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**Question 6: Organic chloride in feed streams to hydroprocessing units is becoming more prominent. Chloride measurement is very important to define correct unit metallurgy; however, measurement is difficult. One of the issues related to accurate analysis of the feed is the impact of feed nitrogen and sulfur on chloride measurement. What test methods are you currently using in light of high nitrogen and sulfur in the feed to give accurate chloride results?**

**Martin Gonzalez (BP)**

For measuring chloride in feed stream, some of our refineries use an instrument based on Monochromatic Wavelength Dispersive X-Ray Fluorescence (MWD XRF), for which nitrogen and sulfur offer no interference. The instrument measures total chloride, whether organic or inorganic. The relevant ASTM method is D7536.

**Tim Lewer (Shell)**

Organic chloride can be measured by removing the inorganic chloride from the sample by water washing, followed by chloride determination of the sample using either combustion Ion Chromatography (IC) or monochromatic wavelength dispersive x-ray. Both instruments are being used within our refineries and have been applied to a number of refinery streams. Nitrogen and sulfur do not interfere with either technique.

**Minh Dimas (CITGO)**

One of the most currently used methods is ASTM 779, which has nitrogen and sulfur interference at concentration greater than 0.1%. There are other ways to measure chloride using combustion; it can be a titration or an Ion Chromatography (IC). Neither one has a large sulfur interference. The Combustion IC (ASTM 991 recently developed by UOP) is fast becoming the preferred method and is specific to chloride in the analysis so interferences are absent. The tricky part is optimizing the combustion to avoid coking of reactor tube and possible plugging.

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