Public Notice No: Proposal/Tie-in Connectivity/1/2015

The Petroleum and Natural Gas Regulatory Board has received a proposal in terms of Regulation 21(1) of the Petroleum and Natural Gas Regulatory Board (Authorizing Entities to Lay, Build, Operate or Expand Natural Gas Pipelines) Regulations, 2008 from M/s Cairn India Limited for Tie-in Connectivity from Raageshwari Deep Gas Terminal (Gudamalani, Barmer, Rajasthan) to GSPL’s High Pressure Gujarat Gas Grid at Palanpur Terminal (Gujarat).

The details of the aforesaid proposal as submitted by the entity are available at the website of the PNGRB: www.pnrb.gov.in under the scrolling window ‘what’s new’.

In terms of Regulation 21(1) (b) of the aforesaid regulations, the Board announces commencement of the public consultation process and solicits views in writing from any person or entity on the said proposal, within 30 days of publication of this public notice in the newspaper. The views may be submitted to the Secretary, PNGRB either through e-mail at secretary@pngrb.gov.in or through post at the address mentioned above.

OSD (R)
16 March, 2015

To,

The Secretary
Petroleum & Natural Gas Regulatory Board
First Floor, Word Trade Center,
Babar Road, New Delhi-110001

Subject: Proposal for “Tie-in Connectivity” from Raageshwari Deep Gas Terminal (Gudamalani, Barmer, Rajasthan) to GSPL’s Gujarat Gas Grid at Palanpur Terminal (Gujarat) under the Petroleum and Natural Gas Regulatory Board (Authorizing Entities to Lay, Build, Operate or Expand Natural Gas Pipelines) Regulations 2008, as amended vide F. No. PNGRB/NGPL/REGULATIONS/AMEND-2014 dated 8th August, 2014

Dear Sir,

Cairn India Limited (“Cairn”) along with Oil & Natural Gas Corporation Limited (ONGC) and Cairn Energy Hydrocarbons Limited (“CEHL”) is developing the Raageshwari Deep Gas (RDG) Field at Gudamalani, Barmer District in Rajasthan State in the RJ-ON-90/1 Block (RJ Block) under the Production Sharing Contract dated 15th May 1995 with the Government of India.

Cairn has taken up development of the RDG field on a fast track basis to increase the gas production from the RJ Block to cater to the significant unmet demand for natural gas in the country. The RDG field development has been approved by the Ministry of Petroleum & Natural Gas, Government of India in the RJ Block Management Committee meeting held on 23rd December, 2014. The gas produced from the RDG field would be gathered & treated at the proposed RDG Terminal, from where it needs to be evacuated through a new 24" pipeline to the nearest available Gas Grid which is the GSPL’s Gujarat Gas Grid with connectivity at Palanpur Terminal. Given the advanced status of gas producing wells and surface facilities, we envisage gas production through the new facilities latest by H1, 2017. The timely evacuation of gas through this proposed pipeline is critical to ensure domestic gas availability in the significantly gas scarce market.

It is in this reference that we are submitting this proposal for “Tie-in connectivity” under the PNRGRB (Authorizing Entities to Lay, Build and operate or Expand Natural Gas Pipelines) Regulations, 2008, as amended vide F. No. PNGRB/NGPL/REGULATIONS/AMEND-2014 dated 8th August 2014 which provides for regulations governing the tie—in connectivity for transport of natural gas from an upstream natural gas source to a natural gas pipeline grid. Accordingly we hereby submit this proposal for tie-in connectivity from RDG Terminal at Gudamalani, Barmer, Rajasthan to the GSPL’s Palanpur Terminal in Gujarat. The detailed proposal is enclosed herewith with relevant attachments.

We request you to kindly accept this proposal for further consideration and also look forward to your continued support in this regard. Should you require any further information/clarification, please reach the undersigned.

