

Please fill in the name of the event you are preparing this manuscript for.	2020 International Petroleum Technology Conference	
Please fill in your 5-digit IPTC manuscript number.	20IPTC-20194-Abstract	
Please fill in your manuscript title.	Original Abstract	
Please fill in your author name(s) and company affiliation.		
Given Name	Surname	Company
Ammar	Alali	Saudi Aramco
ALI	ALJADHER	Saudi Aramco

This template is provided to give authors a basic shell for preparing your manuscript for submittal to an IPTC meeting or event. Styles have been included (Head1, Head2, Para, FigCaption, etc) to give you an idea of how your finalized paper will look before it is published by IPTC. All manuscripts submitted to IPTC will be extracted from this template and tagged into an XML format; IPTC's standardized styles and fonts will be used when laying out the final manuscript. Links will be added to your manuscript for references, tables, and equations. Figures and tables should be placed directly after the first paragraph they are mentioned in. The technical content of your paper WILL NOT be changed. Please start your manuscript below.

## Abstract

**Objectives/Scope:** Depth migration is the preferred seismic ‘imaging’ tool for the exploration and reservoir delineation targets. Imaging addresses the proper focusing and lateral positioning of reflector which is introduced by a complex geology or a laterally varying velocity. In these areas, rapid lateral velocity changes result in dispersion of energy that can’t be recovered by time migration alone. In these cases, depth migration is disposed to produce a seismic data with significant improvement in quality and proper structural positioning laterally. For these purposes, it requires an accurate and detailed interval velocity construction that captures the velocity changes in complex regions vertically and horizontally. This process, building imaging velocity model, is both painstaking and times consuming. An iterative process of tomographic corrections has proven to provide a good final model for migration. However, this process requires a good-enough initial interval velocity model to allow for a faster convergence of the solution through tomographic updates.

**Methods, Procedures, Process:** Velocity information are available from a number of different sources. Well velocity data are available from checkshots, vertical seismic profiles, sonic logs and geological tops. The seismic velocities (stacking-velocities) are interpreted from various seismic time processing stages. An initial interval velocity model can be generated from one source, such as sonic logs, or from a combination of different sources. While wells based velocities can derive a more accurate model locally and are more trust worthy at their location, it doesn’t provide any information spatially. Seismic velocities enjoy the spatial coverage and can populate the entire intended volume, but can be prone to have errors and uncertainty than well velocities.

**Results, Observations, Conclusions:** In this study, I will demonstrate the uncertainties carried out with initial interval velocity model building using different approaches; starting with a Constrained Velocity Inversion (CVI) model derived from stacking velocities, smoothed with average and median filters. The second method is the geostatistical approach which produces a more detailed velocity model. This model is based on well information including twenty wells’ checkshots data, guided by 7 Two Way

Time (TWT) horizon picks (previously picked on time-migrated sections) and using stacking velocity based model CVI as a background velocity. I will also present the inherited uncertainty associated with human interaction and judgment in this process by showing six different models built by various processor applying different parameters and/or editing the data differently.

**Novel/Additive Information:** Building an initial interval velocity model that capture the vertical and horizontal variation is a probabilistic approach that carries uncertainty associated with the process and the processor. We will be showing how this uncertainty can affect depth migration and yield different results as part of the imaging efforts for a land 3D data set in Saudi Arabia.