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New Delhi, Dated: the 10th October, 2018

POLICY FRAMEWORK TO PROMOTE AND INCENTIVIZE ENHANCED RECOVERY METHODS FOR OIL AND GAS

No. O-22013/6/2016-ONGD-V - The Government of India hereby notifies 'Policy framework to promote and incentivize Enhanced Recovery Methods for Oil and Gas' to provide fiscal incentives to adopt Enhanced Recovery (ER), Improved Recovery (IR) and Unconventional Hydrocarbon (UHC) production Methods. The details of the Policy framework are as under:

1. Introduction

- 1.1. The Enhanced Recovery (ER) methods to increase the production of oil and gas include Enhanced Oil Recovery (EOR) and Enhanced Gas Recovery (EGR).
- 1.2. Improved Recovery (IR) refers to any efforts made to increase production of oil and gas beyond current recovery as specified in **Annexure-I**. Current recovery, being the ratio of cumulative production of oil/gas at the end of the last fiscal period to in-place volume of oil/gas.
- 1.3. Unconventional Hydrocarbons (UHC) such as Shale oil and gas, tight oil/gas and gas hydrates have become commercially viable due to technological advancement, and as a result opportunities to tap the potential of unconventional hydrocarbons for commercial exploitation have opened.
- 1.4. The definition of various terms including ER, IR, UHC is at **Annexure I**. The list of ER techniques is at **Annexure II**.

2. Applicability of the Policy

- 2.1. This policy will apply to all oil and gas fields across all contractual regimes and Nomination acreages with National Oil Companies.
- 2.2. This policy will be effective for a period of ten years from the date of notification in the Gazette. The fiscal incentives, however, will be available for a period of 120 months from the date of commencement of commercial production in ER/ UHC projects, and from the date of achievement of the prescribed benchmark of recovery rate for IR projects.



- 2.3. The policy envisages assessment of all the fields for ER potential through mandatory Screening and conduct of Pilot to test and establish efficacy of ER techniques before implementation on commercial scale.
- 2.4. The fiscal incentives will be provided during commercial production of the ER project on the incremental production. In case of IR Project, the fiscal incentive will be available on entire production beyond the benchmark. In case of UHC projects, entire production will be eligible for incentives.

3. Screening of the Fields for Enhanced Recovery

- 3.1. Screening of fields for implementing ER methods would be mandatory for all fields which have been in commercial production for more than 3 years as on the date of notification of this policy.
- 3.2. The ER Screening is to be conducted through designated Institutions as notified by Government from time to time.
- 3.3. The report of the Screening will have to be submitted within a period of one year, extendable by six months.
- 3.4. It would be mandatory for the contractor to pursue ER Pilot if Screening Report establishes the applicability of ER techniques to the field.
- 3.5. The indicative details of ER Screening report and other procedural aspects are at **Annexure- III.**

4. Pilot for Enhanced Recovery (ER)

The Pilot should be initiated immediately after the approval of ER Screening Report. ER Pilot Report should be submitted within 3 years from the date of approval of ER Screening report, extendable by six months. The Pilot, however, will not be mandatory for small size oil fields having less than 25 million barrel of Oil Initial-in-Place (OIIP) and gas fields having less than 0.25 TCF of Gas Initial-in-Place (GIIP).

5. Commercial Phase of Enhanced Recovery (ER)

To avail fiscal incentives under this Policy, contractor will have to submit an application within 12 months after review of Pilot, wherever applicable. In case of UHC and IR projects, application shall be submitted within 7 years from the date of notification of this policy. The indicative project details and other procedural requirements are mentioned at **Annexure-IV.**

6. Eligibility for availing fiscal incentives

- 6.1. To qualify for fiscal incentives, fields should be having a minimum three years of commercial production. However, fields with unconventional



hydrocarbon (UHC) production would be eligible from the start of commercial production. Fields going in for Improved Recovery (IR) would be eligible on crossing the prescribed benchmark of increasing production beyond current recovery of 60% in case of oil and beyond current recovery of 80% in case of gas.

- 6.2. Fields which are currently producing oil or gas using ER techniques or fields for which Field Development Plan (FDP) have been approved for ER projects before the notification of this policy will not be eligible for incentives under this policy. However, those fields would be eligible for incentives where EOR processes approved earlier have been completed and thereafter, operator proposes to undertake another EOR process to further improve recovery by deploying another category of EOR.

