



Comments on Draft Policy for Exploration and Exploitation of Shale Oil & Gas in India

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Petroleum Federation of India

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1 Introduction & Key Challenges

In order to enhance the production of oil and gas in India, there is a need to explore vigorously unconventional or alternate hydrocarbon resources. Accordingly, with the objective to develop a framework to facilitate and regulate Shale Oil and Gas exploration and exploitation, ‘*draft policy for exploration and exploitation of shale oil and gas (‘Draft Shale Oil & Gas E&E Policy or Draft Policy’)*’ has been prepared and comments and suggestions on the same have been invited by the Ministry of Petroleum & Natural Gas, Government of India (‘MoPNG’).

In the subsequent sections, industry comments are submitted for consideration on each of the following aspects of *Draft Shale Oil & Gas E&E Policy*:

- Definitions & explanations;
- Measures proposed relating to water management issues;
- Bidding and approval process;
- Block award process for overlapping areas between conventional & unconventional resources;
- Assignment of interest;
- Ownership over data;
- Safety aspects;
- Environmental Impact Assessment;
- Involvement of State Government;
- Obtaining all necessary approvals prior to bidding; and
- Proposed fiscal & contractual terms.

Some of the key observations on the issue are :

- The figures of shale gas resources quoted in EIA report, in the draft policy, for four basins of India appear to be conservative and do not represent the shale gas potential of Indian sedimentary basins. The USGS survey estimates based on inadequate data to gauge gas contents, porosity estimates and matrix permeability of Indian Shale coupled with the absence of any test data is equally conservative;

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- The term ‘issues in exploitation of Shale Gas/Oil’ referred to in para 2.5 of the Draft Policy should be replaced by ‘global environmental and safety standards observed’;
 - Geologically, the potential and prospectivity of different shale gas basins in India need to be categorized. e.g. the shale gas basins of Vindhyan, Cuddapah, Bhima, etc. are not at par with Cambay, Gondwana and KG basins. Thus, a geological and technical exercise should be done. Accordingly, separate contract & fiscal terms should be designed for different basin areas;
 - Existing licenses provide exclusive rights to explore for and develop all hydrocarbon resources in a block. The contractor with exclusive rights should be allowed to develop that license to the best of their ability, irrespective of the reservoirs and hydrocarbons encountered. Further, priority should be to implement shale gas / oil rounds in unlicensed areas which are appropriate for such developments, which might otherwise be unattractive under conventional terms; and
 - As compared to the conventional sector, the service level intensity of the shale gas development is very high. This is evident from the rig count in shale plays, particularly in the US which has developed shale gas sector. Also, more wells are required for shale gas development as compared to the conventional sector which in turn requires higher rig count e.g. global drilling activity, for both conventional and unconventional resources, is heavily concentrated in the US. Thus, for shale developments to succeed, it would be important to provide a conducive policy framework for the service industry as well. Enabling policy incentives would attract services sector operators and facilitate timely development of the shale gas sector. Without the services sector, shale gas activity ramp-up will be a considerable challenge. This is evident from the current developments in the European markets.
 - **Land availability:** Shale gas requires large tracts of land. As most of the land could be in tribal and forest areas, land acquisition would be a major challenge. In tribal areas and in forest areas, getting land and convert its land use is a challenge.

Unlike USA, where owners of land get a negotiated share (royalty) from Shale gas/oil revenue, in our country, land owners have no such or any other financial incentive to give away their lands for exploration and exploitation of shale oil/gas.

- **Water Availability:** As hydro-fracturing requires large volume of water, success of shale gas/oil would depend upon availability of water, its disposal and issues of contamination.
- **Environmental clearances:** Environmental clearances in forest areas, including water contamination and disposal, are going to be a major challenge. Before identifying acreages for offer, these issues need to be settled to avoid investors facing problem or projects becoming non starter.
- **Legislative challenges:** Current laws (ORDA & PNG Rules), allows grant of an exploration or mining leases for oil and gas on an exclusive basis. If these have to be given on a formation wise (depth wise) basis based on source of gas or oil, then laws need amendment to avoid future disputes or delays. Further, what would happen, if shale gas/oil is interspersed with conventional oil and gas in identified formation?
- **Total lack of infrastructure:** Potential shale gas/oil areas are in remote areas with little infrastructure. Sufficient incentives (both fiscal and non fiscal) would be required to build infrastructure. The companies have to be given operational flexibilities by Government (both central and concerned state Governments) to make shale gas and oil exploration and exploitation a success.

2 Definition & Explanations

2.1 Definition and explanations (Refer to para 2.2 of the Draft Policy)

The Draft Policy defines the terms:

- Shale gas (Refer to para 2.2.1 of the Draft Policy)
- Shale oil (Refer to para 2.2.2 of the Draft Policy)
- Shale gas and Shale oil reservoirs (Refer to para 2.2.3 of the Draft Policy)
- Shale gas and Shale oil blocks (Refer to para 2.2.4 of the Draft Policy)

Comments

- The draft policy confines itself to a narrow definition of shale gas / oil. The origin of the policy lies in the objective of providing an incentive and regulatory mechanism for the exploitation of scarce hydrocarbon resources which by conventional exploration and exploitation techniques are either on the technological frontier or economically marginal. Such hydrocarbon resources require deployment of special exploration and exploitation techniques, which require scarce resources like water and can pose potential environmental risks. Considering the above the following may be taken into consideration for making the policy broad based and inclusive so as to achieve the stated objective.
- Para 2.1 of the Draft policy is proposed to be amended to incorporate “*Technically, these are the gas deposits where permeability of the surrounding rock is too low to produce commercially using standard drilling, completion and production techniques*”.
- Para 2.2.1 of the Draft policy:
 - It is proposed to be amended to incorporate “*Shale Gas means natural gas generated insitu and retained in Shale and associated fine grained rock matrix, adsorbed on to organic particles and within fractures*”
 - The definition of shale gas should be refined to give more clarity about the nature of shale gas reservoirs

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- Para 2.2.2 of the Draft policy is proposed to be amended to incorporate “*Shale Oil means crude oil / condensate generated insitu and retained in Shale and associated fine grained rock matrix and within fractures*”.
 - Comments related to Para 2.2.1 & 2.2.2 of the Draft Policy are:
 - This policy governs all the hydrocarbons produced within the in-situ rock, which are in mobile state at subsurface temperature and pressure conditions. The noticed difference from the mentioned shale plays in the definition is the Oil Shale play and Oil sand deposits and has been exempted from this draft policy as they have different extraction techniques. The phrase ‘mobile state hydrocarbons at subsurface temperature and pressure conditions’ should be introduced to rule out confusion between oil shale and oil sand which are different category altogether. Further the phrase ‘dominant shale’ word should be introduced to include other stringers of sand/carbonate within the shale layer;
 - The present definition of shale gas is narrow due to which situations can arise wherein different interpretations (inclusive as well as exclusive) can be drawn out for actual ground situations. To give an example if one were to discover natural gas in a calcareous mud rock which is otherwise organically lean and not a source rock and the gas is migrated from a different source, under the present definition it would be excluded as a shale gas. The following definition along with explanatory sentences is suggested to avoid any ambiguity:
 - *Shale gas means natural gas found entrapped in fine-grained sediments (lithologies) which are naturally poorly permeable and which can be obtained through boreholes. Given the properties of fine grained sediments (~shale), most commonly organic rich shales retain some or all the gas liberated during maturation (thermal maturation / cooking). This gas is ultimately retained by various mechanisms which include adsorption on organic molecules / clays or stored as free gas in micro or macro pores. Additionally fractures and naturally occurring partings (laminations / bedding planes) present within the shale may also retain free gas. Shale gas is commonly found in mature organic rich source rocks but not as a rule only in source rocks.*
 - *Shale Oil means natural crude oil entrapped within fine grained sediments (lithologies) which are naturally poorly permeable and which can be obtained through boreholes.*

