Production logging or cased hole logging

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- Introduction to production logs
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Objective and introduction

- Introduce production logging to the syllabus of well log I & II.
- Abundance of these logging in south of Iraq
- Job of petroleum engineer.
- Importance of these logs in monitoring production and reservoir performance
- It will give idea about the current status of the well and reservoir and help forward planning for next interventions

Where are we in Sequence of operation

in Sequence of Operation

- Geologic information
- Seismic survey
- Exploration wells

- Geologic interpretation and Planning
- Engineering planning

- Economic appraisal
- Provide investment
- Excute planning

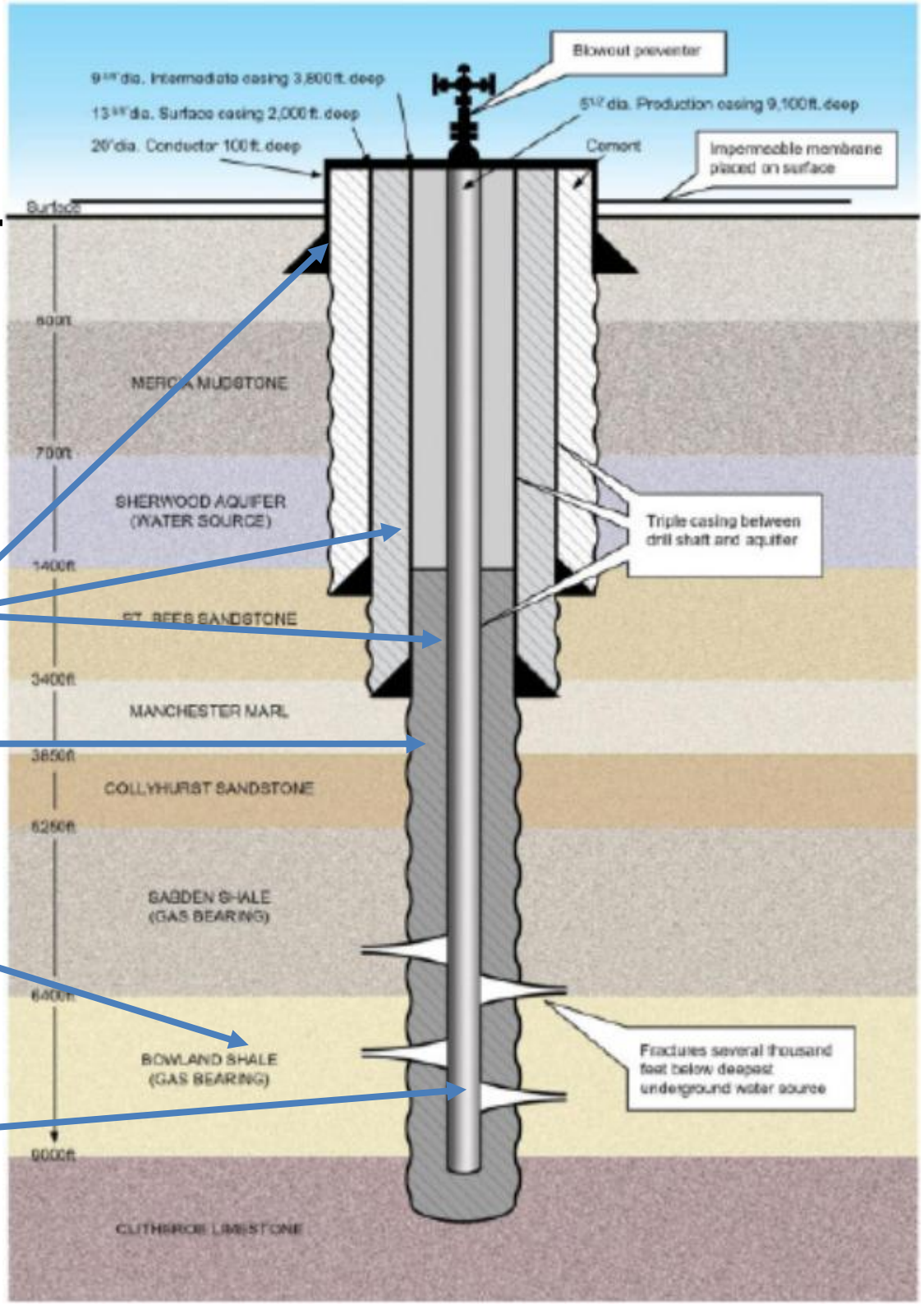
Why we need production loggings

Well integrity

- Casing condition
- Check cement condition

Formation performance

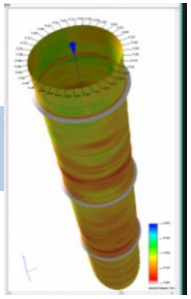
- Monitor formation
- Perforation contribution



