Reliance
Industries Limited

June 21, 2016

BSE Limited
Phiroze Jeejeebhoy Towers
Dalal Street
Mumbai 400 001

National Stock Exchange of India Limited
Exchange Plaza
Plot No.C/1, G Block
Bandra-Kurla Complex
Bandra (East)
Mumbai 400 051

Scrip Code: 500325

Trading Symbol: "RELIANCE EQ"

Dear Sirs,

Sub: Media Release

We enclose a copy of Media Release being issued by the Company titled "**RIL-IIP JOINT TECHNOLOGY DEVELOPMENT BENZENE EXTRACTION FROM FCC LIGHT NAPTHA**" for your record.

Thanking you,

Yours faithfully,
For **Reliance Industries Limited**

Sandeep Deshmukh
Vice President
Corporate Secretarial

Encl.: As above

Copy to:
The Luxembourg Stock Exchange
Societe de la Bourse de Luxembourg
35A boulevard Joseph II
B P 165, L-2011 Luxembourg

RIL-IIP Joint Technology Development
Benzene Extraction from FCC Light Naphtha

Concept to Implementation

RIL Jamnagar Refinery has 2 of the world's largest Fluid Catalytic Cracker (FCC) units. The light naphtha produced from these units is the major contributor of Benzene in the gasoline pool. Due to health and environmental concerns, there has been an increasing pressure on refiners around the world to reduce the amount of Benzene and other hazardous air pollutants in the gasoline pool. In 2011, under Mobile Source Air Toxics (MSAT) gasoline fuel program, Environmental Protection Agency (EPA) in USA required refiners to meet an annual average gasoline benzene content standard of 0.62 volume percent (vol.-%) for all of their gasoline, both reformulated and conventional, nationwide. It was evident that, in the near future, Europe and the rest of the world will also impose lower limits on Benzene content in the gasoline.

In 2011, RIL started to evaluate available technologies to remove Benzene from FCC Light naphtha. All available and the claimed proven technologies at that time had the following disadvantages:

- Higher capital and operating expenditures
- Loss of value due to significantly lower Benzene recovery
- Loss of octane barrel due to loss of high-octane olefinic compounds

Also available extractive distillation technology that used solvent to extracts Benzene from FCC light naphtha was not proven commercially. It is very challenging to extract Benzene from light naphtha using solvent because of its rapid degradation by polymerization in the presence of reactive species such as olefins and di-olefins, and contaminants such as sulphur, nitrogen, chlorides, oxygenates, etc.

In 2011, RIL and Indian Institute of Petroleum (IIP) Dehradun signed an agreement to co-develop an extractive distillation process using a robust solvent that will not degrade appreciably in the presence of difficult species and contaminants, and meet the following targets

- 0.2 vol.-% Benzene or less in raffinate (reurn stream to gasoline)
- 99 vol.-% or higher Benzene recovery (extracted and upgraded to cyclohexane grade benzene)

It was understood that robust and selective solvent will improve unit operation and performance resulting in higher reliability and availability of the unit.

This partnership had a synergy due to the following:

IIP Strengths:

- ✓ Strong understanding of solvents chemistry
- ✓ Very Good understanding of liquid-liquid extraction and extractive distillation processes
- ✓ Excellent laboratory and pilot plant facilities

RIL Strengths:

- ✓ Technical leadership and "can do attitude"
- ✓ Strong operations experience of large size extractive distillation units
- ✓ Strong project implementation capabilities
- ✓ Ensured "freedom to operate" by generating strong IP portfolio and restricting claims of competitors by challenging their Indian patents

Process Development Steps

1. Proof of Concept (Chemistry and Separation) demonstration at lab scale
2. Pilot Plant Studies & Scale-Up
3. Process Design Optimization
4. Development of Technical Information Package

RIL-IIP Team did several experiments in the laboratory and pilot plants, and established that selected solvent is robust and meets the required performance criteria. Based on pilot plant data, process scale-up and process design optimization was done. All this data and work was used to develop Technical Information Package (TIP) containing the following documents:

- ➢ Simplified Process Flow Diagram
- ➢ Heat and Mass Balance
- ➢ Preliminary Data Sheets for Critical Equipment

RIL-IIP filed joint patent for the process to create strong Intellectual Property (IP) and "freedom to operate" assurance.

TIP was handed-over to Technip, who was selected as Detailed Engineering Contractor (DEC) for this new process named Benzene Recovery Unit (BRU).

RIL did the construction and the "flawless" commissioning of BRU. On 23rd May-2016, the on-specification raffinate product (less than 0.2 vol.-% Benzene) was sent to storage for blending and sales.

RIL & IIP has joined the league of technology developers and there are many enquiries for licensing the technology.

Exceptional example of "Make-In-India" Initiative by "Inventing-in-India."

India's resurgence has begun…….



Benzene Recovery Unit – *Sky is the limit*