We are confident that the significant gas potential in the block can contribute to the growing gas demand in our Country. Early monetization of the gas potential requires an early construction of the
export pipeline, which will add significant value to all stakeholders. We look forward to the support of the Board in getting this proposal approved expeditiously.

Thanking You.

Yours Sincerely,

Ananthakrishnan B
Director, Gas Development

Proposal for Tie-in connectivity
(Raageshwari Deep Gas Terminal, Barmer to Palanpur Terminal on GSPL Gujarat Gas Grid

This refers to the “Petroleum and Natural Gas Regulatory Board (Authorizing Entities to Lay, Build, Operate or Expand Natural Gas Pipelines) Regulations, 2008, as amended vide F. No. PNGRB/NGPL/REGULATIONS/AMEND-2014 dated 8th August, 2014 which incorporates the regulations governing the tie-in connectivity between an upstream natural gas source to a common carrier or contract carrier natural gas pipeline network. In accordance with the Tie-In Connectivity Regulations, Cairn India Limited, as the operator, is hereby proposing a “tie-in connectivity” between the “Raageshwari Deep Gas (RDG) Terminal in the RJ-ON-90/1 Block at Gudamalani, Barmer District, in Rajasthan and GSPL’s High Pressure Gujarat Gas Grid at Palanpur, Banaskantha District in Gujarat” as detailed below:-

1 General Details

| A | Name of the Entity | Cairn India Ltd. |
| B | Type of Firm | Public Limited Company |

C | Introduction to RJ-ON-90/1 Block

Cairn India Limited ("Cairn") is the operator of the RJ-ON-90/1 Block ("RJ Block") in the state of Rajasthan, India, and operates the RJ Block on behalf of itself and its Joint Venture (JV) Partners Cairn Energy Hydrocarbons Limited ("CEHL") and the Oil and Natural Gas Corporation Limited ("ONGC") under a Production Sharing Contract dated 15th May 1995 signed with the Government of India (PSC). The RJ Block contains a number of major oil & gas discoveries, including the Mangala field, the largest onshore oil discovery in India since 1985 and the other fields including, the Bhagyam Oil Field & the Aishwarya Oil Field, together known as the MBA field. The RJ Block also has reserves of gas from its Raageshwari Deep Gas ("RDG") Field.

The evacuation of hydrocarbons from these fields is currently realized through facilities built under the PSC regime with an existing oil export pipeline network called the Mangala Development Pipeline Project (MDPL) comprising of:

- 1x24" heated and insulated pipeline (~594 km long) for transportation of crude oil from the Mangala field, Barmer in the state of Rajasthan to Salaya, Jamnagar in the state of Gujarat, supplying ~175000 barrels of oil per day. The crude oil pipeline is continuously heated by the heating stations installed along the pipeline corridor, to maintain the temperature of the waxy crude oil for flow assurance. The MDPL is recorded as the world’s longest continuously heated and insulated pipeline.
- 1x8" Natural Gas pipeline was also laid along with crude oil pipeline from CIL’s existing gas terminal (known as the Raageshwarri Gas Terminal located ~ 80 km south of Mangala Terminal and adjacent to the corridor of MDPL) to Jamnagar as part of RJ block facilities. The 8” gas pipeline feeds gas to the gas-engine generators, installed at regular intervals on the MDPL (~ every 20 km distance) for supplying heating power.

2 Basic Data & Proposal Details

A | Details of source of gas | Background and Approval Status

- Cairn (Operator of the RJ Block) along with its JV partners ONGC and CEHL is producing close to 28% of domestic crude oil production in India from Mangala, Bhagyam and Aishwarya Oil fields in RJ-ON-90/1 Block.
The JV Partners have discovered significant quantities of natural gas in the RDG Fields and plan to develop these as per the Field Development Plan approved by Ministry of Petroleum & Natural Gas under the Production Sharing Contract.