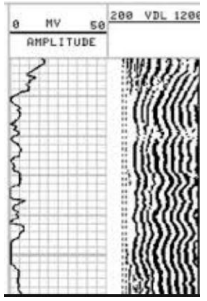
Production loggings

Well integrity

- Casing condition → Corrosion Logs

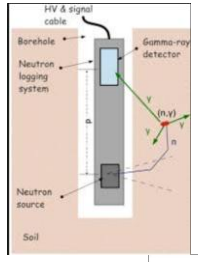


- Check cement condition → Cement bond log

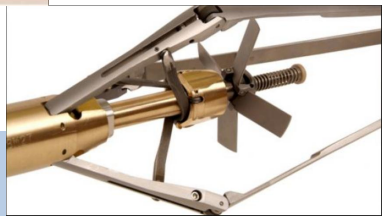


Formation performance

- Monitor formation → Saturation log

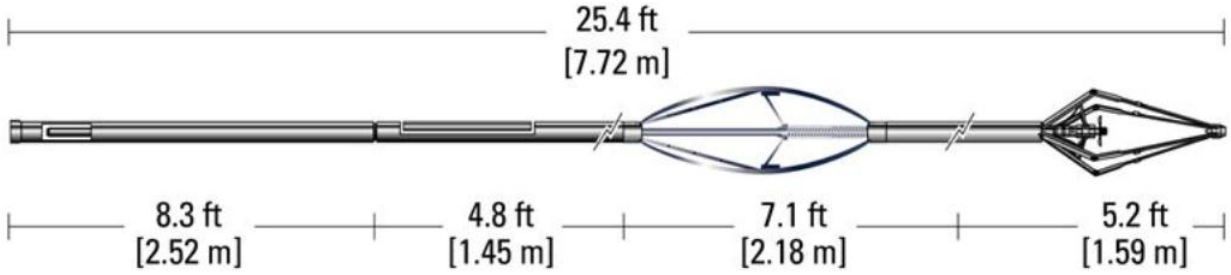


- Perforation contribution → Production logging tool

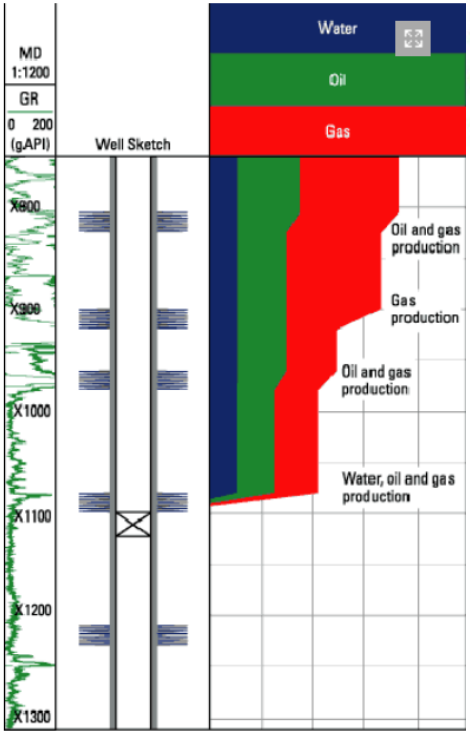


Production log tool

- Flow meter to calculate the flow rate from each perf and to calculate the total rate.
- Measure the water holdup inside the borehole
- Measure the gas holdup inside the borehole

