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Continuous Competency Development of Reservoir Engineers to Overcome the Maturity of Mahakam

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CONTINUOUS COMPETENCY DEVELOPMENT OF RESERVOIR ENGINEERS TO OVERCOME THE MATURITY OF MAHAKAM

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Abstract

Mahakam has been in operation for over 40 years and currently still becomes one of the biggest producing blocks in Indonesia. As the fields mature, the role of reservoir engineers becomes more prominent in order to overcome the elevating complexity and challenges in managing the portfolio and maintaining the potential of Mahakam fields. Therefore, Pertamina Hulu Mahakam strives to continuously focus on human capital and quality improvement of its engineers. The Reservoir Engineer (RE) community consists of 70 people averaging the age of 35 with various educational and professional backgrounds. This paper shares PHM's development methods in ensuring equalization of competence among engineers that include formal training, dynamic job assignment, coaching & mentoring and community based development.

Formal training, being guided through application of geosciences passport, is compulsory for all engineers. Each engineer has to complete all the courses listed within the passport including other disciplines such as geology and geophysics. The training undergoes regular update on its structure and content, including development of the instructors. Implementation of dynamic job assignment exposes reservoir engineers to varying technical experiences within movement target of 2-3 years. Additional short-term task forces are assembled in order to cope with operational dynamics. Assignments monitoring is conducted regularly both by hierarchies via Annual Individual Review (AIR), and by Human Resources Business Partner. The monitoring is later consolidated with Head of RE discipline for the construction of the Individual Development Plan (IDP).

Coaching and mentoring program is intended to accelerate professional skills of mentees by working together with their mentors in solving a challenging project that ultimately benefits both the company and employees.

Community based development is conducted via the establishment of RECON (Reservoir Engineers Collaborative Network), a community that was initiated on 16th of December 2016 to propel the capacity and capability development of reservoir engineers. Supervised by steering committee, members are given the opportunity to share, learn, and innovate through programs run by the organizing committee. These programs include knowledge sharing forum, RE school, one-stop-website, RE Bulletin, formation of champion groups in certain areas, and field visits.

By prioritizing on human capital, increasing competence in both soft and hard skills will enhance reservoir engineers' readiness to face the elevating complexity of Mahakam. Additionally, leadership continuity can be ensured through rapid maturity of young engineers. Lastly, human resources development leads to higher job satisfaction and engagement towards the profession.

Keywords: Competency Development; Reservoir Engineer; Mature Field; Mahakam.

1. Introduction

Mahakam Block, located in East Kalimantan, is one of the biggest gas producing blocks in Indonesia. It is comprised of oil and gas producing fields including Tunu, Peciko, Tambora, Handil, Bekapai, Sisi-Nubi and cluster of the South Mahakam fields. The complexity of the block is portrayed through its large-scale operation that covers swamp and offshore fields with total of more than 2000 drilled wells connecting hundreds of thousands of reservoirs. Mahakam Block has been in operation for over 40 years, and the challenges in operating the block are getting more evident as most of the fields become mature.

The core of challenges in mature field management is a tale of mismatch between two trends – increasing needs as a result of reservoir maturity, and decreasing means due to degradation of asset integrity. Typical outcomes of this incongruity are declining production, weaker economics of new projects, more complex surface constraint, and decreasing reserves of new wells. Further complications may occur as consequence of external factors such as volatility of oil and gas price, new regulations, contractual conditions, and logistic constraints.

Reservoir engineers have the role to monitor and maintain the potential of currently producing wells, to manage the declining amount of perforation portfolio efficiently, as well as to work closely with geologists and geophysicists in proposing new economic wells. In consequence, as the fields mature, the role of reservoir engineers becomes more prominent in overcoming the elevating complexity and challenges in managing the portfolio and maintaining the potential of Mahakam fields. Moreover, the highly dynamic operations and globally changing business process due to technology evolution require rapid maturity of young engineers to ensure continuity of high quality leadership. Therefore, Pertamina Hulu Mahakam strives to continuously focus on human capital and quality improvement of its engineers.

2. Development Methods

The community of reservoir engineers consists of approximately 70 people. They are assigned in various positions which require specific skills-sets including reservoir simulation, well performance, production forecast, data management, as well as operations and well monitoring. These engineers possess wide range of age, averaging at the age of 35. The diversity among reservoir engineers becomes more evident due to the fact that their professional experiences as well as educational background vary significantly. Therefore, in order to ensure equalization of competence among engineers, continuous competency development methods are implemented. These methods include formal training, dynamic job assignment, coaching & mentoring and community based development.

