



# Proliferation of Crude by Rail and its Impacts

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**Shale Oil and Gas exploration has revolutionised the energy outlook for the United States as well as the Global market. Today, the United States is self-sufficient in Natural Gas and is approaching to attain the same for Crude Oil production. This is due to Hydraulic Fracturing utilising the Horizontal Drilling technology. This technology has revolutionised the Global Energy Initiatives.**

Traditionally, Crude Oil was and is transported by pipelines from the well-head to the refineries. The pipeline infrastructure to transport the crude oil was not developed on par with the production. Hence crude oil is being transported by rail cars to the market. Due to O&G production in the Shale Plays there is a strain on the infrastructure to transport crude oil. Crude Oil is transported by trucks from the well-head to railcars and on to their destinations. The destination may be to trans-loading stations followed by refineries. In some cases intermediate storage tanks maybe utilised. Currently, short spurs of pipelines are being built and utilised to transport crude oil to the rail cars.

The crude oil produced in the shale plays is very light and exhibit high vapour pressures compared to the traditional crude transported pipeline. Recently, several accidents have highlighted the crude oil volatility. In order to transport crude oil the shippers are tasked with classification per the Department of Transport (DOT) Packaging Group (PG) regulations. Crude Oil offered for transportation must be classified according to the DOT rules by way of testing. The proper PG group must be assigned and documented.

Issues have surfaced in light of the recent rail accidents in Canada, Alabama and North Dakota. Are the crude oil shipments being classified properly based on the DOT rules? Are the crude oil shipments being tested to determine the quality of the crude oil? Are the rail cars used to transport crude oil adequate based on the rail car specifications and the characteristics of the crude oil quality? Apart from the issues outlined above the quantity and quality of the crude oil has been a subject of concern.

The DOT has been conducting inspections of rail car shipments under an initiative known as operation classification and recently issued emergency orders to properly classify crude oil being offered for shipments. The tests associated with the emergency orders include, Flash Point and Boiling point for classification purposes. Additionally, to address the imminent hazards, offerors of crude oil for transport by rail must also comply with the Hazardous Materials Regulations (HMR)(49 CFR 171 – 180) with respect to all other hazardous aspects of crude oil. This includes testing the crude oil for percent of flammable gases, vapour pressure, presence, concentration and content of compounds such as sulphur/hydrogen sulphide and corrosivity.

The impact of the emergency orders is that one cannot ship crude oil without testing and classifying with sufficient certainty of the packaging group. Penalties may also be imposed if the emergency order is not followed.

Issues regarding the quality and quantity of crude oil are cropping up. Crudes come from the various shale plays and their qualities vary from shale play to play. The quantity issues are magnified by the fact that the crude oil is transported by trucks, rail cars and barges at rail terminals. The quantity issues can be overcome by an accurate proving oversight program. At Intertek we provide a comprehensive meter proving and calibration plan traceable to NIST standards and API specifications. Oversight plan must also be implemented in order to avert quantity issues.

The quality issues can be addressed with rigorous testing schemes. As sulphur and gravity measurements do not provide the quality of a specific crude oil, initial quality measurements must be thorough at both the loading point as well as the destination. Once a database of the quality data is established one can then move to spot checks for a given well area. Intertek provides all the tests required for quality checks.

Measurements at the loading point will not be the same as the measurements at the destination. Example H<sub>2</sub>S measured will be a lot higher than

at the loading point. Therefore analytical schemes to check the quality of the crude oil must be implemented and populated in a database to monitor the crude quality to determine trends. Upon establishing a baseline on the quality spot checks should be conducted to determine validity. Additionally, an oversight program at both the loading point and off-loading point would ensure quality and quantity issues.

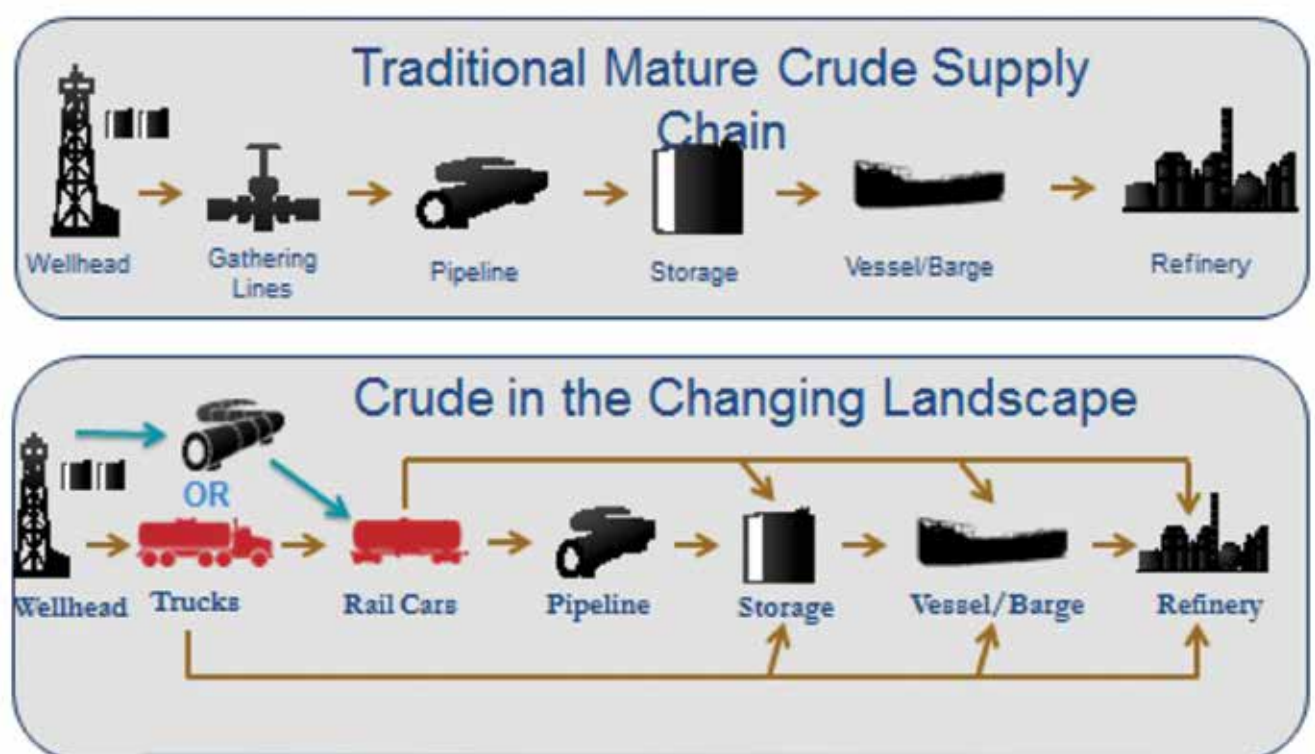
In summary, quality checks must be performed at the loading and unloading points in order to assure the quality of crude oil. The quantity checks must also be measured at both the loading points. The crude oil must be tested and classified prior to shipment for safe transport.

## References

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## Transportation of Crude

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