7. **Fiscal Incentives**

7.1. Incentives for Oil Production

- 7.1.1. A waiver of 50% will be granted on the Oil Industry Development (OID) Cess, on incremental production of crude oil from designated wells of an ER project. For IR project, waiver of 50% Cess will be available on the entire production after crossing the prescribed benchmark recovery rate and for unconventional oil production project, incentive of waiver of 50% Cess will be available on the entire commercial production.
- 7.1.2. In case where OID Cess is not applicable on a field, a notional Cess waiver will be calculated and the equivalent amount will be reduced from Government share of Profit Petroleum in NELP or Government share of revenue in case of fields under Discovered Small Field (DSF) Policy or Hydrocarbon Exploration and Licensing Policy (HELP) from that contract area / block / Mining lease area. In cases where less or no Profit Petroleum or revenue share to Government is available, the contractor will be allowed to carry forward the balance amount of incentive to subsequent financial year(s) for 120 months.
- 7.1.3. The waiver on OID Cess would be applicable only if the average crude oil price of Indian Basket during a calendar month is below a ceiling, to be known as ER Reference price as notified by the Government. Initially, ER Reference price will be USD 80/barrel of crude oil. If during the term of the incentive, average crude oil price, as declared by Petroleum Planning & Analysis Cell (PPAC) is above the ER Reference price for a particular month, the incentive will cease to be effective for that month. This period will, however, not be deducted from the overall tenure of the incentive period.

7.2. Incentives for Gas Production Projects

- 7.2.1. There will be an incentive equivalent to waiver of 75% of applicable Royalty on the incremental production of gas from designated wells of an ER project. For IR project, waiver of 75% Royalty will be available on the entire production after crossing the prescribed benchmark recovery rate and for unconventional gas production project, incentive of waiver of 75% Royalty will be available on the entire commercial production. The incentive will have a ceiling of USD 0.4 per MMBTU for offshore fields and USD 0.3 per MMBTU for onshore fields.
- 7.2.2. In case of onshore fields where Royalty is received by the State Governments, the contractor will continue to pay the Royalty to State Governments at normal applicable rates. The contractor will be allowed to set off the incentive amount from the available Government share of Profit Petroleum in Production Sharing Contracts (PSCs) or revenue share to Government in Revenue Sharing Contracts from that contract area / block / Mining lease area.
- 7.2.3. In cases where less or no Profit Petroleum or revenue share to Government is available, the contractor will be allowed to carry forward the balance amount of incentive to subsequent financial year(s) for 120 months incentive period.
- 7.2.4. In case of nomination fields, the incentive equivalent to 75% of Royalty will be allowed against Oil Industry Development (OID) Cess payable on crude oil from any field of the National Oil Companies (NOCs), preferably from onland crude production.

8. **Upper Ceiling on Fiscal Incentive**

The cumulative waiver of Cess / Royalty on any ER / IR / Unconventional hydrocarbons project shall not exceed the total CAPEX incurred for undertaking the ER / IR / Unconventional oil and gas production methods as approved by the Directorate General of Hydrocarbons (DGH).

9. **Enhanced Recovery (ER) Committee**

The Government will constitute a Committee known as ER Committee comprising of officials from Ministry of Petroleum and Natural Gas, Directorate General of Hydrocarbons (DGH) and sector experts from academia, or industry. The Committee, *inter-alia*, would approve

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Enhanced Recovery (ER) Pilot and ER/IR/Unconventional hydrocarbons Projects for fiscal incentives. The Committee will also develop criteria for measuring the incremental production resulting from adoption of ER methods. The indicative functions and role of the Committee is listed at **Annexure -V.**

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Definition and Meaning of Terms used in the Policy

1. **Enhanced Oil Recovery (EOR)** process typically involves injection of fluids which then interact with the reservoir rock-fluids system resulting in alteration in fluid properties in situ and fluid rock interactions. Alterations in fluid properties in situ can result in oil swelling, viscosity reduction, composition and phase behavior changes. Fluid rock interactions include interfacial and surface tension reduction, rock wettability modification and reduction in capillary pressure.
2. **Enhanced Gas Recovery (EGR)** process involves injection of fluids which then interact with the reservoir rock-fluids system resulting in alteration in fluid properties in situ and fluid rock interactions. EGR typically refers to injection of Nitrogen, CO₂ or other inert gases into natural gas reservoirs to artificially increase pressure/mobility or deploy de-watering techniques (equipment/ chemicals) resulting in increase in yield from gas reservoirs.
3. **Enhanced Recovery (ER) and Improved Recovery (IR)**
 - a. ER refers to EOR and/or EGR. List of ER technologies has been given in Annexure II.
 - b. Improved Recovery (IR) refers to any efforts made to increase production beyond current recovery of 60% for oil fields and beyond 80% for gas fields.
4. **Unconventional hydrocarbon (UHC) production methods** include following:
 - a. Shale oil / shale gas production.
 - b. Tight oil production (less than 1md) / tight gas production (less than 0.1 md). The permeability will be average of the payzone.
 - c. Production from Oil shale.
 - d. Production from gas hydrates.
 - e. Production from heavy oil - Oil which is less than 20 API at standard conditions or with viscosity greater than 100 CP (centipoises) at in-situ conditions.
5. **Current Recovery** for Oil for a field is defined as the ratio of cumulative production of Oil at the end of last fiscal period to 'in-place volumes', and Current Recovery for gas field is defined as the ratio of the cumulative production of gas at the end of last fiscal period to 'in-place volumes'. The 'in-place volumes' would be the 2P numbers of the discovery/field, duly audited by renowned third party reserve certifying agencies.