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- *In addition to the ‘Shale Gas and Oil’, occurrences of oil and gas in other unique conditions may also be included as ‘non-conventional’ and can be grouped with ‘shale gas/oil’ for their exploration and exploitation. Such occurrences require deployment of exploration and exploitation techniques similar to those required for shale gas / oil.*
 - *Examples of such conditions are given herewith which can be included in the policy:*
 - *In tight conventional reservoirs, wherein natural porosity is reduced to such an extent, by geological processes, which render the otherwise permeable lithology to be relatively impermeable.*
 - *In many sedimentary basins, naturally generated gas remains fully or partially entrapped within mature kitchens in depositional or structural depressions (lows). These occurrences in such depressions are normally at depths which are difficult to deal with by conventional methods. Such entrapments are commonly referred to as ‘basin centered gas’, which may be present in a variety of lithologies which can be conventional or unconventional reservoirs.*
 - *In some cases accumulations are found in fine grained naturally impermeable lithologies wherein permeability and or porosities are enhanced due to natural geological processes like fracturing. Such fracturing may occur due tectonic (natural mechanical failure) or other geological processes. The oil and gas in such accumulation is commonly naturally migrated from sources in other intervals / areas. Oil and Gas occurrences in such conditions cannot be explored by conventional methods and require deployment of special advanced techniques akin to those required for shale gas / oil. Areas with possibilities of such accumulations may be included in the policy, only with detailed specification.*
 - **Comments related to Para 2.2.3 of the Draft policy are:**
 - *It is proposed to be amended to incorporate “Shale Gas and Shale Oil reservoirs are gas and oil accumulations in potential shale and associated fine grained rock section / zone persisting over large geographical areas which are economically producible only through special drilling, completion and stimulation techniques”.*

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- Additional aspect should be added in clause 2.2.3 of the draft policy is *“Decreasing costs and reducing risk while maximizing shale gas production necessitates innovative, advanced analytical capabilities for simulation that can give a comprehensive understanding of the reservoir heterogeneity in order to extract hidden predictive information, identify drivers and leading indicators of efficient well production, determine the best intervals for stimulation, and recommend optimum stimulation processes and frequencies. Without the critical insight enabled by integrated analysis to pair productivity analysis with economic feasibility, companies face significant risk and uncertainty when developing new wells or optimizing production of extant wellbores”*;
 - Para 2.2.3 & 2.2.4 - Shale Gas and Shale Oil reservoirs are large areal plays but the continuous accumulation of hydrocarbon in shale is not always true. There are always chances of lithological changes within shale with small intercalation of sand and carbonates, which constitute the free gas content of a regional shale play. Therefore, the definition should also emphasize on the lithological aspects or should mention dominant lithology being shale rather than only shale;
 - Comments on Para 2.2.4 of the Draft policy are:
 - It is proposed to be amended to incorporate *“Shale Gas and Shale Oil blocks, having specific operational window in terms of sub-surface vertical depth / geological formation, is defined as a major shale section / reservoir / zone / window composed of predominantly fine grained rock dominated by shale and may also contain other associated rock types like Silt stone and fine grained sand stone in in the form of stringers, lenses and intercalated layers having gross volume less than 50 % by wt.”*
 - It is not possible to define an window having only shale oil / gas prospect as per above definition prior to drilling , sampling and logging as there will always be associated fine layers , lenses, stringers of silt stone, sand stones etc. having poor permeability and as these cannot be mapped precisely / conclusively.
 - It will also be quite challenging and at times almost impossible to exploit only shale play section without affecting non-shale section having hydrocarbon as defined in the draft Policy.

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- Therefore the Shale gas play in the Policy and Contract document should be defined clearly to avoid any conflict post award, related to interpretation after obtaining Logs, cores etc.
 - A clause of depth of operation for shale oil and shale gas will not be a good idea. Both shale oil and gas should be given a single window status in the policy and it should be changed to shale play (oil & gas) single window. The experience from the US indicates that normally Shale Play is reservoir for both natural gas and liquid hydrocarbon;
 - Defining specific operational window is difficult in basins like Cambay where most of the conventional reservoirs are members within the shales (with varying depths);
 - Shale Oil and Gas Blocks will have specific operational window for oil and gas in terms of subsurface vertical depth. Any subsurface formation which cannot be otherwise included in the definitions and inclusions earlier given for 'shale gas / shale oil' will be excluded from this policy, wherein they fall within the defined operational window.
 - Considering the above mentioned points, another round of discussions should be initiated to address the unlocking of value of all unconventional resources of hydrocarbons, for the country, rather than going by narrow definitions of shale gas / shale oil.;
- Also the policy states different windows (depth-based) for shale oil and shale gas to be defined by Government of India ('GoI'), which appear to be unrealistic from technical and operational perspective. Incorporating a composite term of 'shale play' (as in USA, Poland, etc) for a more realistic approach is suggested.

3 Water Management Aspects

3.1 Measures proposed relating to water management aspects (Refer to para 2.5 & 2.6 and Annexure I & II of the Draft Policy)

Comments

- Clause 2.5 (iii) of the Draft Policy should be amended to read as “*The treatment of wastewater before discharge is regulated under the Water (prevention and control of pollution) Act administered by the State Pollution Control Board. The discharge standards as prescribed under The Environment (Protection) Rules, 1986 – Schedule 72: Oil Drilling & Gas Extraction Industry needs to be appropriately amended to permit deep well (> 1000m depth) discharge (Refer Schedule 72 Clause A Item (ii)). Section to be introduced to cover the specifics of use and disposal of fracturing fluids, liquid and solid waste management*”;
- Clause 2.5 (iv) of the Draft policy to be amended to define fresh water and to clearly articulate that in case the aquifer is considered as entirely saline (TDS > 3000 mg/l) and thus not potable - the need for multiple casing is not mandatory;
- Government to make available to the Contractor suitable site(s) for such large volume of rain water harvesting.
- In case of mandatory rain water harvesting requirements investments it must be remembered that in most areas these investments could be capital intensive as well as come into conflict with local water use rights. Therefore costs on developing such harvesting structures need to be cost recoverable. Also clear guidelines need to be laid down whether such structures can be built to harvest rainwater along existing drainage structures. These rights would naturally involve clear right of use of such drainage structures, canals, rivers streams or re-charged ground water aquifers etc. Without clarity on these I see potential for social conflicts which will endlessly delay projects.
- Making multi-well pad drilling mandatory in the policy may not be appropriate. It should be determined by the operator based on topography, lease area, economics, etc.
- The Government should facilitate in getting such clearances, consents, permits, etc.
- This needs to be discussed between stakeholders as part of proposed Model Contract GoI to facilitate co-ordination of operator with Ground Water Boards and Jal Nigams to jointly assess water availability, water management scenarios and to ensure non-possibility of aquifer contamination;

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- Suitable sites in all basins and clear definition of remedial measures should be mentioned under “National Environmental Policy 2006”;
 - If possible, the source of water for hydraulic fracturing jobs and its subsequent disposal plan should be clearly described in the policy. The ground water policy should be decided;
 - It is not clear at what stage rain water harvesting would be required – during Phase-I or during development as hydrofrac would be done even in Phase-I/Phase-II. Also, sourcing water based on rain water harvesting would not be sufficient for water requirement for hydrofrac. Moreover, clarity on sourcing of water may be there else hydrofrac may not be possible except during rainy season where there would be ample water from river and rain sources;
 - GoI should issue guidelines in consultation with Central/State Agencies for regulating and permitting water clearance in given time frame;
 - In US, ground water, pond water or river water is used for hydraulic fracturing depending on the availability in the area and permission by the river authorities. Permits may be required depending on the depth and specific Groundwater Conservation District Rules;
 - Also, the federal Clean Water Act and state laws regulate the discharge of flowback water and other drilling wastewater to surface waters, while the Safe Drinking Water Act (SDWA) regulates deep well injection of such wastewater. Hydraulically fractured wells are also subject to various state regulations (like from DOE, EPA, etc);
 - Annexure-I (iii) should be amended to include new rules/guidelines & TOR’s developed, if any, should be jointly reviewed with the contractor before implementation / bidding of the Block; and
 - The operator should have the freedom to decide on use of technology and options rather than adopt only some recommended methods. The operator should have the freedom to use the best technology, according to his judgement and given his choice of best technology available. Since shale gas E&P is not on the basis of cost sharing, there should be no compensation mechanism either.
 - Water, the main requirement for hydro fracking is very scarce resource in India. Shale gas exploration being a completely commercial proposition, a precondition needs to be put in place disallowing the usage of local ground water for fracking. The JV should be able to procure Water from commercial sources and at commercial rates. The main reason behind this being that if allowed to utilize the groundwater over exploitation of already depleting resources will create further problems for the local population.

