Application of Oil Well Economic Evaluation in Petroleum Enterprise Management

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Abstract: About petroleum enterprise, there are objective laws that the difficulty of exploitation increasing, the taste of resource dropping, the rate of water content rising, these problems will lead to economic benefit reduction of the enterprise. To solve the problem, this study aim at implement enterprise's fine management conducted by every oil well economic situation creatively and research on the theory and methods of economic evaluation especially for single oil well by decomposing all items of cost in productive process and put forward economic classification model. Using the model, we can know operation conditions of single oil well and provide quantitative basis for investment decision, cost control and measures establishment. On the whole, to evaluate oil well benefit can improve managerial and administrative expertise and increase enterprise revenue.

Key words: Oil well economic evaluation, petroleum enterprise, management

INTRODUCTION

Owing to petroleum is a kind of non-renewable resources and is an important strategic material, it is a key issue that how to make limited oil resources of the largest contribution to economic benefit in enterprise management. Based on the already existing economic evaluation for blocks and oilfields and start with the evaluation of single oil well benefit specially by decomposing management objectives will contribute to implement precise management and improve managerial and administrative expertise (Ai and Li, 2009).

GENERAL PRINCIPLE OF ECONOMIC EVALUATION

Generally, economic benefit refers to produce use value as much as possible by consuming labour and occupying resources as less as possible (Fowler, 1997). That is, economic benefit means to consume living labour and materialized labour less and bring in products social demanded more. In economic activity, labour expenditure is input or cost, while the produced use value and magnitude of value is output or gains. In short, economic benefit is a kind of contrast relationship, moreover, the greater portion of output and input, gains and cost is economic benefit.

It can be perceived from the definition of economic benefit that there are three aspects included in the definition, that is, consume less, achieve more and answer social demand. The economic benefit may be considered high, only when satisfying the three conditions simultaneously. Consume less, means to try to reduce living labour and material, fuel, driving force and depreciation expense of fixed assets, etc. materialized labour consumption. Meanwhile, because of the opportunity cost, capital occupation should be reduced. Achieve more, means to try to produce more number, more powerful and higher quality productions and emphasize productivity rising. Answer social demand, means to try to follow the tracks of market demand to organize production activities. Only can the product be received by market demand, the value can be achieved and it is possible to gain economic benefit. If the production will not be welcomed, the value cannot be achieved also and it is out of the question to gain economic benefit included in product value.

During the production and management of an enterprise, economic benefit must be analysed and evaluated quantitatively. Comparing the quantity of consumption with the quantity of acquisition, this comparison is by means of value form, that is, by currency.

METHODS OF ECONOMIC BENEFIT CALCULATION

Input-output balancing method, main technological and economic indicators method, production function method and utility function method are some of usual methods of calculating economic benefit. The basic activity of petroleum enterprise is to produce oil and gas to obtain certain amount of relevant product, sales revenue is the out put of the enterprise. The research uses

input-output balancing method, for it is the most direct and simple method to evaluate the economic benefit of the special industry, petroleum.

With regard to single oil well, when the output is greater than the input, it is a beneficial well and the output is beneficial yield; when the output is less than the input, it is a defective well and the output is inefficient yield; when the output is equal to the input, the oil production is in condition of Break-Even Point, at this time, the output is the separation of beneficial yield and inefficient yield, it is just the special boundary point to classify oil well yield (Lian *et al.*, 2000).

PRINCIPLES FOR SINGLE OIL WELL ECONOMIC EVALUATION

The single oil well economic evaluation is more difficult than the conventional block and oilfield economic evaluation, it requires more precise investment orientation and cost partition. In view of the particularities, the study establishes principles especially for single oil well economic evaluation.

Comprehensiveness of data collecting: To collect data of single oil well roundly, including reservoir condition, developing course, extract pattern, well type, production performance, investment utilization and cost level, etc. is the base of calculating oil well economic benefit precisely and analyzing oil well condition deeply.

Accuracy of cost dividing: Cost should be divided accurately when conducting economic evaluation and the rationality of evaluation can be guaranteed. In concrete terms, material costs, downhole operating costs, well logging and testing costs should be recorded to corresponding well; water fee, electricity fee, oil displacement matters costs, etc. should be apportioned by the quantity of oil and water produced by particular oil wells; other cost items should be apportioned by the number of production days.

Authenticity of benefit classifying: Implication of the establishing economic classification must be distinct on the aspects of productive process, administrative mode, earning capacity and development potential and the economic benefit level should be classified clearly by applying the classification. Oil wells can be managed classificatorily at this rate and take different measures to improve oil wells' benefit in different classes, provide foundations for enterprise's precise management.