6. **Screening Analysis** involves gathering of reservoir data and carrying out laboratory and simulation studies on the data to ascertain high level techno-commercial feasibility of ER processes for the given field /reservoir.
7. **Enhanced Recovery (ER) Pilot** involves implementing selected ER method(s) (based on Screening) on a small portion of the field / reservoir, which is considered representative of the field, in order to ascertain the results of the ER method and its evaluation for field scale implementation.
8. **Year** means a period of twelve (12) consecutive Months according to the financial year.
9. **Operator/Contractor** refers to one of the entities / party having a participating interest in a given contract area / field and is appointed as the Operator/ Contractor in accordance with the terms of the contract (PSC / RSC / DSF / OALP/ PML agreement/ PML grant). Operator is typically entrusted with carrying out day to day Petroleum Operations during the term of the Contract.
10. **Commercial Production** - The production of crude oil or condensate or natural gas or any combination of these from the Contract Area (excluding production for testing purpose) and delivery of the same at the relevant Delivery Point under a program of regular production for sale.
11. **ER / IR / UHC Reference Price** shall be USD 80 / barrel of crude oil initially which may be modified and notified by ER Committee from time to time.
12. **Notification Date**-Date on which this policy is notified in the Gazette.
13. **Due Date** -Date on which the policy expires (ten years from the date of notification).
14. **ER Project** is defined as a field scale implementation of an approved ER technique for a given contract area or field.



List of Enhanced Recovery Techniques

Tertiary Recovery Methods used for EOR	
Thermal	<ul style="list-style-type: none"> • Hot Water Injection • Cyclic Steam (CSS) • Steam Flooding • In-situ Combustion • Steam Assisted Gravity Drainage (SAGD)
Chemical Flooding	<ul style="list-style-type: none"> • Polymer Flooding • Alkali Flooding • Surfactant Flooding • Alkali Surfactant Flooding • Alkali + Surfactant + Polymer (ASP) Flooding
Miscible Gas Flooding/Injection	<ul style="list-style-type: none"> • CO₂ Injection • Flue Gas Injection • Nitrogen Injection • Hydrocarbon Gas Injection • CO₂ + Nitrogen + Hydrocarbon Gas Injection + Flue gas (any combination)
Others	<ul style="list-style-type: none"> • WAG (Miscible) • Foam Assisted WAG (Miscible) • Simultaneous WAG (Miscible) • Foam Injection • Microbial Flooding • Acoustic Technique • Electromagnetic Technique • Injection of Chemicals that generate tremendous heat and gas in-situ • Low Salinity Water injection • CO₂ injection (Immiscible)

The above techniques can be used alone or deployed in combination.

Tertiary Recovery Methods used for EGR	
<ul style="list-style-type: none"> • Nitrogen injection • CO₂ injection • Any other Inert Gas injection (other than nitrogen or CO₂) • De-watering techniques 	

The above techniques can be used alone or deployed in combination.

Notes:

1. The list of technologies may be reviewed annually by the ER committee and new technologies may be added to the list.



Enhanced Recovery (ER) Screening Report and Approval Procedure

1. Designated Institutions for conducting ER Screening

The designated Institutions such as IRS (ONGC), IIT-ISM Dhanbad, IIT Kharagpur, IIT Bombay, IIT Delhi, and Pt. Deendayal Petroleum University (PDPU) or such Institutions as notified by Government on the recommendations of ER Committee. The renowned overseas institutions may be engaged in carrying out ER Screening provided they have collaboration with any of the notified Indian Institutions.