2.1 Formal Training

Formal training refers to the learning program in which the goals, objectives and materials are defined by the training department and geosciences tutor. A geosciences tutor is responsible for knowledge and competency development of the engineers within the subsurface or geosciences domain. The training programs are guided through the application of geosciences passport, which is a complete check list of compulsory courses for every individual within the geosciences and reservoir team. Each reservoir engineer has to complete all the courses listed within the passport including courses pertaining to other disciplines such as geology and geophysics which can be seen in Figure 1. The cross-disciplinary courses are important to ensure profound understanding in the basics of relating subsurface subjects which ultimately will be beneficial in daily technical communication within the team.

In addition to technical training, engineers within the geosciences & reservoir team also receives mandatory formal non-technical training that covers the improvement of their competency in soft-skills including basic

communication and human skills, business acumen and leadership skills, as well as their competency in Health, Safety, Security and Environment (HSSE). All of these technical, soft-skill and HSSE training are integrated within the Individual Training Plan (ITP).

The technical training passport and mapping were designed to improve reservoir engineers' competency in 3 main stages. The first stage consists of fundamentals or basic theories of subjects that are important for junior engineers such as basic petroleum geology, basic reservoir geology, open hole log acquisition and interpretation, fundamentals of geophysics, fundamentals of reservoir engineering, reservoir monitoring, well performance, and introduction to programming using Visual Basic. The second stage is an intermediate stage in which reservoir engineers will be focused more on developing their practical abilities including the use simulation software available in the market, production logging interpretation, and well test interpretation. The final stage incorporates advanced theories and more comprehensive and integrated view within reservoir engineering such as field development planning, reserves evaluation, and petroleum economics. In order to cope with Mahakam dynamics, the training undergoes regular update on its structure and content, including development of the instructors.

2.2 Dynamic Job Assignment

Implementation of dynamic job assignment exposes reservoir engineers to varying technical experiences. Within every 2-3 years, reservoir engineers will be reshuffled into different teams. Since each team in every asset may have unique solutions in overcoming problems within the asset, reservoir engineers will obtain vast experiences both technical and non-technical. They will develop ways to rapidly learn new subjects and quickly adapt to new working environments.

Additional short-term task forces are assembled in order to cope with operational dynamics. On a case-by-case basis, several reservoir engineers are assigned into small teams to work on a specific project.

Assignments monitoring is conducted regularly both by hierarchies via Annual Individual Review (AIR), and by Human Resources Business Partner. The monitoring is later consolidated with Head of RE discipline and VP Geosciences & Reservoir for the construction of the Individual Development Plan (IDP).

2.3 Mentoring

Coaching and mentoring program is a collaborative, mutually beneficial partnership between a mentor, who possesses greater skills, knowledge and experience, and a mentee, who is looking to increase his or her skills, knowledge and experience. It is intended to accelerate professional skills of mentees by working together with their mentors in solving a challenging project that will ultimately benefit both the company and employees. The program is available on PHM level through SMART program in which employees are enabled to select a topic from a totally different discipline. This cross-disciplinary program is aimed to provide new point of view in solving daily work problems. An internal coaching and mentoring program among reservoir engineers is also available via a community called RECON (Reservoir Engineers Collaborative Program).

The program either on corporate or discipline level has a typical duration of 9 months. Since it will take the time outside of working hours, participants are required to efficiently manage their time. The coaching and mentoring program is monitored by the committee through regular progress report and mid-term presentation. In the end of the program, participants will deliver a final presentation in front of top managements.

2.4 Community Based Development

Community based development is conducted via the establishment of RECON (Reservoir Engineers Collaborative Network), a community that was initiated on 16th of December 2016. It aims to be a medium that

enables PHM reservoir engineers to propel their capacity and capability development. Supervised by steering committee, members are given the opportunity to share, learn, and innovate through programs run by the organizing committee. The structure of RECON committee that incorporates steering and organizing committee can be seen in Figure 2. RECON possesses 5 people within the steering committee to supervise and advise matters pertaining to management-level decision making in order to ensure that the programs run by organizing committee are in-line with the corporate objectives and targets. The organizing committee consists of 8 people serving the role as chairman, co-chairman, coordinator of mentoring section, program section, champion group section, publication and knowledge management, and field trip section.

Mentoring section coordinates the coaching and mentoring program at discipline level which was explained in the previous chapter. The section arranges the registration for mentee, mentor and topics. The topics are proposed by the community so that the mentoring program will be able to provide added value in solving real problems faced by the community. The selection process including objectives setting will then involve the steering committee. Since the establishment of RECON nearly 2 years ago, there have been 6 pairs of mentor and mentee who have completed the program and 7 pairs still on-going.