- In addition segregation of aquifers by usage of double casings should be made mandatory. The casing depths should be specified area wise and the deeper of the two should not be shallower than 1000m for the reasons enumerated ahead. We should take care that not only the rechargeable aquifers are segregated but naturally present water which is normally found several hundreds of meters below the conventional ground water levels is also protected. This will safeguard our resources for several years to come.
- Treatment and disposal of the water that has flown back from the well after fracking has to be made more stringent and the water management authorities should work out very clear guidelines to this effect. The general trend abroad is that organizations involved in fracking do not declare the chemicals used as propanant under the claim that it is proprietary. This should be disallowed and disclosure of chemical and preapproval of the same needs to be stressed on. Further the water pollution control authorities should be empowered to undertake surprise tests of the flowback water to ascertain that no harmful chemicals are employed.
- Propane fracking should also be considered as option in severe water shortage areas. Cost implication may be seen and should be compensated.

4 Bid Process

4.1 Bidding & Approval process (Refer to para 3.2, 5 (5.1 to 5.7) and Annexure IV of the Draft Policy)

Comments

- There is insufficient data at this stage to introduce any open acreage system for shale gas in the country. Open acreage is only possible after sufficient data has been generated;
- Since shales and arenaceous units of lithology occur in nature together, it is difficult to allocate a depth window connotation. Provisioning for 2 or more operators in the same block for different lithologies is a difficult task. This aspect requires greater deliberations from legal perspective;
- Evaluation of bids and awarding of Contracts should be done in a time bound manner, preferably within 3-4 months after the last of date of closing of bids.
- Sub surface operational window of depth may be redefined after obtaining actual data by the approval of the Steering Committee (SC); and
- Work programme may be divided into yearly committed work programme so as to monitor yearly progress. e.g Phase-I: 5 years should be for exploration, appraisal and evaluation of the prospect and feasibility. This should include the following:
 - Detailed Geological, Geophysical & Geochemical Studies for screening of the potential productive shale play which shall include Total Organic Content (TOC), thickness of target shale, gas content Scf/Ton;
 - Scheme for availability of water and disposal of flowback water: Studies on secure source of water for drilling and hydrofrac;
 - Drilling of pilot/test wells : vertical and horizontal wells;
 - Hydraulic fracturing and flow rates studies : Collection of data from drilling of pilot wells – core analysis, log analysis, net shale thickness, single/multilayered reservoir, well spacing, estimation of gas/oil in place, feasibility of horizontal well drilling & completion and finally screening for completion strategy. Screening criteria/evaluation for stimulation/hydrofrac treatment consideration based on data collected during initial drilling of pilot/test wells;
 - Techno-economic feasibility report and full scale commercial development plan
 - Any other study which the operator considers relevant to assess the prospectivity of the block and feasibility to exploit the resource in a commercial manner;

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- Bidder should commit to a minimum work program/ investment of wells to be drilled during this phase (Bid evaluations on the basis of meterage drilling depth, commitment of vertical well vs directional / horizontal well may be looked into. Since the objective may be to screen the potential of the productive shale thickness, lateral continuity, areal extent, TOC, thermal maturity unlike conventional for which specific studies as above may be required and may be given weightage);
 - The operator should have the technical freedom to modify or amend work programme details –like deciding on change over from vertical to horizontal wells and consequently coverage of vertical well with horizontal wells—depending on the geological and other technical ground level data. For example, even after committing on drilling ,say, five vertical wells, the operator should have the technical freedom to cover the same area with specific number of horizontal or a combination of horizontal and vertical wells, as warranted by geological and other technical data in the area; and
 - Once the commerciality is established, the other wells should be allowed to be completed as a part of development / production wells.

Another view

- The contractor should be permitted to interchange between work program (say one fractured horizontal well instead of 2 vertical wells) or the replacement can also be compared in terms of amounts spent / committed between the work programs. More weightage should be given for horizontal wells and the same should be based on number of stages.

4.2 Bid parameters, weightages and evaluation terms (Refer to Annexure IV of Draft policy)**Comments**

- ‘Operational experience’ should be defined clearly;
- Bidders having experience (whether as Operator or as Non Operator) in Shale Gas Operations should be given appropriate weightage in the bid. Further, experience relating to CBM & Coal operations may also be considered
- In the Annexure – IV, Clause No. (iii), it is mentioned that the Contractors technical capability will be evaluated mainly based on the requirement that any consortium partners should have at least 3 years of operational experience in upstream conventional oil and gas/

CBM/ Shale gas or oil, anywhere in the world, and will be considered as one of the basis for award of contract.

- It is suggested that the weightage be changed from 40% MWP and 60% PLP to 40% MWP, 40% PLP, 10% in Unconventional gas/oil Experience and 10% in Conventional Experience;
- As per Annexure IV (i) & (ii) the bid evaluation is solely on MWP and PLP with 40% & 60% weightage respectively. The PLP percentage appears to be high for a realistic evaluation. At this early stage of Shale gas in India the objective of GoI should be more of data generation and facilitate that the country reaches a level of sustainable exploitation of Shale Gas. It should not be lopsided to earning from PLPs which in any case would be there. This would filter out actual interested bidders who know the game and realistically understand cash-flow matrix, instead there could be chances of unrealistic PLP bids and those block idling;
- Bid evaluation criteria suggested in the draft policy is 40% weightage on MWP and 60% weightage on fiscal (PLP). It is suggested instead to follow the criterions similar to CBM rounds like 30, 35 and 35% for Technical capability, MWP and fiscal package;
- Production Level Payments (PLP): As per the draft policy, PLP percentage is one of the bidding parameters. This may give rise to irrational bidding by participating companies in the bidding round, which can be avoided by having a pre-fixed profit split percentages for a particular category of blocks;
- Cap on maximum number of wells under MWP: As part of the bidding process certain weightage is given to MWP commitment by the bidders. This sometimes leads to unexpected commitments made by bidders in terms of number of wells a bidder bids for a particular block, which cannot be justified. It is therefore recommended that the number of wells to be bid under each block should be capped depending upon the basin type and block area;
- More weightage should be given to Work Program since without effective work program there could be no success/discovery and hence resulting in no revenue to GoI; and
- There should be no weightage for pad drilling. Operators have no idea whether pad drilling will be required or not as this depends upon technical / geological parameters of the block which will not be known until proper exploration / studies are carried out during / after the MWP.

Another view

- Experience should be considered only of the Operator and not of Non Operator who have commercial production of any unconventional hydrocarbons (like CBM, shale gas, etc.) instead of only shale gas;
- There should be no cap on number of wells in MWP as that would result in everyone bidding at the cap to get the maximum points. Stiff penalties should be there on operators who do not complete their MWP commitments; and
- There should not be mandatory pad drilling. Instead there can be a weightage / points for pad drilling.
- It is going to be difficult to evolve criterion for bid evaluation as compared to the normal criterion followed for bid evaluation in the NELP rounds.

- To give two examples:

- In case of seismic acquisition program in the NELP rounds bidders have generally been quoting 3D API in terms of sq. km. However, in a few cases some bidders have gained advantage by quoting for 'high resolution 3D API'. Nowhere in the bids were the difference between parameters for a normal 3D and a high Resolution 3D, were brought out.

Exploring for shale gas may require some additional efforts to achieve the results beyond conventional 3D and utilization of latest cutting edge technologies ex. 3 Component 3D, Wide azimuth etc.

What is required is that the bid document may specify, on a case to case basis, what would be the minimum parameters to be maintained and then award additional points on bidders explicitly specifying if they would undertake any additional program.

- In case of wells, the problem is even more acute. Presently no systematic data, on the possible 'shale gas' prone horizons, is available from any of the four basins identified. In case bids are invited, the exploratory work program will have to be planned in two stages, the second dependent on the results of the first. In all probability, the contractor will have to first systematically establish the presence of and distribution of shale gas bearing horizons, through vertical test wells. This will have to be followed by a program for drilling of horizontal wells to establish the sustainability and commerciality of any discovered shale gas pays.