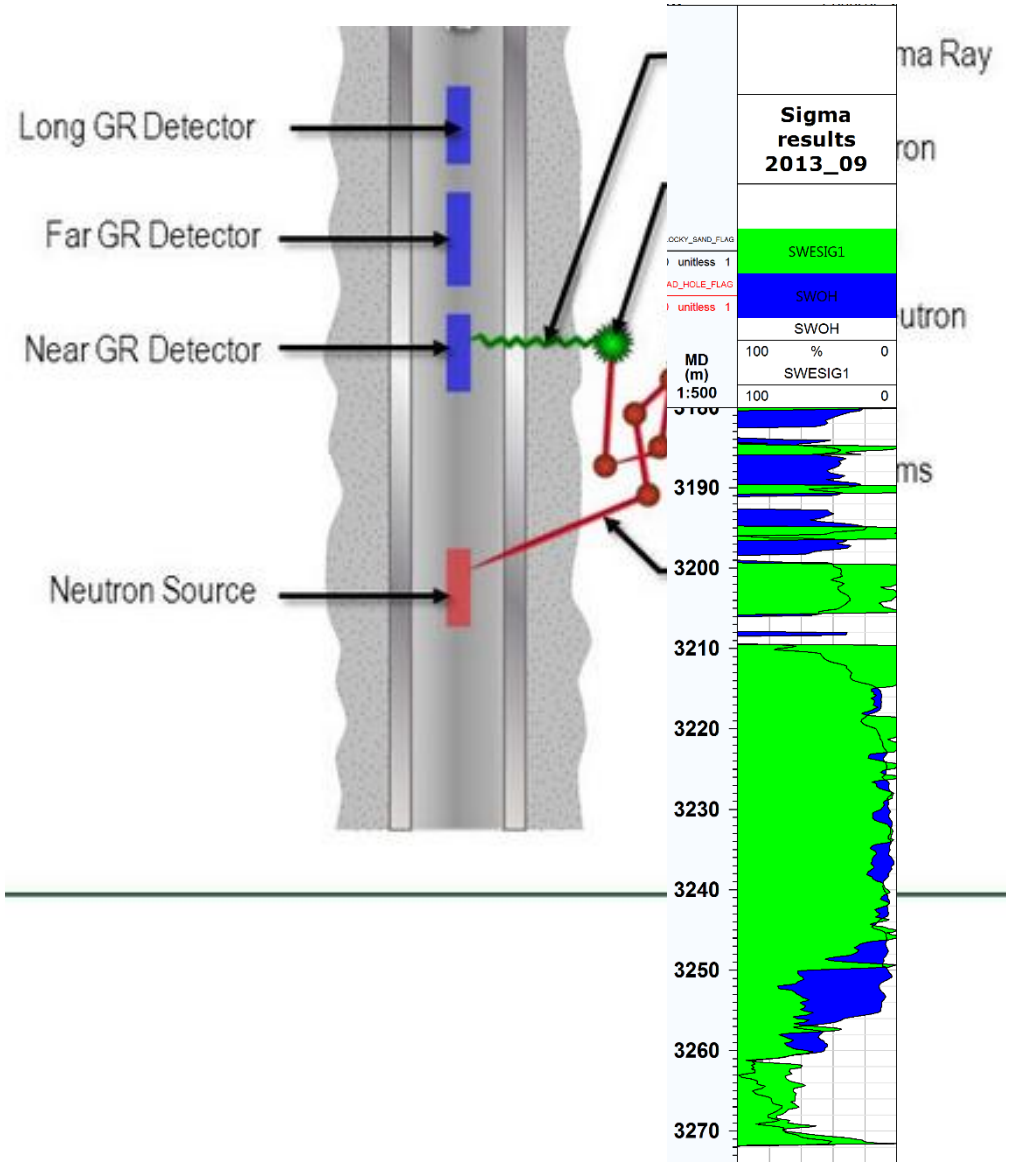


Basic Measurement sonde	Gradiomanometer tool	Gas Hold Up tool	Flow-Caliper Imaging tool
• Telemetry, • gamma ray, • CCL, • pressure, temperature	• Density, • Deviation	• Gas holdup	• Velocity, • Water holdup, • X-Y caliper