**Location of source of Natural Gas**
- The natural gas produced from RJ Block will be processed at RDG Gas Processing Terminal (RDG Terminal) which is located at Gudamalani Tehsil in Barmer District of Rajasthan.
- Proposed RDG Terminal will also be the Delivery Point for sale of gas and starting point of the proposed Tie-in connectivity pipeline.

**Quantity of Natural Gas**
- RJ-ON-90/1 Block holds significant reserves of natural gas
- Subsequent to ramp-up over a period of 1 year, the estimated gas production will be 3 MMSCMD plateau for a period of 5 years with an overall profile of 15 years. Out of this around 2.6 MMSCMD will be for external sales, while the rest will be for internal consumption in the RJ Block and for meeting the heating requirements of MDPL. Additional gas production is also expected from significant in-place reserves and on-going exploration activities being undertaken by RJ Block JV Partners’ which will be appraised and developed in due course as per the provisions of the PSC.
- The recoverable reserves of natural gas as part of field development plan are estimated to be 359 bcf (10.25 bcm)
- The reserves of the field have also been independently verified by DeGoyler & McNaughton.
- The quality of natural gas from Raag Deep Field is excellent with ~82% methane, negligible CO2 and nil H2S.

**Current Plan for commencement of first gas**
- As per current plan, the first gas from RDG Terminal is expected to commence from H1, 2017, subject to approval of the pipeline
- There are 30 wells already drilled in the field. The field is on production for the past 4 years. Current capacity of the wells is around 1 MMSCMD.
- The operator is planning to drill a minimum of 42 more wells to augment and sustain the gas supply in the next 3 years
- Drilling for new wells is expected to start in Q1 of FY 2016-17 with contracting for drilling rig, related equipment and services at an advanced stage
- The operator is in advanced stage for contracting construction of gas processing facilities to process produced gas from the RDG field. This is in addition to the existing gas processing terminal
- The new processing facilities would consist of
  - Well fluid receipt facilities
  - Gas dehydration and condensate handing facilities,
  - New old pads and upgradation of old well pads
  - New intra-field pipelines for well fluids and waste disposal
  - Utilities and infrastructure
- The operator has already completed FEED for the terminal and is very close to awarding the EPC contract for the terminal.
- The RJ JV is also in advanced stage for acquiring all statutory and
The existing pipeline infrastructure nearest to RDG Terminal is **GSPL’s High Pressure Gujarat Gas Grid (Palanpur Terminal)** authorized by PNGRB. The pipeline is owned and operated by Gujarat State Petronet Limited (GSPL). The Palanpur Terminal on GSPL’s Gujarat Gas Grid is located in Banaskantha District of Gujarat State and provides Tie-in connectivity option for gas production from RJ-ON-90/1 Block.

The location of RJ Block’s RDG Terminal and GSPL’s Palanpur Terminal is provided in the map under *Annexure – 1*.

<table>
<thead>
<tr>
<th>C</th>
<th>Length &amp; Route of the proposed tie-in connectivity</th>
<th>Origin Point of the Pipeline:--</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>The Origin Point of the Gas Pipeline shall be “<strong>RDG Terminal</strong>” located at Gudamalani Tehsil in Barmer District of Rajasthan. The approx. location co-ordinates are:-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Latitude : 25°17’ 54.48” N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Longitude : 71°45’ 21.85” E</td>
</tr>
</tbody>
</table>

**End Point of Pipeline:**--

The End Point of the Gas Pipeline shall be “**GSPL Palanpur Terminal**” located at Banaskantha District of Gujarat State. The approx. location co-ordinates are:-

Latitude : 24° 10’ 28.68” N
Longitude : 72° 21’ 52.33” E

**Length and route of the proposed tie-in connectivity**

The total length of proposed pipeline from its Origin Point at RDG terminal to its End Point at GSPL Palanpur Terminal is estimated to be ~194 km.