This would also ensure that whichever area is contracted for exploration, produces a valid and scientific first pass result for determining future course.

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- Therefore the minimum work program may have to be divided into a firm program of vertical wells followed by an optional program of horizontal test wells. For the purpose of evaluation either of the following two strategies could be adapted:
 - Split the exploration phase in two parts, a) Exploration test phase with vertical drilling and testing and b) Exploration assessment phase with horizontal drilling and testing.
 - Give separate weightages for program committed in both these phases.
 - Restrict first round of exploration (in any block identified) to the exploration test phase, as it is practically a 'wild-cat' phase. Bids to be evaluated on commitment of wells in first phase. The program for the second phase will then be conditional and the contractor be allowed to enter the second phase only on completion of all elements of the first phase.
 - If the presently followed practice and suggested terms for exploration phase are to be followed then weightage will have to be given primarily on a) Number of wells committed and b) Committed drilling meterage (differentiating vertical and horizontal components of meterage) per well, giving higher weightage to horizontal meterage.

5 Block award process - Overlap with existing areas

5.1 Block award process where there is overlapping with existing areas (Refer to para 3.3, 3.4 & 3.5 of the Draft Policy)

Simultaneous Exploration and Exploitation of Hydrocarbons i.e. conventional Oil and Natural Gas, Coal Bed Methane (CBM), tight gas and Shale Oil and Gas from the same contract area by same/ different operators will be governed by the relevant policy of the Government of India. As such, in case of acreage an offer for shale oil / gas overlaps or falls within an existing Oil and Gas /CBM Block, right of first refusal will be offered to the existing contractor to match the offer of the selected bidder, provided he agrees to all the terms and conditions of the bid. In case they refuse, they will have to enter into a model co development /operating agreement for simultaneous exploration.

Comments

- Government should expedite the policy for simultaneous exploration. Modalities for a model co-development/operating agreement for simultaneous exploration need to be defined: For example if the two operators feel that a particular well can satisfy the exploration objective for both the shallower conventional play and deeper unconventional play; what would be the guidelines for cost sharing and cost recoveries to satisfy the MWP of the concerned operators.
- First right of refusal with the existing to contractor shall be providing undue advantage to the existing players. ROFR would reduce competition and the Government may be denied of getting potentially more competent and better terms.
- This clause is discriminatory in nature and needs modification. The reasoning is as follows:
 - Any new player wanting to bid for the blocks would have his own estimation of resources and reserves, based on which he works out a CAPEX and OPEX scenario. Such a scenario, in the present context would be heavily dependent on a new operator's need for creating both the surface as well as subsurface infrastructure and CAPEX thereof. If the existing operator is to match any bid made on such inputs, it would always be of advantage to him as he would face significantly lower CAPEX and OPEX, having most of the infrastructure in place. Ultimately a fresh bidder would always be at a disadvantage thereby removing any incentive he may have for entering the venture with its inherent risks.

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- The shale gas activity should be distinct totally separate and independent of any previous rights for conventional oil and gas, to ensure fresh infusion of capital and efforts for unlocking the value of these resources.
 - It is also important to understand that pre-existing operators had no incentive to undertake shale gas / shale oil exploration as in most acreages the conventional exploration and exploitation was less risky and with well understood parameters to develop an economic model. So thought also needs to be given if the national objective of unlocking value of shale oil/ shale gas can be achieved by providing incentives for pre-existing operators to undertake shale oil / shale gas activities.
 - DGH to facilitate providing all the existing raw data of the block to the Contractor. Overlapping licenses with simultaneous operations will pose significant HSE risks & operational conflicts, would lead to conflicting claims to resource ownership, inefficiencies in optimal utilisation of capital, among others;
 - Regarding simultaneous exploration and exploitation of hydrocarbons in the same area where an existing operator is carrying out exploration activities, nothing should be done which violates the existing contracts with the existing lease holders. Any violation of the contract will amount to violating the rights of the existing operator who has already done considerable work on development of mining in the area. For example, the existing operator has done reservoir planning, drilled / drilling wells, interconnected wells through pipelines and will continue to do so and other related activities;
 - Existing conventional license holders might have completed all the geology, geophysical & geochemical studies where the new company bidding for the same area for shale gas license should bid for the same studies. Under first refusal provision preference will be given to existing conventional license holder if he matches the selected bidder's offer. In such case, the existing license holder has to commit the same work program which he had carried already for conventional license;
 - Most of the onland areas / basin viz. Cambay, Gondwana, KG and Cuavery are already awarded to various Contractor and most of these blocks are under development phase. Exclusion to these blocks / areas shall limit the scope of prospective Shale Gas areas. The proposal in the Draft Policy will delay exploration and exploitation of shale gas in such areas. This may be covered in 3.3 or the existing operators should be given rights to exploit shale oil and gas resources.

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- The two paragraphs viz. 3.3 & 3.4 can be interpreted as self-contradictory. It would help to reverse the order of the two for greater clarity, and change the wording in Para 3.4 to also make clear that excluded blocks have rights to exploit any/all hydrocarbons: “*All areas which are already allotted under Nomination / pre-NELP / NELP / CBM rounds have exclusive rights to explore and exploit all hydrocarbons on that license*”;
 - Point (ii) of Annexure III in contract terms of draft policy should be defined clearly for existing license holder and new companies bidding for the same license;
 - In case of co-development of conventional and unconventional hydrocarbon resources, an order of precedence of the various policies may be provided to address any future conflict that may arise;
 - In case of existing operator encountering substantial reserves in shale-sand intercalations or in shale formation, while drilling for conventional oil or gas in a CBM/ NELP block, the course of action may be specified in the new draft policy;
 - In case of shale gas blocks overlapping with existing O&G/CBM exploratory blocks there should be an option for the existing operator to have a Right of first refusal (‘ROFR’). However, in case of multiple overlaps the highest operator with percentage overlap will get preference and there should also be a cut-off i.e. a minimum overlap percentage to exercise ROFR;
 - In case the boundary of a shale gas block falls in two conventional oil & natural gas/ CBM blocks with two different operators, it should be clarified as to who will get the ROFR;
 - It is to be ensured that submitted bid for shale play is not formed deliberately to affect the operations and operators in overlapping areas. There should be some mechanism to ascertain that the bids which are to be matched are realistic at their own rights;
 - The draft policy excludes from its ambits the blocks in development and production phase. This will leave possibly huge shale gas/oil resources in these blocks. This should not be excluded from the policy framework. As a possible option they can be allowed to be explored and exploited by the same operator under simultaneous exploration/exploitation scenario with a guaranteed work commitment by the operator of a matching size block in the bid offer; and

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- The existing operator should be allowed adjustment to his understanding of the geology on the work programme/bid.
 - In some cases where Shale oil and gas are interspersed with other oil and gas sources, it will be difficult to ring fence regimes

Another view

- As the bidding for the block is open and all participants are being provided with equal opportunity, First Right of Refusal should not be provided to the existing conventional oil & gas exploration party. Instead, there may be a policy for prioritisation of land usage.

6 Fiscal Regime (Para 4 (4.1 to 4.4 & Annexure III of Draft policy))

Fiscal regime proposed for exploration of shale oil / gas is proposed to be based on royalty and production linked payments, similar to the regime adopted for CBM operations. Ad-valorem Royalty at the prevailing rate for crude oil and natural gas would be applicable to shale oil and gas respectively, and accrue to the State Governments, whereas the production liken payment on ad-valorem basis, will be made of the central government. This is proposed to be linked to different production slabs which will be biddable item. This will minimise Government intervention and remove complications in accounting, and incentive for gold plating, which may occur while allowing profit sharing, based on cost recovery. Government share of production will be net of all statutory dues.

Comments

6.1 Royalty at ad-valorem rate at well head (Refer to Annexure 3 (i) of Draft policy)

- Since, the shale gas production is in small quantities as compared to conventional natural gas production, it is recommended to introduce sliding scale royalty (gas price and production level sensitized);
- The royalty rates should be lower than the rates applicable in conventional oil & gas in view of the risks and technological complexity involved;
- Incentive may be provided on royalty based on depth & production; and
- Well head value for calculation of royalty should be clearly defined in the MPSC in order to avoid any doubts relating to calculation of royalty to be paid to government. Royalty percentage and formulae for computation of well head price should be specified.