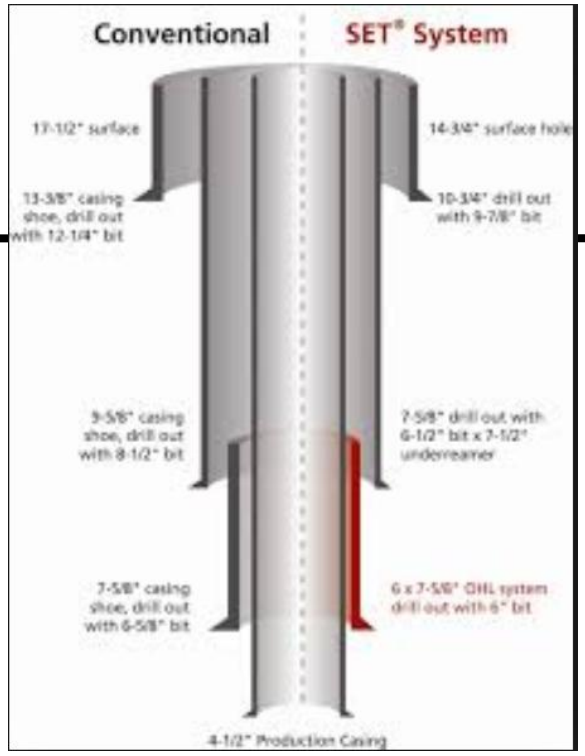
Saturation log tool

- Utilize Neutron theory to measure Sigma Formation
- Sigma Formation is directly related to the amount of Cl in the water which is related to the salinity of the formation water.
- Sw will be then calculated
- Sw from cased hole measurement will be compared with the initial condition to give understand about the oil depletion in the reservoir and the new OWC

