Complete Water Analysis

Summary:

A complete water analysis performed by Oilfield Labs of America closely follows the prescribed methodologies prescribed in API RP 45 with regard to metals analysis, chloride analysis and sulfate analysis. We follow sample preservation directions where practical and field gasses must be performed in the field for scaling tendencies to be determined. Cations are determined by SM 3500 - ICPES-OES and are listed in Table 1 ICP Metals. Anions determined are Cl and SO_4, Cl via $AgNO_3$ titration and SO_4 by the turbidimetric method. The field analyses required to determine scaling tendencies are pH, HCO_3, dissolved CO_2 and H_2S.

Instrumentation:

Inductively Coupled Argon Plasma Optical Emission Spectroscopy- (ICP-OES) is a mature, accepted method of determining elemental content of aqueous solutions. Our instrumentation is state of the art, computer controlled and automated. We use a simultaneous configured system that can determine any number of elements all at one time rather than individually like inefficient AA or sequential ICP instrumentation. Sample processing times are approximately 3 minutes/sample. Additionally, due to the advanced resolution of today' optical grading's and electronic signal detection used, most spectral interferences experienced in classical ICP technology, do not occur in today's advanced models. Our ICP's also have auto-samplers configures to run in tangent with the vendor software. This allows unattended operation. This coupled with smart software, will recognize when the instrument is out of calibration and stop the run.

Quality Assurance:

All analytical runs where customer samples are analyzed are required to pass routine QA samples at prescribed levels of accuracy several times during the analytical run. The level of accuracy is set at 10%. If the QA sample does not pass for the element in question, the problem is corrected and the sample is re-analyzed. QA data relevant to a particular sample can be provided upon request. Blanks are also added and checked against the calibration curve to insure accuracy at the bottom of the curve. These are added at the same frequency of the QA samples.

Scaling Tendency Calculation:

When requested and when field gasses have been provided, OLA can provide scaling tendencies and momentary excess. All data is generated using DownHole SAT by French Creek. These are provided at the bottom of the report in two columns. Momentary excess is provided in lbs/1000 barrels.

Table 1 ICP Metals	Na	K	Ca	Mg	Ba	Sr	Na	Fe	Mn	P	B

Note: Mn, P, and B are not necessarily needed for scale indices but are provided gratis