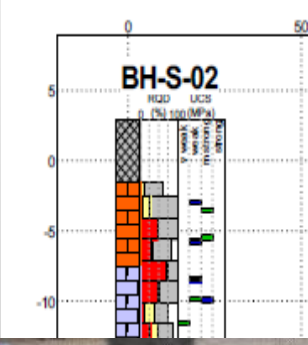


Relationship between Rus Clay and Rus Gypsum

Different areas of Doha have different Stratigraphy - sometimes the difference is between boreholes in same exploration area.



Inter



Standardization in Logging of Rus

The use of standard logging as per BS5930:1999+A2:2010 does not provide enough detail on the variation in the stratigraphy.

Sometimes the logging doesn't account for even large changes (>1m)

Standardization of Logging of Rus – Example 1

10.5 to 50.0 Moderately weak to weak, pale white to yellowish brown Siltstone /
Calcsiltite with bands of shelly shale and



Standardization of Dug Logging



CALCIULITE with close to spaced fractures



Effects on Design

Rus Formation is difficult to core so samples are difficult to get to the laboratory for testing.

Field records are extremely important in determining how skewed the lab testing data may be.

Standardization of Logging

“For engineering geology purposes, the basic objectives of logging core are to provide a factual, accurate, and concise record of the important geological and physical characteristics of engineering significance. Characteristics which influence deformability, strength, and water conditions must be recorded appropriately for future interpretations and analyses.” – USBR – Rock Manual Chapter 10

Changes to Core Logging

- Both Consultants and Contractors to provide more detail on where there are changes in material type.
- Provide more information on field strength for the Rus Clay Facies – pocket penetrometer?
- Try to standardize descriptions between projects – as has been done for Simsim Limestone

Summary

Knowledge of the depositional history of sedimentary deposits is instrumental in the development of descriptions on geologic logs.

During Investigation – the samples require detailed descriptions especially for the variations between strong and very weak zones.

Summary

The deposition of the Rus Formation includes numerous interbeds of very weak materials (clay facies) and strong (gypsum facies) that:

1. Need to be quantified
2. Need to be provided with field strength information
3. Requires an understanding so that the in situ testing will actually obtain the data required for design.

15:15 – 15:30

Afternoon Break

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