6.2 License/lease fee and other charges (Refer to Annexure III (ii) of fiscal regime)

- The required payments should be identified at bid stage;
- DGH / Central Government should have an in-principle approval for issuance of PEL in respect of blocks on offer from State Government and the PEL should be issued by the relevant state government as soon as the block is awarded and the contract is signed.

Alternatively, it should be considered “Deemed Issued”, hence there will no delay. Also, there should a standard format of PEL for all states;

- It is suggested that the GoI supports the state governments in the process of issue of PEL. Many a times the state governments are inadequately equipped to award the PEL / ML leading to huge delays. e.g. there is a significant delay in issue of PEL in states such as Jharkhand / Orissa due to the lack of knowledge of PEL issuance. In such a scenario the issue of PEL alone takes more than a year. Hence an apex body should be formed which can provide support the state governments in providing the PEL in order to expedite the process. In essence better coordination between central and state governments is required;
- Other important clearances like Environment clearance, clearance from Pollution Control Board of state government and Mining Lease should be in place before the signing of the Contract with the GoI. Alternatively, all these clearances should be considered as “Deemed Approved” by the respective Ministry/(ies)/State Government at the time of signing of the Contract. Operations should immediately start after the signing of the Contract and there should be no delay in getting the other clearances required for starting the work;
- Based on typical shale gas type curve evolution on date, the mining lease (ML) should be at least for 50 years. In addition, for any statutory or governmental delays, such period of delays should be automatically added in the ML period;
- The matter of dispute and arbitration shall be decided by the competent authority as a matter of law provided to the parties under contracts for dispute resolution. Holding back the ML extension pending resolution of disputes may not be appropriate; and
- The draft policy states that extension of ML may be made automatic to all the contractors who do not have any dispute with the State /Central Government, and who do not have any arbitration pending. Although, the automatic extension is welcome, it is proposed that extension should not be linked to “disputes” or “pending arbitration”.

6.3 Production level payments (Refer to Annexure III (iii) of fiscal regime)

- There should be “NIL” PLP for average production upto 1 mmscmd, since this is a virgin field with nearly absence of data.

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- PLP should be fixed by GoI rather than biddable item. No weightage in bid evaluation criteria should be given to PLP;
 - Initial period of SG-PLP holiday in terms of years may be made biddable. Further the period should commence from the date a well is brought online and shall be well specific;
 - Incentive may be provided by way of reduced PLP or Production tax may be provided for exploration cum exploitation of shale gas from deeper horizons (less than 2000m & more than 2000m); and
 - Incentive may be provided for shale gas exploration in regionally difficult areas like north east considering high cost of exploration/drilling/hydrofrac/completion costs from deeper level.

6.4 Cost Recovery will not be admissible (Refer to Annexure III (iv) of fiscal regime)

- Given the potential for delays in shale oil and gas exploration with number of local and regulatory challenges, an element of inbuilt cost sensitive mechanism will definitely encourage more investment.
- There should not be any provision for cost-recovery in shale gas because this will inevitably lead to complexities and complications as is being seen in the current PSC's with cost recovery. The bidder is interested in returns of a stipulated amount, based on his perception of the risks involved in both cases, namely contract on royalty payment or on cost-recovery basis; and
- Profits will accrue only after production starts, irrespective of the contract type. If a field is not viable whether it is cost recovery or not doesn't matter. The bidders will bid royalty based on their threshold IRR.

Another view

- As shale gas exploration is cost intensive with attendant risks, cost recovery with certain cap (say 40%) may be kept to attract investors/bidders.

6.5 Commercial discovery bonus (Refer to Annexure III (v) of fiscal regime)

- This may be waived at least for first bid round to attract bidders having expertise in shale gas exploration; and
- This needs to be defined in more clear terms as the commercial discovery would be determined on a well basis or on field basis.
- The payment of a commercial discovery bonus by the Contractor should be done after the start of production of hydrocarbons, instead at the time of declaration of commercial discovery. For instance, in a very unlikely situation, where the proposed development plan is not mutually agreed between the Contractor and the Government and the Contractor withdraws from the block subsequently, they will be required to pay the discovery bonus without exploiting the hydrocarbon.

6.6 Fiscal Stability & Tax incentives

- A clear, stable and incentivized tax regime plays an important role in contractual framework;
- Any change in direct and indirect tax laws and rules after the date of contract should not adversely affect Shale PSC participants and their service providers including sub-contractors and their employees. Fiscal stability should be independent of expected economic benefits arising out of changes in price of oil or gas, etc.;
- Fiscal stability clause should also protect Shale PSC participant from any new levy introduced after the bidding of the contract. A corresponding amendment/clarification/enabling provision shall be made to the respective laws in consultation with the Ministry of Finance;
- Most of the countries had / are providing fiscal incentives to develop their shale gas sector. United States, the largest shale gas producer and China are appropriate examples where substantial fiscal incentives were provided; and

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- To develop the shale gas sector in India it would be important to provide fiscal incentives. Following may be considered both for direct and indirect tax:
 - Tax holiday/weighted deduction should be provided for both oil and gas production;
 - Exemption should be provided from MAT provisions;
 - Short stay exemption should be provided for expat remuneration;
 - PSC Consortium members or service providers acting in consortium should be taxed in an individual capacity;
 - Certainty/clarity in taxability of service providers on a presumptive tax basis to be provided;
 - Exemption from CST on goods supplied to E&P companies for petroleum operations should be provided;
 - No cess would be levied on shale oil and shale gas. Additionally, Excise duty & Service tax exemption should be provided;
 - Expanding the list of duty-free items that can be imported by the E&P sector; and
 - The transactions between operator and non-operators should be clarified not be considered as 'service' for the purpose of levy of service tax.

6.7 Income tax applicability (Refer to Annexure 3 (vii) of Draft policy)

- There may be some incentive to Contractor/bidders for lower tax rate for initial 2-3 years so as to recover the cost incurred during exploration drilling, development costs; and
- Alternatively, any adverse increase in taxes and levy of taxes / cess or payments subsequently introduced after signing the contract by GoI should be allowed to be adjusted against the Royalty /PLP payments by the contractor.

6.8 Exemption from payment of customs duty (Refer to Annexure III (viii) of Draft policy)

- The Shale Oil / Gas operations are distinct from NELP and CBM Operations. A separate list of items for exemption from customs duty is attached. However if the existing list is to be utilised the List 14 (which is for CBM) needs to be amended. (A list for shale oil and gas is annexed as **Annexure A**).
- Exemption must also be given to local manufacturers from excise duty / CST / GST and other local taxes and levies; and
- Instead of taking essentiality certificate for every purchase, operator should be given an authority to avail custom and excise exemption. The operator can file a return with DGH anytime such authority is exercised to confirm that it is in line with the rules and regulations.

6.9 Site restoration as per NELP /CBM (Refer to Annexure III (ix) of Draft policy)

- Site restoration needs to be discussed with stakeholders and should be included in Model Contract

7 Contractual Regime (Para 3.6 to 3.12 & 4.1 to 4.4 & annexure III on Contract terms of Draft Policy)

7.1 Contract Duration (Refer Annexure III contract terms of Draft Policy)

- Total Contract period should be at least 50 years given the profile and nature of shale gas
- The contract phases in the policy are exploratory phase (7 years) and development/production phase (25 years). This appears to be reasonable except that the exploration phase I should be divided into two sub phases wherein 1st sub-phase should be dedicated to seismic\G&G data generation and the second for well(s).
- Phase I should be split into Phase IA and Phase IB.

Phase IA (4 years)

- Work Programme to include work detailed geological, geophysical, geochemical, laboratory and engineering studies including selection of exploratory well sites.
- Drilling of sufficient exploratory wells including coring.
- Preliminary feasibility studies.
- Submission of report on technical findings.
- Exit clause to be there after Phase IA

Phase IB (3 years)

- Work Programme to include
- Drilling and stimulation of test wells and flow rate studies.
- Scheme for availability of water and treatment / recycling / disposal/ disposal of flow back water.
- Any other study which the contractor considers relevant to assess the prospectively of the block and feasibility to exploit the resource in a commercial manner.
- Third party certification of Shale gas / oil resources for techno – economic feasibility report and full scale commercial development plan.
- Environmental and Social impact and related studies

- Exit clause to be there after Phase IB
- Contractor should have the option to exit the block at the end of sub-phase 1 if the seismic data does not establish any prospectivity. This will save the Contractor from unnecessarily drilling wells as part of the commitment or pay liquidated damages for not completing the committed. Also relinquishment should be optional and not mandated percentage-wise; and
- ML extension should be on the basis of the reserves G&G data provided by the contractor. Genuine Disputes cannot be a reason for denying the ML.

