

Table 1 - Water chemistry for wells sampled in Excell Operating Survey

Location	pH	CO ₂	H ₂ S	Chloride	Alk	SO ₄	Na	Ca	Ba	Sr	Mn	Fe	TDS
CHRISTIANSON 21-12	7.8	45	2	300	1098	161.5	469	6.974	0	0.11	0.0024	0.1	2040
CHRISTIANSON 21A-12	7.9	45	3	250	1037	137.8	464	8.258	0	0.11	0.0024	0.01	1901
CHRISTIANSON 21B-12	7.9	50	2	220	1098	156.3	440	5.364	0	0.08	0	0	1923
CHRISTIANSON 21C-12	7.9	45	2	240	1098	47.5	459	5.732	0	0.08	0	0	1854
CHRISTIANSON 22-12	7.8	45	3	200	976	103.1	422	6.022	0	0.09	0	0	1711
CHRISTIANSON 31A-12	7.9	45	2	240	976	165.6	471	7.316	0	0.09	0.036	3.67	1868
CHRISTIANSON SWD	7.8	45	2	260	976	277.5	451	8.806	0.531	0.378	0.0104	0.01	1978
J YOUNG 32A-12	7.9	45	2	280	1096	151.2	441	7.927	0	0	0.0011	0.16	1980

CHRISTIANSON 21D-12

Scale Predictions and Testing

Baker Hughes models scaling tendencies of production water using the scale modeling software program ScaleSoftPitzer. Scaling predictions from this software program yield both the scaling potential expressed as the saturation index (SI) and the scaling tendency that is associated with the potential amount of precipitation (in mg/L) of a concerned scale at system conditions. The SI is a measure of the degree of super saturation of the scaling ions in an aqueous system and an indication of the driving force for the supersaturated scaling ions to form scale. SI is the logarithm of the ratio between scaling ion activity and the thermodynamic solubility of a concerned scale. In other words,

SI < 0 the concerned scaling ions are under-saturated (no scaling tendency),

SI = 0 the scaling ions are at the saturation/equilibrium level, and

SI > 0 the scaling ions are supersaturated (tend to form scale).

The greater the SI, the stronger the driving force promoting the precipitation of scaling ions, and generally once initiated the faster the precipitation process. The amount of equilibrium precipitation (mg/l) is the maximum amount of scale that would precipitate out of solution when the scaling ions reach the saturation/equilibrium level from the initially supersaturated state. It indicates the mass of scale that could potentially precipitate from super-saturated brine. Table 2 below represents the information collected from the sample points throughout the Christianson field.