Program section is responsible in coordinating knowledge sharing forum, RE school and special projects.

RECON knowledge sharing forum invites inspiring speakers to share their knowledge to the community. Several top level managements of oil companies, service companies, e-commerce companies as well as the president of SPE international have been invited to share their ideas. The invitation to non-oil and gas companies was conducted to inspire the community with a different point of view in tackling their day-to-day challenges.

RE School is an interactive 2-hour workshop held in 3 consecutive days that discusses specific topics. The topics, which were initially chosen by the community through survey, include petroleum economics and management, database management and programming and petroleum simulation. Special projects program acts as a medium to connect members with specific project ideas and engineers with eagerness to be exposed to extra technical subjects outside of daily routine.

With the objective to preserve the knowledge of an expert to the community, champion groups are formed. Each champion group is assigned to become the center of excellence within one specific subject. Currently, there are 3 champion groups covering subjects of Reservoir Evaluation & Well Performance, Petroleum Simulation and Programming & Database Management. Knowledge transfer is also expected internally within the champion group since one group consists of 5 people being senior experts and junior engineers who possess future potential to be an expert in the topic.

The publication and knowledge management section ensures equal spread of knowledge among members by managing information platforms such as monthly RE Bulletin, One Stop Website and Discussion Forum. The content of RE Bulletin covers news pertaining to reservoir engineering, fun facts, sharing knowledge articles, socialization of existing or new company rules, and RECON program updates. One-stop website is a platform that is expected to include all information available for a reservoir engineer (e.g. company rules, best practices guideline & manual, and experience sharing). The discussion forum enables RECON members to discuss either technical or non-technical topics via online by making a new thread or commenting on existing threads. These threads will be preserved so that the discussion containing valuable information will be available for future reference.

Field visit is crucial in order to understand the risk and constraints of the job executions, to know the direct impact of data calculation, to recognize the uncertainty of the outcome and to promote cross-functionality. Each reservoir engineer is encouraged to perform witness activities between 1 to 2 visits per year. The visits will be recorded on web-based logbook for tracking and monitoring purposes. Routine visits are arranged with destination to Handil Lab and Workshop, Outcrop Visit in Samarinda, and Operations Witnessing. Meanwhile, non-routine visits have been conducted to Pertamina Refinery Unit V, Pertamina Marketing Operation Region VI, PT Badak NGL, Seismic Vessel, Jack-Up Rig and Testing Barge.

3. Survey Results and Discussion

A survey has been conducted in July 2018 to measure the performance of competency development of reservoir engineers over the past 2 years. The amount of survey samples or respondents covers approximately 86% of the population meaning that the results of the survey will be representative.

First part of the survey incorporates general questions regarding competency and career development and the role of management in these areas. The results which are depicted in Figure 4 show satisfying performance of the role of management in developing the competency of reservoir engineers. Most importantly, it describes that 87% of the respondents experienced improving technical competency and 83% of respondents experienced improving leadership competency within the last 2 years.

Second and final part of the survey covers questions that pertain to the role of RECON as a community in helping develop the competency of reservoir engineers. Figure 5 summarizes the survey and shows that almost 100% of the respondents agree that the presence of RECON as a community could help bolster their technical capacity and networking as an engineer. High engagement towards the profession is indicated by the responses of 87% respondents that feel proud to be a reservoir engineer. The quality of RECON programs are measured in numbers ranging between 1 and 5 where 1 being the lowest and 5 being the highest degree in quality. The results show that respondents are satisfied with the quality of RECON programs since the average scores of the programs lie between 3.3 and 4.0 in which company visit becomes the most anticipated program.

4. Conclusion

Competency development of reservoir engineers in Pertamina Hulu Mahakam is based on 4 methods: formal training, dynamic job assignment, mentoring and community based development. By prioritizing on human capital, increasing competence in both soft and hard skills will enhance reservoir engineers' readiness to face the elevating complexity of Mahakam. Additionally, leadership continuity can be ensured through rapid maturity of young engineers. Lastly, human resources development leads to higher job satisfaction and engagement towards the profession.

5. Recommendation

The global industry is rapidly changing in a very fast pace. The requirement of skills for PHM reservoir engineers in order to adapt with the evolving industry could also change rapidly through time. Therefore, it is recommended to constantly and continuously monitor and update the needs and competency of reservoir engineers.