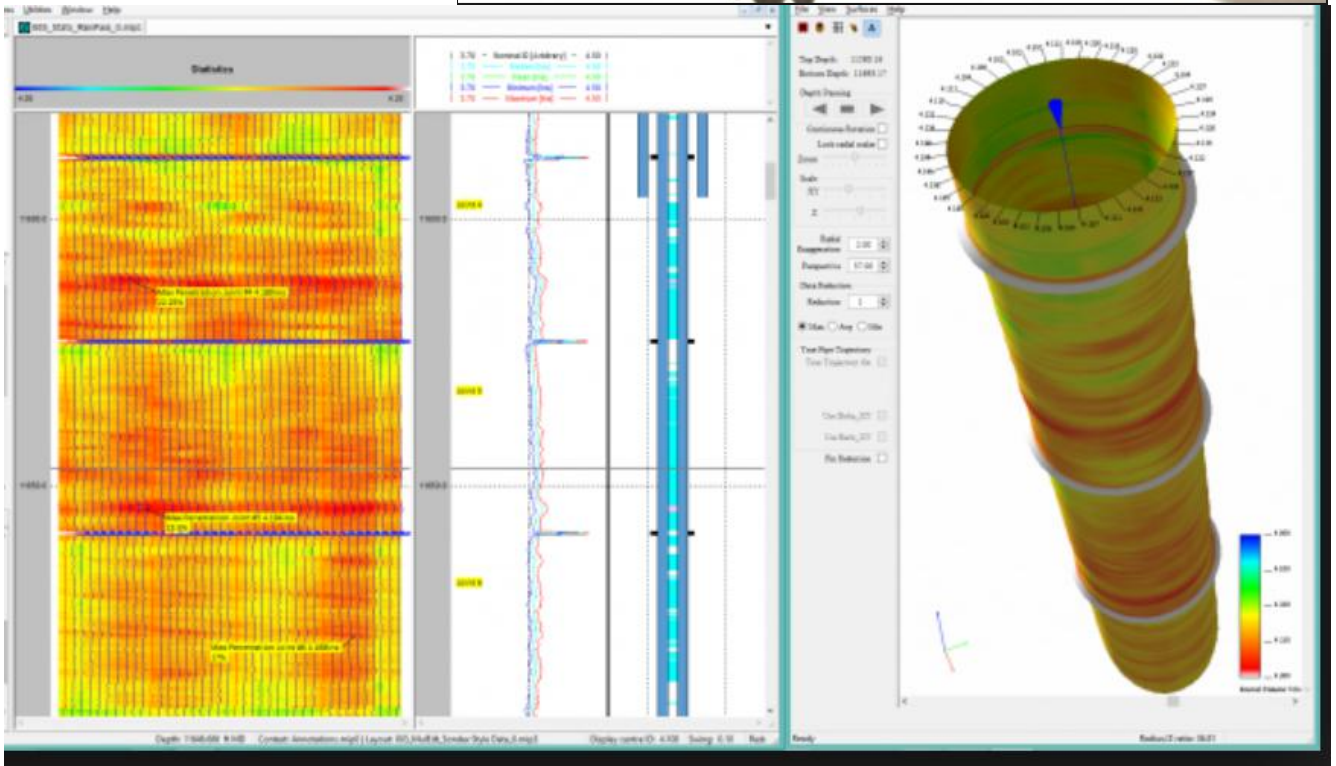


Corrosion log

Mechanical:
Will measure the internal radius of the casing or the tubing

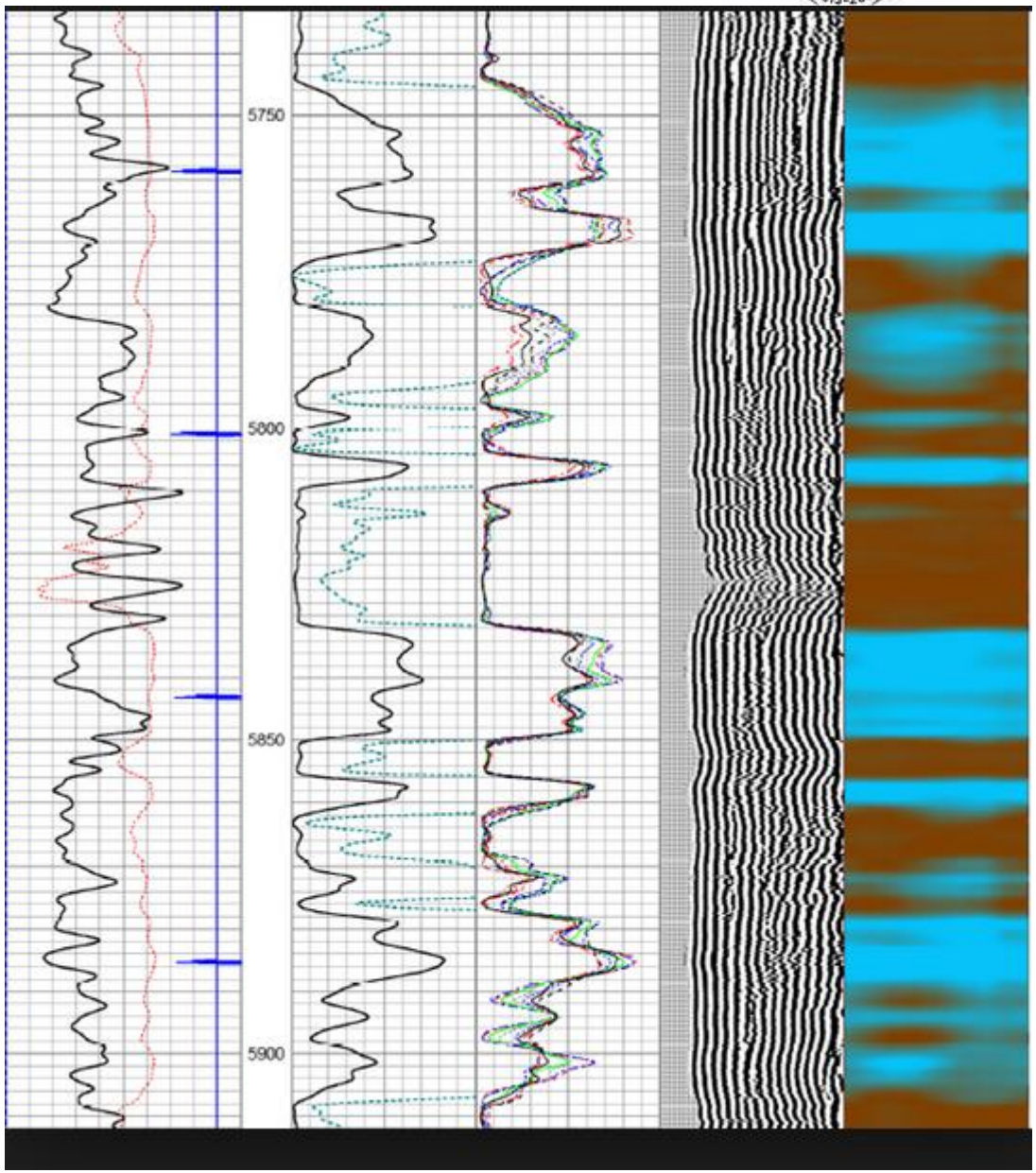


Electromagnetic:
Will measure the total thickness of the casing multiple or triple



Cement log

- Use the theory of sound
- Similar to sonic log in open hole
- Will give the indication of the good cement bond with formation
- Will give indication of cement bond with casing



Summary

- Production logging or cased hole logging are taking big part of oil industry specially in south of Iraq
- Importance of adding this topic in the syllabus of the well log course
- Availability of data to assist research and development in university
- Develop our engineers in the topics that more likely they will work on