- The route considered for such connectivity is based on detailed route study carried-out by Cairn.
- Approx. 135 km length of proposed gas export pipeline is proposed to be installed parallel to MDPL (from RDG Terminal to AGI-12)
- Remaining approx. 59 km length of proposed gas export pipeline is proposed to be installed in the new route i.e. from AGI-12 to Palanpur.
- Various other route options were also studied and the comparative summary is tabulated below:-

### Comparative Summary of Various Route Options

*Following options were evaluated in-order to accommodate the proposed gas pipeline along existing BSPL corridor to the maximum and then take a detour at suitable point, follow new corridor to reach Palanpur or Mehsana Terminal*

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Route Description</th>
<th>Route Along BSPL (KM)</th>
<th>New Route Length (KM)</th>
<th>Total Route Length (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RDG - AGI12 - GSPL Palanpur Terminal</td>
<td>135</td>
<td>59</td>
<td>194*</td>
</tr>
<tr>
<td>2</td>
<td>RDG - AGI15 - GSPL Mehsana Terminal</td>
<td>189</td>
<td>52</td>
<td>241*</td>
</tr>
<tr>
<td>3</td>
<td>RDG - AGI16 - GSPL Mehsana Terminal</td>
<td>207</td>
<td>49</td>
<td>256*</td>
</tr>
<tr>
<td>4</td>
<td>RDG - GAIL’s HVJ Kota Network</td>
<td>-</td>
<td>~425</td>
<td>~425*</td>
</tr>
</tbody>
</table>
For the purpose of approximation of total route length, additional 2-3% margin would be considered in order to allow for local detours, route diversions, detailing around crossings/obstructions and other developments around the cities/towns enroute.

As can be seen clearly from above comparison, the proposed route from RDG Terminal to GSPL Palanpur Terminal (via. AGI-12) is the shortest route. Other options of direct-connectivity between Raageshwari and Palanpur would envisage all-together new route coupled with concerns on related to proximity/crossing of various forest lands and townships. Reduction in pipeline length but eventually long process/cost for the entire new corridor and associated approvals process.

The salient features of the proposed “Natural Gas Export Pipeline System” are as follows:-

- Pipeline Size : 24” NB
- Length : Approx. 194 km
- Class Rating : ANSI Class 600#
- Material : Carbon Steel, API 5L Gr X65 PSL2

### A. Overall Gas Demand

Gas source from RDG Terminal is envisaged to connect with GSPL's High Pressure Gujarat Gas Grid authorized by PNGRB. GSPL's Network is spread across Gujarat and well connected with most demand centers of Natural Gas in Gujarat. Natural Gas demand within Fertilizer and Power which holds top priority under Government's Gas Utilization Policy, has an existing demand of around 35 MMSCMD in the State of Gujarat. Further significant demand exists from City Gas Distribution (CGD) sector and industries.

### B. Access to Demand Centers in India

GSPL's High Pressure Gujarat Gas Grid is also connected with GAIL's National Gas Grid and RGTIL's East-West Pipeline, which gives access to most demand centers in India. As per the report of Working Group on Petroleum and Natural Gas for 12th five year plan, the total demand of Natural Gas in India during 2014-15 is 405 MMSCMD, whereas total supply of domestic gas in India at present is around 80 MMSCMD. Demand supply projection for next five years is as below:

<table>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Gas Demand</td>
<td>405</td>
<td>446</td>
<td>473</td>
<td>494</td>
<td>523</td>
</tr>
<tr>
<td>Domestic Gas Production</td>
<td>100</td>
<td>110</td>
<td>125</td>
<td>136</td>
<td>151</td>
</tr>
</tbody>
</table>

The capacity of a pipeline is a function of the pressure. The operating pressure of gas at the RDG Gas Terminal would be around 45 bar. Depending on the pressure requirement at the connectivity point at Palanpur, the exact capacity of the pipeline will be determined.
| F | Any other issue considered relevant by the entity | • Project Status  
*Refer Annexure-2*  
• Project Schedule  
*Refer Annexure-3* |
ANNEXURE-1: TERMINAL LOCATION & PIPELINE MAP