6. Acknowledgement

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7. References

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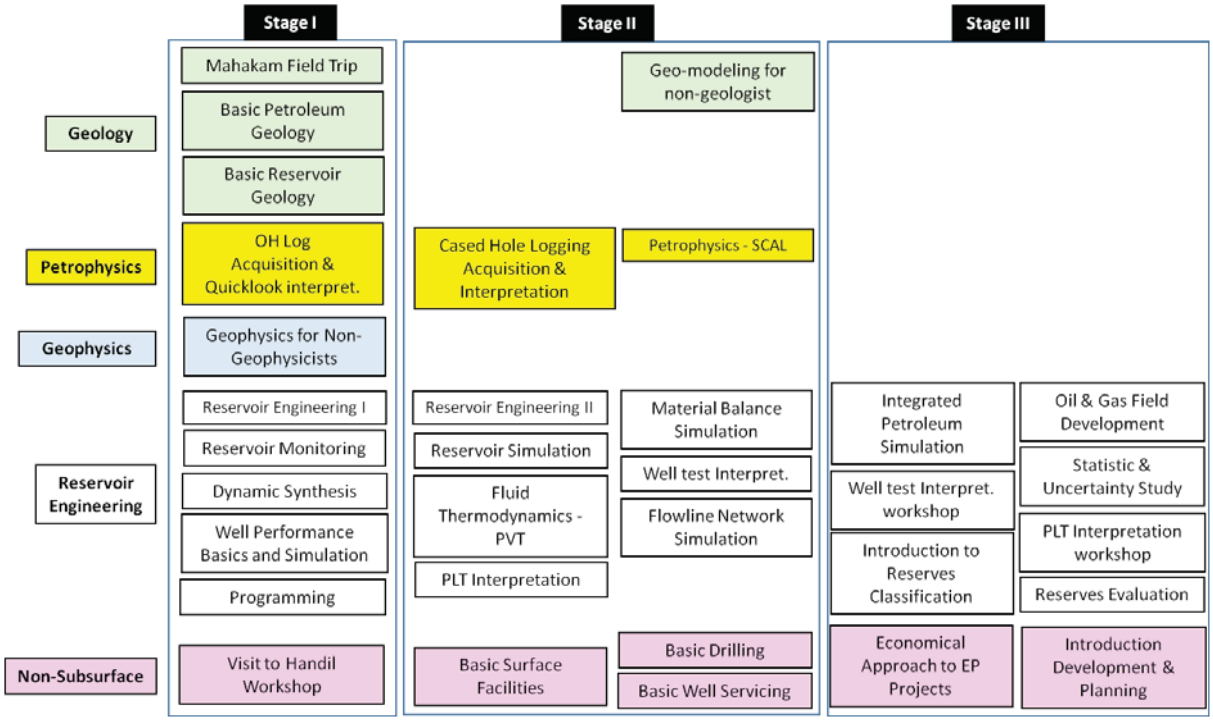

Figure 1. Reservoir Engineers Training Passport and Mapping

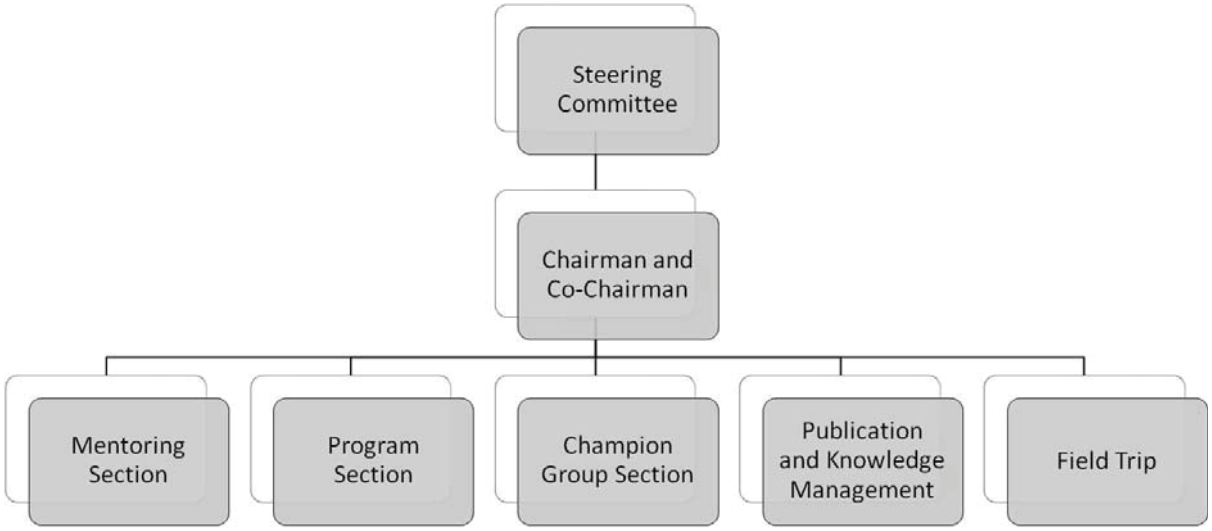

Figure 2. Organization Chart of RECON (Reservoir Engineers Collaborative Network)

