

Spectral Noise Logging Tool @model

There is no mathematical model which is capable to simulate all the acoustic noise captured by [Spectral Noise Logging Tool](#).

Yet there is some understanding of the acoustic noise components which are present in the wellbore and their dependence on some basic properties of the noise sources and the media around the [Spectral Noise Logging Tool](#).

This understanding is based on numerous laboratory and field studies and some of them can be substantiated by physical models and even quantified by mathematical models.

Overall it is usually assumed that there are four major types of noise:

Tool noise	Reservoir flow noise	Pipe flow noise	Completion noise
Any electronic device generates the acoustic noise which may not be audible for human ear but can be easily captured by high-sensitivity noise tool	A reservoir flow generates an acoustic noise as the percolation process is never laminar and micro-turbulence in pore-to-pore fluid migration is accompanied by density variation which creates pressure pulse propagation which is then called the acoustic noise.	A pipe flow generates and acoustic noise when it starts developing a turbulence. The turbulence is accompanied by density variation which creates pressure pulse propagation which is then called the acoustic noise.	The completion elements often force turbulence in the streamlining fluid flow which again generates acoustic noise.
$(1) \quad N(f) \sim \frac{1 - \exp(-f)}{f}$ <p>where</p> <ul style="list-style-type: none"> f is the acoustic noise frequency 	<p>Reservoir Flow Noise @model</p> $(2) \quad N \sim u \cdot \Delta p$ <p>where</p> <ul style="list-style-type: none"> u is the inflow reservoir flow velocity Δp is the pressure drawdown 	<p>(Lighthill equation)</p> $(3) \quad N \sim u^8$ <p>where</p> <ul style="list-style-type: none"> u is the pipe flow velocity 	

The noise which is captured by the [Spectral Noise Logging Tool](#) is simply a linear sum of the above components.

See Also

[Petroleum Industry / Upstream / Data Acquisition / Well & Reservoir Surveillance / Well Logging / Downhole logging tool / Spectral Noise Logging Tool \(SNL\)](#)