- 2. For producing fields which have been in commercial production for more than 3 years as on date of notification of this policy, the Contractor will submit to the DGH, an ER screening report within 12 months of notification date. Producing fields which have not completed 3 years of commercial production as on the policy notification date will be required to submit the ER screening report within 12 months of completing 3 years commercial production. DGH may grant 6 months extension in submission of report on ground of just and sufficient cause.**
- 3. The ER Screening report should necessarily cover the following details:**
- i. Production volumes historical and forecasted for Base case (without ER)
 - ii. Preliminary Techno-economic feasibility of the selected ER method, if any
 - iii. Production volume estimates / forecast after ER, if applicable
 - iv. Details of the proposed ER pilot
 - v. Additional specific details as required by DGH
- 4. Result of a screening study may be considered favourable by the DGH, if it establishes the applicability of an ER technique to the reservoir / field which would result in an enhanced production.**
- 5. It would be mandatory for the operator to pursue ER pilot if the DGH considers the result of ER screening report as favourable or directs the operator to conduct the ER pilot, if there exists reasonable probability of enhanced recovery.**
- 6. Such screening report would be approved by DGH, within 30 days of submission /last reply of contractor, provided the queries raised by DGH have been satisfactorily replied to by the contractor, and the report shall be submitted to ER Committee for information.**



A. Approval of Enhanced Recovery (ER) Project

1. The application for ER incentive shall be approved by the ER Committee only if the proposed project satisfies the eligibility criteria.
2. Details of the ER project submitted by the operator after examination are found to be satisfactory.
3. The application of ER project must necessarily contain all the details pertaining to the ER project mentioned below and any additional information / details as required by the ER Committee:
 - i. Details of the reservoir / field location and size in which ER project is applicable including well details
 - ii. Production volume -historical
 - iii. Production volume estimates and forecast with ER from the designated ER wells (which may include some of the existing wells which are part of ER scheme)
 - iv. Planned CAPEX for ER project and milestone timelines including number of wells to be drilled
 - v. Technical details of the ER scheme selected
 - vi. Due diligence from a renowned third party service provider (who is pre-approved by DGH based on operator's request)
4. The ER Committee may seek opinion of a renowned third party, if required, for the same.
5. While evaluating the ER project, the ER Committee will take into account the objective criteria for measuring the incremental production under ER project.
6. The ER Committee will approve the field as eligible for ER incentives based on conditions as provided in the policy within 60 days of application/ last reply of Contractor, provided the queries raised by the Committee have been satisfactorily replied to by the Contractor.

B. Approval of Unconventional Hydrocarbon projects / IR Projects

1. The incentives will be applicable to future discovery of Shale gas and or Shale oil/Tight oil and /or Tight gas /Gas Hydrate discoveries of unconventional resources.

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2. Fields having at least 2/3rd of the total number of wells completed as producers in the Shale gas and/or Shale oil/ Tight oil and/or Tight gas / Gas Hydrate reservoir area shall be considered as eligible for incentive for the entire output from such fields. While considering the number of wells, the number of wells will be rounded off to the lower number in case of decimal.
3. In case of IR projects, the application by the contractor can be made only after current recovery of 60% for oil and/or 80% for gas has been achieved in the field.
4. Massive hydraulic fracking, massive acid fracking shall be considered as techniques eligible for incentives for UHC projects. However, mini fracking, acid fracking, frack stimulation near the well bore and frack packing or any fracking meant for well completion shall not be considered as techniques eligible for incentives under this policy.
5. The proposals under Unconventional production/ Improved Recovery (IR) projects will need to be submitted to DGH which in turn will examine and submit its report to ER Committee for incentive approval.

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Role and Functions of Enhanced Recovery (ER) Committee

The Committee shall be responsible to review and provide approval at different stages which include Eligibility Criteria, ER Pilot, ER Commercial phase and the ER incentives applicable for each case for ER technologies or IR or unconventional production processes as well as other matters related to administration and governance of this policy. In addition, indicative functions of the Committee are listed as under:

1. Reviewing the list of Institutions to carry out ER Screening every year or as deemed necessary. Based on the recommendations of ER Committee, the Government may notify new Institutions to conduct ER Screening.
2. Carrying out a mid-term review, at the end of five years, on the overall efficacy of the policy and assess performance of ER technologies applied on approved fields, incremental production profile as a result of ER and Unconventional production activities etc.
3. The Committee will also develop objective criteria for measuring the incremental production under ER methods such as production against the projection made in the approved ER project.
4. Approval of ER projects, IR projects or Unconventional hydrocarbon production projects and review of the CAPEX & incentives of the contractor thereof.
5. Developing a long term roadmap for building an ER ecosystem and evaluate options/possibilities of strengthening existing institutions by giving them an autonomous status in order for them to serve wider industry participants. The Committee may invite members from industry and academia to help shape the long term ER roadmap.
6. Organizing knowledge sharing forums periodically, for wider industry participants as well as global technology and service providers to discuss leading global practices related to ER.
