Abandonment and Site Restoration (ASR) Reservation Scenario with Cost Recovery on MATD Structure

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Submission date: 16-Aug-2023 02:10PM (UTC+0700)
Submission ID: 2146534741
File name: Conference_2023-Abandonment_and_Site_Restoration_June_2023.pdf (544.7K)
Word count: 3043
Character count: 16006

RESEARCH ARTICLE | JUNE 12 2023

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AIP Conference Proceedings 2598, 030009 (2023)
https://doi.org/10.1063/5.0134918

Abandonment and Site Restoration (ASR) Reservation Scenario with Cost Recovery on MATD Structure

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Abstract. Abandonment and Site Restoration (ASR) activities are carried out on the MATD structure. The works in the ASR project include engineering design, licensing and regulatory compliance, well abandoned, demolition, transportation, storage, and site restoration. The total cost of ASR work is used as an approach because in Indonesia there is no decommissioning work, so the data reported in the ASR fund reserve report is estimated data from owner estimate and an appraisal has been carried out by KKKS who are still using cost recovery. ASR work includes engineering aspects and reserve funds for land restoration in order to improve or restore damaged land conditions by forming structures and functions according to with surrounding conditions. The stage that will be carried out after an oil and gas facility has expired and has received approval for decommissioning is to clean the facility from hydrocarbons. All flushing line piping, equipment and areas in the facility must be ensured to be clean so that the potential for hazardous and flammable/explosive waste is eliminated. The process of abandoned the well commonly known as Plug & Abandoned (P&A) is then carried out with PTK and SNI which have set the process (P&A).

Keywords: abandonment and site restoration, well abandoned, cost recovery, engineering design, demolition.

INTRODUCTION

Upstream oil and gas business activities of production (post-operation) will leave production facilities and other supporting facilities that have been used for production activities, so that they have the potential to become obstacles activities in their territory, including transportation, agriculture, mari navigation, exploration and research of natural resources. "Kontraktor Kontrak Kerja Sama" (KKKS) must make abandonment of production facilities and other supporting facilities that have been used for upstream oil and gas business activities and site restoration of upstream oil and gas business activities at the time of cessation of production. The implementation of the Abandontment and Site Restoration (ASR) activities referred to above refers to the Revised-1 "Pedoman Tata Kerja" (PTK) [1] issued by SKK MIGAS as the regulator on the oil and gas industry sector in Indonesia and other relevant provisions that apply.

The works in the ASR project include engineering design, licensing and regulatory compliance, well abandoned, demolition, transportation, storage, and site restoration. The author aims to find jobs that are significant to the total cost of ASR work and find the equation model used for the approach in calculating the total cost of ASR projects. This equation model is used as an approach because in Indonesia there is no decommissioning work, so the data reported in the ASR fund reserve report is estimated data from the company concerned (owner estimate) and an appraisal has been carried out by an independent consultant who has appointed by SKK Migas.

LITERATURE REVIEW

For some of the case studies, CBL data showed very good semen, whereas for some case studies, CBL data showed little or no semen. Those showing little or no cement had the casing perforated across this interface and squeezed the cement in and placed across the interface in the wellbore. For wells without CBL data, CBLs were obtained and analyzed rapidly as part of the abandonment scope. During the initial completion of the well, the pipe and auxiliary accessories are run in the hole according to the completion design. During abandonment and decommissioning, this

is taken to the fore. There are several wells with permanent packers located very deep in the well that would require very extensive surgery to retrieve them. The risk of leaving it in the pit is analyzed and deemed acceptable without negative impact. However, attachments or pipes around and above the freshwater- saline interface are raised to the surface. The casing is also cut and raised to the surface [2].

Dismantling Facilities on Land is to move all production facilities and pipeline facilities on land. When oil and or gas field is considered unproductive, the production and process facilities are unloaded and moved to a temporary storage area for further transfer to the final storage area or reused for production facilities and processes in the work area. After all the equipment in the production and process facilities are unloaded and moved, then the area is returned to its original condition before being used for land / site restoration [3].

Decline curve method is one method for estimating the amount of oil reserves based on production data over a certain period of time. In principle, forecasting the amount of remaining oil reserves with this method is estimating the results of extrapolation or drawing a straight line obtained from a graph or curve made based on plotting between production data and production time wherein this study a plot is drawn between the rate of oil production and production time [4].

