

#### 14.4 **Successful Upgrading Of Estonian Shale Oil Via Hydrotreating**

Alan Goelzer<sup>1</sup>, Igor Kond<sup>2</sup>

<sup>1</sup>*Jacobs Consultancy, Houston, Texas, United States*, <sup>2</sup>*Eesti Energia, Narva Õlitehas, Tallinn, Estonia*

Eesti Energia AS, its subsidiary AS Narva Õlitehas, and Jacobs Consultancy have developed strategic plans and conceptual designs for a Shale Oil Upgrader Plant to enhance the value added for generation in conjunction with the expansion of the Narva Oil Factory [Estonia]. Through paper studies, Jacobs Consultancy identified that the best added value can be obtained by converting Estonian raw shale oil into crude-like analogs of petronaphtha, low-sulphur diesel gas oil, and low-sulphur vacuum gas oil. Estonian shale oil is highly aromatic and enriched in phenolic compounds. Estonian shale oil has not previously been upgraded. Eesti Energia, Narva Õlitehas, Intertek PARC, Haldor Topsoe, and Jacobs Consultancy performed pilot plant hydrotreating studies and successfully upgraded Eesti Energia's shale oil. Highlights of this program and results are discussed.