PROPOSED 24" GAS PIPELINE FROM RAGHESWARI TO GSPL GRID

BARMER MPT

RAAGHESWARI TERMINAL

Existing 24" Crude oil pipeline

Proposed 24" Gas pipeline

PROPOSED 24" CARN GAS CONNECTIVITY PIPELINE
EXISTING 24" CARN BARMER SALAYA OIL PIPELINE
EXISTING GSPL KALOL PALANPUR PIPELINE
## ANNEXURE-2: STATUS OF THE PROJECT

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Activities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>RDG Terminal &amp; Well Pads</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>HAZOP, HAZID, QRA and SIL studies</td>
<td>Completed</td>
</tr>
<tr>
<td>2</td>
<td>FEED for RDG Terminal</td>
<td>Completed</td>
</tr>
<tr>
<td>3</td>
<td>Tendering process for RDG Terminal</td>
<td>In process (Expected Q2 2015)</td>
</tr>
<tr>
<td></td>
<td><strong>Pipeline</strong></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>DFR for export gas pipeline</td>
<td>Completed</td>
</tr>
<tr>
<td>5</td>
<td>Desktop studies &amp; reconnaissance survey of pipeline</td>
<td>Completed</td>
</tr>
<tr>
<td>6</td>
<td>Detail route survey of pipeline</td>
<td>Completed</td>
</tr>
<tr>
<td></td>
<td><strong>Any Other Item</strong></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Environmental Clearance (EC ) for entire project</td>
<td>In process (Expected Q2 2015)</td>
</tr>
<tr>
<td>8</td>
<td>Project financing</td>
<td>To Be Advised</td>
</tr>
</tbody>
</table>
ANNEXURE-3: HIGH LEVEL PROJECT SCHEDULE

<table>
<thead>
<tr>
<th>L1 Project Schedule - RDG</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Q1</strong></td>
</tr>
</tbody>
</table>

- **Q1 2014**: FDP Submission, FEED Submission, FEED Approval, EOI Tender, Tender Award
- **Q2 2014**: EC, EPC Contract Award, Award EPC Contract for RDG Terminal
- **Q3 2014**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal
- **Q4 2014**: EPC Contract Award, Award EPC Contract for RDG Terminal

- **Q1 2015**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal
- **Q2 2015**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal
- **Q3 2015**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal
- **Q4 2015**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal

- **Q1 2016**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal
- **Q2 2016**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal
- **Q3 2016**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal
- **Q4 2016**: EOI, Tender, Tender Award, EPC Contract Award, Award EPC Contract for RDG Terminal

**Note:**
- FDP – Field Development Plan
- EOI – Expression of Interest
- EC – Environment Clearance
- LLI’s – Long Lead Item
- MC – Mechanical Completion
20 March, 2015

To,

The Secretary
Petroleum & Natural Gas Regulatory Board
First Floor, Word Trade Center,
Babar Road, New Delhi-110001

Ref No: RJ/0315/PNGRB/AB/09

Subject: Proposal for “Tie-in Connectivity” from Raageshwari Deep Gas Terminal (Gudamalani, Barmer, Rajasthan) to GSPL’s Gujarat Gas Grid at Palanpur Terminal (Gujarat) under the Petroleum and Natural Gas Regulatory Board (Authorizing Entities to Lay, Build, Operate or Expand Natural Gas Pipelines) Regulations 2008, as amended vide F. No. PNGRB/NGPL/REGULATIONS/AMEND-2014 dated 8th August, 2014

Dear Sir,

This is in reference to our letter Ref No: RJ/0315/PNGRB/AB/08 dated 16 March 20, 2015 and subsequent email from PNGRB dated 20 March 20, 2015 regarding the capacity of the proposed tie-in connectivity pipeline.

The expected total capacity of the proposed tie-in connectivity pipeline shall be ~4MMSCMD as per the currently planned infrastructure.

Thanking You.

Yours Sincerely,

Ananthakrishnan B
Director, Gas Development