METHODOLOGY

The preparations made before starting the research were to collect all the necessary field data related to the plan for calculating the Abandonment Site and Restoration (ASR) fund reserve as stipulated in the SKK Migas procedure [1]. The systematic analysis of the series carried out is as follows:

a) Analyze how long the production lifetime of the MATD structure is, so that ASR can be carried out at the right time where the structure has started to stop operating.
b) List any assets that already exist, are being and will be built.
c) Planning ASR activities such as what methods will be used to conduct P&A wells in the structure, demolition of above-ground facilities.
d) Taking into account the estimated cost of ASR.

To present an analysis of the ASR mechanism in Indonesian PSCs for marginal blocks. The impact of the current regulation will be carried out in a case study using the marginal block model. The NPV of the contract must be positive because it will be used as an economic indicator for each contractor. Modification of the ASR funding mechanism will be proposed if the block does not meet the economic indicators Fig.1.

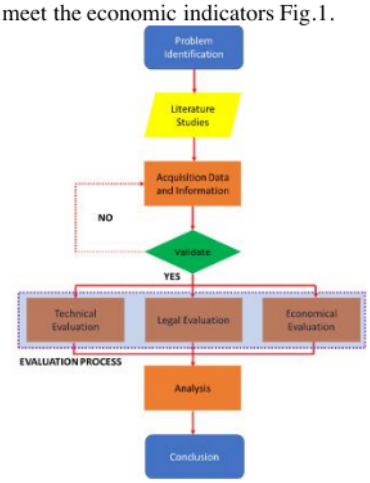

FIGURE 1. ASR Research with Cost Recovery Scenario

Problem Identification

Abandonment and site restoration is the final stage of field development after the contract period ends. At this stage, all drilling and production components left in this field need to be cleaned so that the field conditions do not interfere with the balance of the ecosystem that has been formed prior to the drilling or exploitation operations. This stage is the responsibility of the KKKS. The KKKS must determine the strategy that will be carried out when it reaches

the end of the contract period with the highest decision remaining with SKK MIGAS.

A petroleum contractor is required to include a well abandoned procedure (Plug and Abandonment – P&A) in which the KKKS concerned is responsible for restoring the contract area, removing all equipment and installations that have been built and rebuilding the affected areas during the production process and oil and gas exploitation in accordance with the policy government related to health and the environment [3].

Decline Curve Analysis

Decline curve analysis is a method used to estimate oil production gains. For the MATD Field up to production status as of December 2021, these wells are producing from several zones which produce an average comingle production. For decline curve analysis, it is done per layer. The method used in this decline curve analysis is the empirical method introduced by J.J. Arps with several types of decline, namely exponential, hyperbolic and harmonic. Production forecasting is carried out until December 31, 2035 with the lowest production limit for each well of 10 barrels/day. By using the calculation of the decline of the overseas structure of 14.82% per year, it is obtained that the forecast for the existing production of the MATD structure at the end of 2035 is estimated that the cumulative production is 26173.11 Mbbl Fig.2.