7.2 Guidelines will be developed for extension of Phase I (Refer Annexure III contract terms of Draft Policy)

- Extension provision should be more liberal than NELP/CBM given the potential challenges

7.4 Relinquishment - (Refer Annexure III contract terms of Draft Policy)

- Appears to be a typo error whereas instead of “opinion” it should be read as “option”
- Draft Policy provides “The contractor will be allowed to retain only the development area approved by the Steering Committee (‘SC’), at the end of Phase-I”. This should not be mandatory and Contractor should have the option that whether he wants to relinquish any area or not;
- Shale gas acreages will run from few hundred to several thousand sq km which will often be difficult to access the in 7 years window. Sometimes it so happens that with further appraisal of a discovered area, it is found that the reservoirs extend to already relinquished area;
- The concept of relinquishment has mainly been extracted from relevant provisions for conventional oil and gas PSCs, where after drilling a few wells if oil or gas is not discovered, the area can be relinquished. Further, shale play in India is in infancy and a lot of understanding has to be developed, it is proposed that operator should not be asked to relinquish a particular percentage of area;
- Contractor should be able to keep all remaining undeveloped acreage after 7 years if it has other-wise complied with the Development work programme; and
- As a possible option, a method similar to ‘Held by Production (HBP)’ adopted in USA can be implemented.

7.5 Development and Production Phase - (Refer Annexure III contract terms of Draft Policy)

- ML period should be atleast for 40-50 years.
- There is inconsistency in draft Policy para “4.4” , which mentions ML period as 30 years where as this section provides for 25 years. This need to be made consistent.
- 3rd Party certification of reserves is ambiguous. This clause needs to be further clarified as to who would decide the 3rd Party (Operator/SC/DGH);
- There should be no link between the number of rigs and the extent of development area. These technical issues should be left to the best judgment of the operator, based on technology used and geological parameters on ground. An operator might choose to use horizontal drilling technology for covering the development area based on availability of latest technology. Alternatively an operator may choose to use fewer rigs. The use of number of rigs should be left to the choice of the operator. The only requirement should be to adhere to the MWP and FDP;
- The time duration of development period may be increased to 30 years;
- During this period, the operators generally resort to technical flaring of gas. Such incidentally produced gas though should be allowed to be sold at local market. A provision for this should be incorporated in the model contract;
- Exploration activities may be allowed in retained area, even during development phase;
- Periodic revision of development plan may be allowed in view of great heterogeneity in shale, which may only be deciphered during subsequent drilling; and
- Pipeline network should be available to the shale gas operators from the beginning to avoid any flaring of initial smaller quantities of gas produced.

Another view

- Development area should be based on number of rigs that Contractor is willing to commit to run continuously during the initial development phase. If the Contractor reduces the number of rigs it is running continuously, then after a period of time (suggest 1 year) the remaining undeveloped acreage in the development area should be reduced by:
 - 10 KM² per rig removed after 2 years
 - 8 KM² per rig after 3 years

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- 6 KM² per rig after 4 years
 - 2 KM² per rig after 6 years

7.6 Steering Committee for decision making under contract - (Refer Annexure III contract terms of Draft Policy)

- Draft shale gas policy is not based on Cost Recovery Method. Therefore, the requirement of approval of budgets, including annual budgets and approval/review of annual accounts should be done away with;
- Similarly, policy should not provide for a Steering committee or, if at all provided, should be re-named as “Review committee” and should review only the progress of work on the block;
- Contractor should have a final say on the Work Program. The contractor must follow Safety/Environment & Reservoir GIPIP, which are specifically stated before the Blocks are bid;
- Steering Committee role should be limited to policy / direction setting and operational aspects shall be delegated to Operating Committee. Steering Committee should focus on the broad framework and advice the contractor on an overall / macro level and should not get involved in detailed operational matters. The contractor should be provided with operational freedom to decide and act on the operational issues. This is essential considering the fact that the contractor takes all the risks and uncertainties involved in the project, be it financial / geological / market etc;
- Steering Committee should act as facilitator for the operation of the Block and should act as an interface between the regulator / Ministry and the contractor. This would ensure faster development of the block and they should not have any voting rights in decision making process;
- Chairman of the SC should be the Operator’s representative as there is no cost recovery
- Steering committee with District collector, member from MOEF and NEERI should be helpful for contractors to resolve statutory issues/local issues;
- Number of SC members may be restricted to a minimum so as to minimize delays related to non-availability of members for meetings / approvals; and
- In order to shorten the turnaround times of Steering Committee decisions, deemed approval clauses should be made effective if response is not provided within a time frame (say 120

days) in areas such as approvals for field development plans, commerciality approvals and budget expenditures.

- Steering Committee (SC) should be empowered to give clear & transparent guidance in the Model Contract, including giving necessary approvals such as, extension of Phase, granting time extension for excusable delays, transfer of Participating Interest etc. This will help in taking quicker decisions and the exploration activities will not suffer. No separate approvals should be insisted from MOP&NG.
- Steering Committee (SC) should form a multidisciplinary team consisting of technical/legal/financial experts of both internal & International repute, who will be involved in checking and validating the different activities related to Drilling, G&G and Development/ Productions. This team should function under Steering Committee. The multidisciplinary team should ensure that the recommendations/reports etc. are submitted in a time bound manner. Functioning of this team should be faster and transparent and their opinion should be made available to concerned Contractors.

7.7 Others – Bank Guarantee, Dispute Resolution, Liquidated damages, etc. - (Refer Annexure III contract terms of Draft Policy)

- Gas / oil sales should be at arm's length and on free market condition. 'Arm's length' needs to be defined include those successful through a transparent tender process, even if related to Contractor or GoI. For other transaction, this is not relevant as there is no cost recovery. This will simplify contract administration, avoid potential disputes etc;
- Instead of proposed bid-determined up-front / pre-determined liquidated damages (LD) to be paid in case of non completion of committed work programme, a formula-based or some criteria-bound amount may be fixed. LDs should be in accordance with the NELP IX NIO. Exploratory well pre determined LD could be US\$ 1,000,000 per well;
- Alternatively, LD should be calculated on the basis of dry wells;
- There should be no damages to pay in case of non-completion of MWP due to undue delay in obtaining permissions from Government agencies (say more than 6 months). The contractor should be allowed to decide whether to continue and wait for clearance or to quit from block and relinquish without payment of LD;

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- New clauses on time extension on the basis of excusable delays for permissions from state authorities, other approvals as per various acts and regulations (similar to that of environmental clearances) may be provided
 - Instead of a single BG for the entire 7 year period, Bank guarantees can be taken on different distinct components of the Work programme, and can be liquidated once that work is completed.;
 - BG should be submitted once only and not annually. Annual submission of BG will call for clearance of budgets and other approvals every year and these requirements are not needed when the contract is not based on cost recovery;
 - BG should not be taken from big companies with say net worth of more than US\$ 2 billion.
 - The Model Contract should clarify that applicable BG would be only for minimum work commitment of Exploration Phase I and percentage amount should be specified.
 - A standing board of arbitration may be constituted to adjudicate cases in time-bound manner or any existing entity like Appellate Tribunal may be empowered to look into such cases;
 - The MoEF have implemented the scheme of Accreditation and Registration of specialist consultants under the National Accreditation Board of Education and Training (NABET) and the Quality Council of India (QCI). The consultants registered under the Category - Offshore and Onshore Oil and Gas Exploration, Development and Production to be considered competent to carry out Environment Impact Assessment Studies. Furthermore water quality testing will be carried out by NABL certified laboratories;
 - The nature and extent of the in-principle approval requires to be elaborated. Further, which approvals will be included, what will be the nature of the facilitation in matters of land acquisition and the water resources management and will it mean that groundwater abstraction approvals will be obtained before the bidding process;
 - The Planning Commission has constituted a Working Group on “Water Governance” for the formulation of the Twelfth Five Year Plan (2012-2017). Under this Working Group, a Sub-Group was constituted to draft the Model Bill for the Protection, Conservation, Management and Regulation of Groundwater Resources, 2011, which provides for strengthening the regulatory powers of gram sabhas, panchayats and municipal bodies related to groundwater. Implications of the proposed legislation should be taken into consideration in the in-principle approval; and
 - Clause 3.11 of the Draft Policy provides that Government of India will ensure all statutory regulatory and security clearances are obtained before bidding. Please clarify the list of

clearances intended to be covered under this. Further, please clarify if this includes the Environmental Clearance for exploratory drilling and permit for groundwater abstraction.