Figure 3. Past Routine and Non-Routine Visits

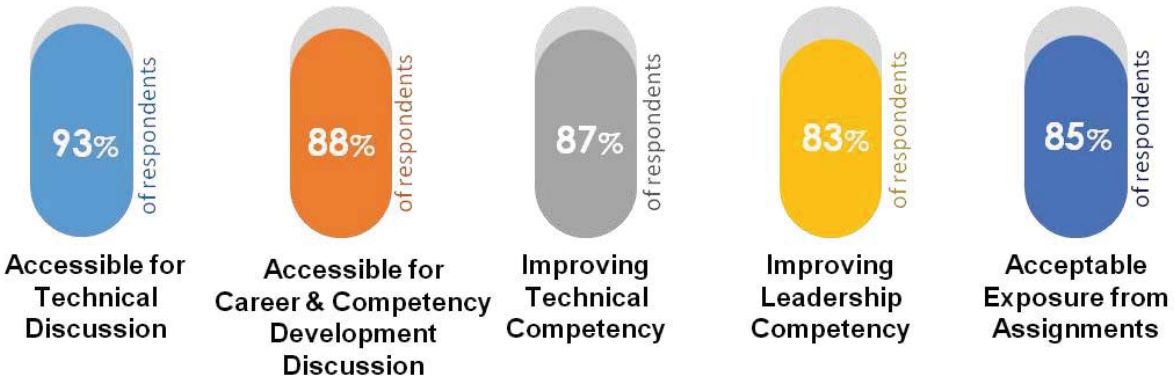

Figure 4. General Survey Results for Competency Development Performance and the Role of Management

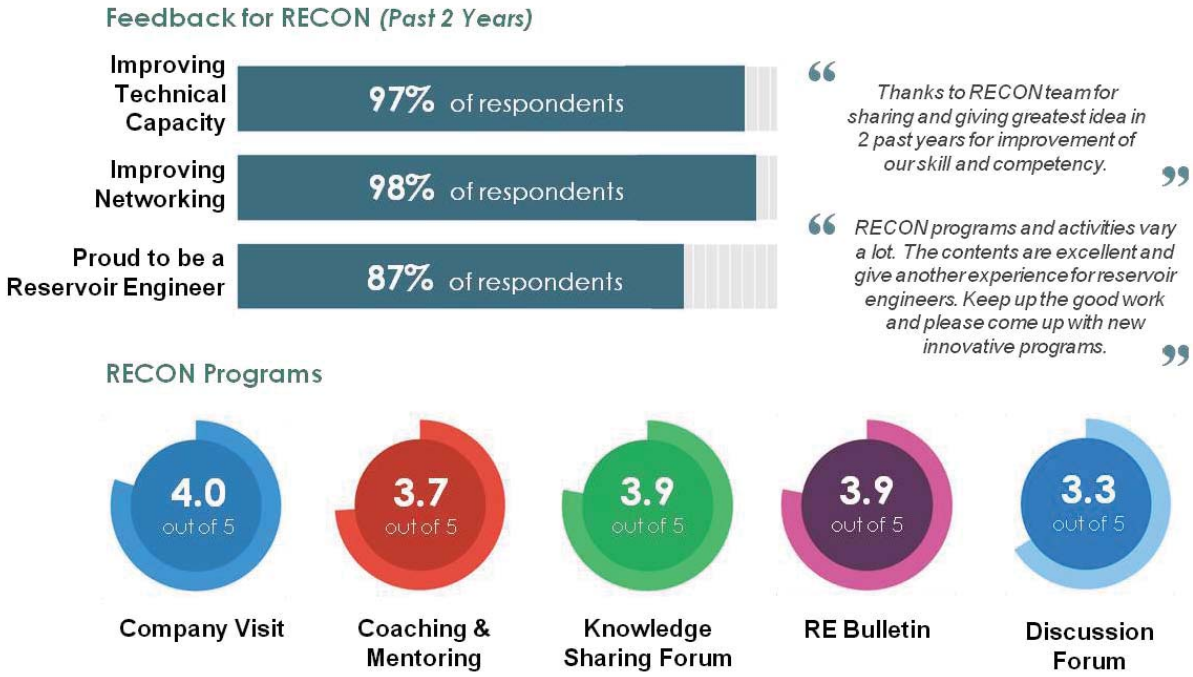

Figure 5. Survey Feedback for the Role of RECON as a Community in Competency Development