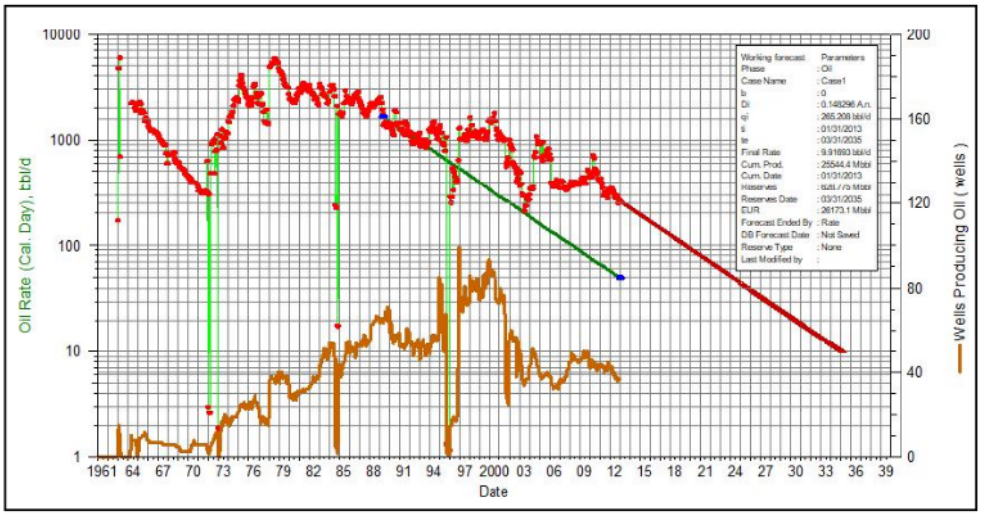

FIGURE 2. MATD Structure Production Decline

Data Acquisition and Validation

Data collection is the first step in conducting this research. Screening stage for wells (well diagram and well history), Collecting Stations (PFD and P&ID Layout), Supporting Facilities (PFD and P&ID Layout) and Other Facilities (PFD and P&ID Layout) that enter the ASR component. A validated item is a collection of ASR component data that has been collected. The validation method used can be a site visit, discussion of the engineer/operator who is the PIC in the MATD field and confirmation of the ministry related to the area to be restored.

Evaluation

Technical Evaluation is a number of technical abandoned procedures (abandonment) in accordance with API standards, for example, starting from abandoned wells in the field. It starts with monitoring active wells or dead wells, but potentially the most active. This monitoring includes pressure, fluid level, wellhead pressure and surface gas flow.

Legal Evaluation is all licensing activities and compliance with regulations and is budgeted based on the size of the field and the level of complexity. This type of item that requires a permit refers to the licensing document based

on PP 44 2014 of the Ministry of Environment concerning Registration of National Competencies in the Environmental Sector, Issuance of Environmental Permits, Issuance of Hazardous Waste Management Permits and Issuance of Recommendations for Transport and B3 Registration so that permits and compliance with regulations are obtained for the regulation. Field.

Economic Evaluation is related to the assumption that ASR will be carried out at the time of the cessation of production in a field and the costs are escalated to the next ASR plan year to be paid by KKKS in United States dollars each semester. Then the ASR Cost Estimation will be closer to the actual conditions at the time of implementation. ASR when using the time concept of the value of money.

RESULT AND DISCUSSION

Table 1 estimated cost for the 2021 ASR implementation year for the MATD Working Area is USD 11,674,468.64 and for the year of asset implementation, namely at the end of the KKKS contract period in 2035 with an escalation against the US dollar currency of 2.5% amounting to USD 16,495,718.57.

TABLE 1. Details of Funds Reserved Form ASR-2 MATD Work Area

NO	ITEM	ASSET QUANTITY	ABANDONMENT & SITE RESTORATION IN 2021 (US$)	ABANDONMENT & SITE RESTORATION IN 2035 (US$)
		1	2	3
1	Engineering Design	1	68,607.46	96,940.55
2	Legal Evaluation	1	69,055.22	97,573.22
3	Well Plug & Abandonment	26	4,801,152.59	6,783,902.92
4	Demolition :			
	a. Platform	-	-	-
	b. Gathering Stasion	1	529,659.97	748,395.67
	c. Oil Tank Equipment	1	990,592.57	1,399,681.37
	d. Terminal	-	-	-
	e. Pipeline (km)	57	2,887,771.32	4,080,345.27
	f. Power Cabel & Control (meter)	4000	3,609.02	5,099.46
	g. Supporting Facilities	1	25,530.90	36,074.49
	h. Others	1	25,530.90	36,074.49
5	Transportation		1,954,034.22	2,760,999.20
6	Relocating Facilities		305,183.58	431,216.41
7	Site Restoration		13,740.90	19,415.53
	TOTAL (US$)		**11,674,468.64**	**16,495,718.57**

Well Plug and Abandoned (P&A)

MATD Area has 43 wells with status: 19 production wells, 8 suspended wells, and 16 abandoned wells. The cost of abandoned the well in each area will be different. This is adjusted to the depth and function of the well. Based on the depth, the cost of abandoned the well is divided into two, namely less than 1000 meters (< 1000 meters) and more than (> 1000 meters). The wells that will be closed are wells that have not been plugged and abandoned. Details of well abandoned planning costs consist of manpower costs and service and equipment costs. Manpower costs are costs used for experts, while service and equipment costs are costs for activities and equipment needed for P&A wells.