ECONOMIC CLASSIFICATION MODELS FOR SINGLE OIL WELL

In accordance with the established principles for single oil well, financial regulations and items of cost in operation (Chen *et al.*, 2005), considering oil price, yield, commodity rate, invest, cost, resources tax, sales tax, quantity of water injection and fluid (including oil and water) extraction, geological conditions and well type, etc., on the basis of the result of economic evaluation, oil wells are classified as Benefit the First Wells, Benefit the Second Wells, Benefit the Third Wells, Marginal Benefit Wells and Inefficient Wells as shown in Table 1.

Benefit the first wells: When the annual after-tax revenue of single well's oil yield and the associated products is greater than the production cost and allocated period expense and geological exploration expense, the well is Benefit the First Well.

Benefit the second wells: When the annual after-tax revenue of single well's oil yield and the associated products is less than or equal to the production cost and allocated period expense and geological exploration expense and is greater than the production cost, the well is benefit the second well.

Benefit the third wells: When the annual after-tax revenue of single well's oil yield and the associated products is less than or equal to the production cost and is greater than the operation cost, the well is benefit the third well.

Marginal benefit wells: When the annual after-tax revenue of single well's oil yield and the associated

Table 1: Discriminants of economic classification model for single oil well

Economic categories of single wells	Discriminant
Benefit the first wells	$Q \times I \times (P-R) > C+F_1+F_2$
Benefit the second wells	$C < Q \times I \times (P-R) \le C+F1+F2$
Benefit the third wells	$Cc < Q \times I \times (P-R) \le C$
Marginal benefit wells	$Cmin < Q \times I \times (P-R) \le Cc$ $Cmin = Ccl+Crl+Cdl+Cry +Czy+Cyq+Czr+Cys+Cjh$
Inefficient wells	$Q \times I \times (P-R) < Cmin$

Q: Yield of single oil well, 10^4ton; I: Commodization rate, %, P: Crude oil price without value-added tax, yuan/ton, R: Taxes for per yield, yuan/ton, C: Production costs, 10^4 yuan, F_1: Period expense, 10^4 yuan; F_2: Geological exploration expense, 10^4 yuan, Cc: Operation costs, 10^4yuan, Cmin: The lowest operating fee, 10^4 yuan, Ccl: Direct material costs, 10^4yuan, Crl: Direct fuel costs, 10^4 yuan, Cdl: Direct impetus costs, 10^4 yuan, Cry: Direct staff costs, 10^4 yuan, Czy: Maintainability downhole operating costs, 10^4 yuan, Cyq: Oil and gas processing costs, 10^4yuan, Czr: Oil displacement matters costs, 10^4 yuan, Cys: Transportation costs (only to mean transport oil and gas by conveyances, without pipeline transport costs), 10^4yuan, Cjh: Natural gas purification costs, 10^4 yuan

products is less than or equal to the operation cost and is greater than the lowest operating fee, the well is marginal benefit well.

Inefficient wells: When the annual after-tax revenue of single well's oil yield and the associated products is less than or equal to the lowest operating fee, the well is inefficient well.

IMPORTANT ROLES OF ECONOMIC EVALUATION IN IMPROVING MANAGERIAL AND ADMINISTRATIVE EXPERTISE OF PETROLEUM ENTERPRISE

By classifying oil wells based on their economic benefit, we can be aware of every oil well conditions entirely, that is, we can know sigle well production status, costs level, operational aspect, etc., which located in different geological conditions, displaced by different patterns, extracted by different well types. The results of economic evaluation will play important roles in production arrangement, investment control, costs saving when applying in the production and management roundly.

Strengthen the scientificalness of production arrangement: By calculating oil wells' benefit, we can classify and select wells of the five classes. Based on the result, in making the program of production, inefficient wells could be arranged to shut down and marginal benefit wells should be arranged to reduce yield for the best effectiveness. This dynamic programme adjust embodies the scientificalness of production arrangement in business administration.

Enhance the optimization of investment control: If calculate the minimum demarcation line of increased yield before taking measures in allusion to oil wells (Chen *et al.*, 2004), we can determine the feasibility of measures for single wells and which wells should be treated on, what measures should be resorted to, how many should be put into. Then, the pertinence of measure input can be increased and the optimization of investment control can be enhanced.

Intensify the effectiveness of costs saving: Before evaluate oil wells' benefit, we should decompose all items of cost in productive process and be clear about the proportions of every cost item in total operation cost. To

find the first few highest items, we can know the main cause of pushing the cost and take special actions to reduce the specific spend. Based on the analysis, we can make pointed references to control cost rising and will conducive to the whole efficiency.

CONCLUSION

Oil well economic evaluation is based on the data of the whole process of oil production and considering yield, invest, cost, geological conditions and well type, etc. In other words, the activity of oil well economic evaluation penetrates all parts of petroleum enterprise's production. Because of this specific characteristic, we can know situations of every well belonged to the enterprise in all directions. Further more, the economic evaluation results can help us to determine the production arrangement, investment direction, cost control etc. scientifically. Therefore, it is all-important significance to strengthen the research of oil well economic evaluation for intensifying dynamic tracing during production process and more for implementing precise management.

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