- Existing OISD regulations and Oil Mines Regulations (OMR) have been prepared based on the requirements of conventional Oil and Gas drilling and production which is not entirely suitable for low pressure gases. Separate safety regulation may be prepared specific to the requirements of low pressure unconventional gases industry.
- Also today there is multiplicity of authorities ie DGMS and OISD. This should be resolved and only one authority should be responsible for safety.
- National Accreditation Board for Education and Training (NABET) approved consultants for onshore E&P operations should also be acceptable for conducting EIA studies for the shale oil/gas blocks
- Contracts should provide that in case a Contractor is denied any statutory clearances or permission after signing of the Contract, they should be reimbursed/compensated for money spent in block/area.
- Clear and defined water rights and use of land rights should be made part and parcel of the acreages offered. Any policy without clarity on these in the terms of offer will be meaningless.
- In case of mandatory rain water harvesting requirements investments it should be noted that in most areas these investments could be capital intensive as well as come into conflict with local water use rights. Therefore costs on developing such harvesting structures need to be cost recoverable. Also clear guidelines should be laid down whether such structures can be built to harvest rainwater along existing drainage structures. These rights would naturally involve clear right of use of such drainage structures, canals, rivers streams or re-charged ground water aquifers etc. Without clarity on these there could be potential for social conflicts which could endlessly delay projects.

Another view

- LD should be decided at a rate per meter of un-drilled meterage in place of the existing pre-determined LD charges specified in draft policy; and
- It is recommended that BG should be allowed to be submitted annually based on the budget which is prepared and submitted to Steering Committee annually.

8 Other aspects of Draft Shale Policy

8.1 Constitution of an Empowered Committee of Secretaries (Refer para 6 of Draft Policy)

- SC has government nominee representative / Chairman and takes all necessary decisions related to the operational issues. Hence, creation of another body to look into similar issues would necessarily duplicate the process. Only extra ordinary issues related to operations / logistics may be escalated to the Standing Committee for decisions. All other issues may be decided at SC level;
- The ECS requires the representation of the Secretary of Ministry of Water Resources and the Member Secretary of the Central Pollution Control Board as these are critical aspects of shale oil and gas exploration and production. The representation of the Director – NEERI is not merited as NEERI is a specialist organisation carrying out Environmental Impact Assessment Studies and thus there will be a conflict of interest especially if NEERI is a specialist organisation designated under clause 3.9.
- It is suggested to include Chief Secretary of concerned states as member to facilitate resolution of state related issues, which may arise from time to time; and
- During implementation of the Contracts, the role of the committee should be to facilitate resolution of inter-ministerial and state related issues
- The functioning and decision making should be time bound and faster. BPRL feels that more power in decision making for day to day operational activities should be given to Steering Committee .

8.2 Approval of CCEA for award of blocks (Refer para 7 of Draft Policy)

- No comments

8.3 Negotiations and finalization of contracts (Refer para 8 of Draft Policy)

- There cannot be any negotiations after the bids are finalized; and
- The negotiable provisions of Model Contracts must be declared by the Government in the policy document.
- The model Contract (which will be the basis of signing contracts) should be finalized in consultation with the stake holders

8.4 Comments from other ministries/departments (Refer para 9 of Draft Policy)

- Ministry of Defence and Home should also be consulted to facilitate security related issue if to be addressed in the Policy

8.5 Approval of CCEA (Refer para 10 of Draft Policy)

- Approval of CCEA should be defined clearly for existing license holder and new companies bidding for the same license.
- Further to comments in para 3.3 supra, if any conventional oil and gas or any other gas exists in future shale oil and gas area the such ROFR should be given to Shale oil and gas contractors
- The model Contract (which will be the basis of signing contracts) should be finalized in consultation with the stake holders
- Shale oil and gas is an unconventional source / alternate source of energy with no historical geological data. In such a scenario withdrawing the marketing freedom will not justify the financial tenability of the awarded blocks.
- Contractor should have complete marketing freedom subject to Indian domestic market shall have the first call. There should be no interference by the Government in market related gas price discovery.
- Market determined price to be discovered based on the arms length principle. Government to interfere only in case Contractor is selling the gas at a price less than market determined price to protect its royalty and PLP.
- A clear framework on gas price in proposed policy and contracts would be a prerequisite if the Government wants to attract investment. Such in-principle approvals should be valid for the Contract period.
- Needs clarity on the laws to be applied for shale gas. To facilitate investment the Government should formulate regulations /guidelines on environmental and water related issues which would be some of the key factors in making success or otherwise of Shale oil and gas activities in India.

8.6 Other comments

- Following clause to be added in section 2.5 of the draft policy:

‘To optimize performance of those wells in unconventional reservoirs it is essential to have a consolidate repository of data and analyze aggregated data sets to establish an optimized hydraulic fracture treatment strategy. It is necessary to implement the use of Multivariable analysis, also called Multi Variant Analysis (MVA) using advanced data mining / statistical techniques, to evaluate critical performance variables important in optimizing hydraulic fracture treatment’;

- Following clause to be added in section 3.7 of the draft policy:

‘All data gathered during the course of operation shall be the property of the GOI. GOI would create a simulation platform with high visualization and data mining capabilities. It is necessary to create workflows that systematically and logically walks through a suite of analytical capabilities enabling exploration of trends and surface hidden patterns. These workflows should ensure robust and cleansed version of data that has been transformed and imputed to preclude the adage “garbage in, garbage out”, followed by predictive perspective implementing soft computing workflows based on regression, neural networks, decision trees, genetic algorithms and fuzzy logic’;

- Before awarding the blocks, GoI needs to ensure that necessary environmental clearances are there for the area. In other words, GoI may exclude the environmentally restricted areas within the blocks;
- Shale gas blocks should be handled by Special Purpose Vehicle (‘SPV’) and all environmental and other clearances should be obtained by the SPV before the blocks are handed over;
- As the production of Shale Gas reaches its peak initially and majority of the production comes within the first year itself. Therefore, in order to utilize the Shale Gas to its full potential, the blocks should be identified only at those places where the pipelines already exist or the Government should build the pipelines in advance;
- The draft policy opines that there will be freedom to market shale gas within India on arm’s length basis within the framework of the government policies on marketing and pricing of the gas. It has to be appreciated that the cost structure of shale gas production is fundamentally different from the conventional gas production. Typically, shale gas wells

cost more than the conventional gas wells. The additional costs largely pertain to the hydraulic fracturing. Well completion and other related costs are also significantly higher. This peculiarity of the shale gas cost structure results in higher break-even costs. At current prevailing natural gas prices in the country, shale gas production will not be sustainable, very much like gas production from deep water regions, if they are governed by the framework of the government policies on pricing of the gas. The current prevailing pricing structure will act as a disincentive to explore for gas. To incentivise shale gas operators, shale gas prices should be market-linked with freedom for marketing. There should be no government intervention with either pricing or with marketing of the gas. This will lead to higher E&P activity and maximise government revenues;

- The clause on freedom to market gas needs to be elaborated (Currently, there is no mention of gas utilization policy);
- In case EIA study has been carried out by the operator for the same area under conventional Oil & Gas exploration, it may not be necessary to carry out the same study again provided a long time period has not lapsed between two sets of operations; and
- New rules/guidelines should be jointly reviewed with the contractor before implementation. The Contractor's investments need protection.
- Effective Date of the Contract shall be from the grant of PEL and major statutory approvals i.e. Environmental Clearances. Similarly Development /ML Phase should commence after grant of an ML and receipt of Environment Clearance and land acquisition.
- Government shall have no rights on the assets purchased under the Contract.
- Government to expedite the Land Acquisition and Forest clearance proposals (for well-sites and pipelines for evacuation of gas, oil and water). Inability to be considered for automatic grant of excusable delays.
- Some provisions could be kept in Contracts for allowing sale of gas/liquid volume while conducting/flowing test well(s) for data gathering during Phase-I as we will be requiring to collect data for at least 30 days initial well rate for assessment.
- A clause needs to be included on unitization issues for plays extending across many blocks/acreages.
- Model Contract should be finalised in consultation with stakeholders.