Decommissioning

Oil and gas gathering and processing stations have different collection and distribution processes. First, the distribution of oil from the MATD Area and collected at the PPP Prabumulih, then pumped to the Refinery Unit (RU) III Plaju. Dismantling the Collecting/Processing Station using conventional methods or common methods, namely welding and heavy equipment. Welders are used to weld and cut pipes/flowlines and production equipment that does not require heavy equipment. Meanwhile, heavy equipment (power shear) is used as a cutter while dismantling the oil/water tank. The welding and dismantling process is carried out after the preparation process, namely the process of cleaning (cleaning and purging) pipes and tanks at the collection/processing station of oil fluid so that the welding process and equipment dismantling are sterile.

Supporting facilities are facilities that support the ongoing oil and gas production process, for example office areas, employee mess, operator rooms, and production support equipment (pump house, transformer house, chemical warehouse, minilab, etc.), security, sports facilities (sports halls, soccer fields, golf courses), canteens, water

installations, workshops, firefighter units, etc. There are two methods offered for the demolition of supporting facilities and other facilities, namely demolition of all facilities or part of the assets that can be donated to the local government which will reduce the cost of demolition.

Transportation and Site Restoration

Transportation for the mobilization of unloading in the MATD structure uses an operational car, while the cost of servicing loads and unloads of equipment using trucks is not included in the transportation cost but has been included in the unloading cost. Based on the data, the storage area in each area is different, namely the Prabumulih Area for unloading storage at KM 01, Limau Area in LB 03 Limau Barat, Pendopo Area in Rajawali Pendopo Yard, and Adera Area in Booster Serdang. In the site restoration process, it is returned to the current state. Most of the demolition areas are located in oil palm plantations, rubber plantations, and close to residential areas.

Estimated Cost of ASR Funds Reserved MATD Area

The estimated cost for the year of implementation of ASR in the MATD Working Area for the year of asset implementation, namely at the end of the KKKS contract period in 2035, against an escalation in the US dollar currency of 2.5% amounting to USD 16,495,718.57, this ASR cost using conventional methods and in accordance with applicable regulations, namely well P&A using SNI, campaign and using rigs. When compared to 4 methods of abandoned wells, which shows the highest total cost of ASR, namely abandoned wells do not use SNI, this is due to the absence of standardization for well abandoned, resulting in cost overruns for abandoned wells. The second order of the highest total ASR costs is P&A wells on a standalone basis, for consideration using this method due to the different productive ages of the wells so KKKS are more risky to close them first but the cost of abandoned the wells is higher than the campaign method because KKKS must prepare a rental fee every time when wells are economical. Finally, the most economical total cost of ASR is P&A wells using rigless, but it is unfortunate because this method has not been included in the PTK ASR and will be considered by SKK MIGAS if using rigless is more economical than using rigs Fig.3.

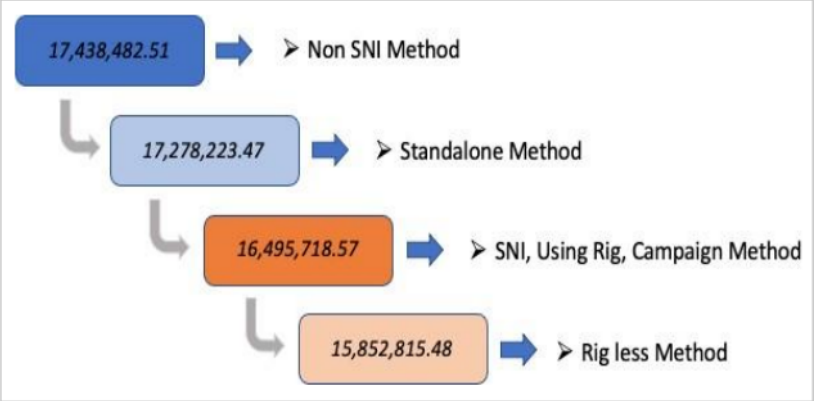

FIGURE 3. Comparison of Total ASR Costs with Variations of the Well P&A Method

CONCLUSIONS

Estimated ASR costs are forecast in accordance with the economic life of the MATD Working Area based on the results of the decline curve (DCA) analysis, which is until 2035. KKKS with sufficient area and not renting it can use it as a storage area or junkyard as a result of equipment dismantling to reduce land rental costs and transportation costs. Some supporting facilities that can later be reused without demolition can be donated to local governments (according to existing regulations), such as administrative buildings, mess and other facilities so that they can be useful.

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