9 Annexure A - Customs List

9.1 Suggested changes in List 14 CBM & Shale Gas/Oil

No.	Existing Notification	Proposed List
(1)		<u>Aircrafts and Helicopters including assemblies/parts</u>
(2)	Land Seismic Survey Equipment and accessories, seismic survey vesels, global positioning system and accessories, and other materials required for seismic work or other types of Geophysical and Geochemical surveys for on-shore activities	Land Seismic Survey and <u>Aeromagnetic Survey Equipment</u> and accessories, seismic survey vessels, global positioning system and accessories, and other materials required for seismic work or other types of Geophysical, <u>Geotechnical and Geochemical surveys for on-shore CBM & Shale Gas/Oil activities.</u>
(3)	All types of Drilling rigs, shot-hole drilling rigs. Mobile rigs, workover rigs consisting of various equipment and other drilling equipment required for drilling operations, snubbing units, hydraulic workover units, self-elevating workover platforms	All types of Drilling rigs (<u>including coring rigs, air drilling rigs,</u> shot-hole drilling rigs, Mobile rigs, workover rigs), consisting of various equipment and other drilling equipment required for drilling operations, snubbing units, hydraulic workover units, self-elevating workover platforms, <u>transportation and material handling equipment, portable mobile office, stores, workshop and site camp cabins.</u>
(4)	All types of Equipments / units for specialized services like, cementing, logging, casing repair, Production testing, simulation and mud services, reservoir engineering, geological equipment, directional drilling, Stimulation, Coil Tubing units, drill stem testing (DST), data acquisition and processing, solids control, fishing (as related to downhole retrieval in coal bed methane operations), well control, blowout prevention (BOP), pipe inspection including Non Destructive Testing, coring, gravel pack,	All types of Equipment / units for specialized services like, cementing, logging, casing repair, <u>formation testing,</u> Production testing, simulation and mud services, <u>mud logging,</u> reservoir engineering, geological equipment, <u>horizontal and</u> directional drilling, Stimulation, <u>Hydraulic Fracturing,</u> Coil Tubing units, drill stem testing (DST), data acquisition and processing <u>including software, equipment and materials required for fracture diagnostic, monitoring and studies,</u> solids control, fishing (as related to downhole retrieval in

No.	Existing Notification	Proposed List
	well completion and workover for CBM wells including wireline and downhole equipment	coal bed methane and <u>Shale Gas/Oil</u> operations), well control, blowout prevention (BOP), pipe inspection including Non Destructive Testing, coring, gravel pack, well completion and work over for CBM <u>& Shale Gas/Oil</u> wells including wireline and downhole equipment
(5)	All types of casing pipes, drill pipes, production tubing, pup joints, connections, coupling, Kelly, cross overs and swages, Drive Pipes	All types of casing pipes <u>and its accessories</u> , drill pipes, production tubing, pup joints, connections, coupling, Kelly, cross overs and swages, <u>Drive Pipes, all drill string and BHA components, sucker rods and accessories</u> .
(6)	All types of drilling bits, including nozzles, breakers and related tools	All types of drilling bits, <u>down hole hammers</u> including nozzles, breakers and related tools
(7)	All types of coal bed methane chemicals including synthetic products used in coal bed methane operations, required for drilling, production and transportations of gas	All types of chemicals including synthetic products, proppant, cement used in coal bed methane <u>& Shale Gas/Oil operations</u> , required for drilling, <u>completion</u> , production and transportation of <u>oil/gas and water/effluent</u> .
(8)	Process, production and well installation for CBM and water injection including items forming part of the installation and equipment required like process equipment, turbines, pumps, generators, compressors, prime movers, water makers, filters and filtering equipment, Telemetry, Telecommunication, Tele-Control and other material required for installations	Process, production and well installation for CBM <u>& Shale Gas/Oil operations</u> and water injection including items forming part of the installation and equipment required like process equipment, turbines, pumps <u>including artificial lift equipment and its accessories</u> , compressors, generators, prime movers, water makers <u>and treatment equipment</u> , filters and filtering equipment, <u>workshop and maintenance equipment</u> , <u>all types of instrumentation items</u> , Telemetry, Telecommunication, Tele-Control, Control system, <u>metering equipment, material and equipment for electrical system</u> and other materials

No.	Existing Notification	Proposed List
		required for installations.
(9)	Line pipes for flow lines and trunk pipelines including weight-coating and wrapping.	<u>Metallic and non-metallic</u> line pipes <u>and fittings</u> , for flow lines and trunk pipelines including weight-coating and wrapping
(10)	Tanks used for storage of coal bed methane, water, mud, chemicals and related Materials	Tanks <u>and vessels</u> used for storage of coal bed methane <u>and Shale Gas/Oil operations</u> , water, mud, chemicals and related materials
(11)	All types of fully equipped units/equipment required for pollution control, fire prevention, fire fighting, safety items like fire and gas detection equipment, including H2S monitoring equipment	All types of fully equipped units/equipment required for pollution control, fire prevention, fire fighting, <u>fire suppression</u> , safety items like fire and gas detection equipment, including H2S monitoring equipment
(12)	Mobile and skid mounted pipe laying, pipe testing and pipe inspection equipment	Mobile and skid mounted pipe laying, pipe testing and pipeline inspection equipment, <u>pigs and material handling equipment for pipe laying and its operations and maintenance</u> ,
(13)	All types of valves including high pressure valves	All types of valves including high pressure valves
(14)	Communication equipment required for operations including synthesized VHF Aero and VHF multi channel sets, Non-directional radio beacons, intrinsically safe walkietalkies, directional finders, EPIRV, electronic individual security devices including electronic access control system	<u>All types off</u> Communication equipment required for operations including synthesized VHF Aero and VHF multi channel sets, Non-directional radio beacons, intrinsically safe walkie-talkies, <u>repeater systems</u> , directional finders, EPIRV, electronic individual security devices including electronic access control system..
(15)	Specialized antenna system, simplex telex over radio terminals, channel micro wave systems, test and measurement equipment	Specialized antenna system, simplex telex over radio terminals, channel micro wave system, test and measurement equipment
(16)	Area Surveillance system	Area Surveillance system

No.	Existing Notification	Proposed List
(17)	Common depth point (CDP) cable, logging cable, connectors, geo-phone strings, perforation equipment and explosives	Common depth point (CDP) cable, logging cable, connectors, geo-phone strings, perforation equipment and explosives
(18)	Wellhead and Christmas trees, including valves, chokes, heads spools, hangers and actuators, flexible connections like chicksons and high pressure hoses, shut down panels, Cathodic Protection Systems including anodes	Wellhead and Christmas trees, including valves, chokes, heads spools, hangers and actuators, flexible connections like chicksons and high pressure hoses, shut down panels , Cathodic Protection Systems including anodes
(19)	Technical drawings, maps literature, Data tapes, Operational and Maintenance Manuals required for coal bed methane operations	Technical drawings, maps literature, Data tapes, Operational and Maintenance Manuals required for coal bed methane <u>and Shale Oil / Gas</u> operations
(20)		<u>All types of HSE and personal protection equipment</u>
(21)		<u>All types of construction materials and equipment required for CBM & Shale Gas/Oil facilities, operations and maintenance.</u>
(22)	Sub-assemblies, tools, accessories, stores, spares, materials, supplies, consumables for running, repairing or maintenance of the goods specified in this List	Sub-assemblies, tools, accessories, stores, spares, materials, supplies, consumables for running, repairing or maintenance of the goods specified in this List