ANALYSIS OF RISK-BASED ASSET MANAGEMENT PLAN TO INCREASE PERFORMANCE OF WATER LOCAL COMPANY

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ABSTRACT

This study aims to obtain the concept of risk-based asset management planning with consideration of government regulations and international standards of asset management that can improve the performance of Regional Water Company (PDAM) of Aceh Province. This plan consists of asset procurement plans, asset operating plans, asset maintenance plans, and asset deletion plans. Major risks that can occur in asset management planning include the mismanagement of asset needs, debt settlement failure and corporate financial failure, lack of strong local commitment, real loss, apparent loss, environment, lack of optimal planning and the use of operational costs effectively and efficiently, and the lack of subscribers due to the dominance of people who use groundwater that has an impact on the reluctance of people to buy water through PDAM.

Keywords: PDAM Aceh, Risk Based Asset Management, Risk

ANALISIS PERENCANAAN MANAJEMEN ASET BERBASIS RISIKO DALAM MENINGKATKAN KINERJA PERUSAHAAN DAERAH AIR MINUM

ABSTRAK

Penelitian ini bertujuan untuk mendapatkan konsep perencanaan manajemen aset berbasis risiko dengan pertimbangan peraturan pemerintah dan standar internasional manajemen aset yang dapat meningkatkan Kinerja Perusahaan Daerah Air Minum (PDAM) Provinsi Aceh. Perencanaan ini terdiri dari rencana pengadaan aset, rencana operasional aset, rencana pemeliharaan aset, dan rencana penghapusan aset. Risiko utama yang dapat terjadi dalam perencanaan manajemen aset antara lain kesalahan perencanaan kebutuhan aset, kegagalan penyelesaian hutang dan kegagalan finansial perusahaan, kurang kuatnya komitmen pemerintah daerah, kehilangan air yang sebenarnya (real loss), kehilangan air yang jelas terlihat (apparent loss), pencemaran lingkungan, kurang optimalnya perencanaan dan penggunaan biaya operasional secara efektif dan efisien, dan kurangnya jumlah pelanggan karena masih dominannya masyarakat yang memanfaatkan air tanah yang berdampak pada enggan-nya masyarakat dalam membeli air melalui PDAM.

Kata-kata Kunci: Manajemen Aset Berbasis Risiko, Risiko, PDAM Aceh

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INTRODUCTION

Clean water management for the community is done by Perusahaan Daerah Air Minum (PDAM). To provide optimal water needs of the community, PDAM must have a good performance.

In 2015, PDAM performance rate was 53.3%. For more details, PDAM Performance development in Indonesia and Aceh is shown in table 1.

Table 1. Data on PDAM Operations Audit Results throughout Indonesia

Performance category	2013		2014		2015		ACEH (2015)	
	SUM	%	SUM	%	SUM	%	SUM	%
Healthy (Good)	176	50,3	182	50,7	196	53,3	3	20
Less Healthy (Less Good)	104	29,7	103	28,7	100	27,2	6	40
Poor	70	20	74	20,6	72	19,5	6	40
Total	350	100	359	100	368	100	15	100

Source: Kemenpupera Report (2015)

The government institution that covers all PDAMs in Indonesia, namely the Agency for the Improvement of the Implementation of Drinking Water Supply System (BPPSPAM), in the PDAM performance appraisal report of 2017 explained that the dominant factors affecting the performance of PDAM are the level of water loss (Non-Revenue Water), billing effectiveness and less than 24 hours. Especially the problem of the level of water loss (Non - Revenue Water) very impact on the performance of the PDAM where the water loss rate is tolerated is 20%, while the average PDAM Indonesia is still far from the tolerance limit that is in the range of 32.5%. This problem of water loss/leakage rate is closely related to the management of company assets i.e. network pipes and physical assets in PDAM water supply and distribution.

Susanto & Ningsih (2014) stated that the various problems faced by the PDAM at this time,

such as the high level of water leak (Non-Revenue Water) reflects not maximizing the management of major water company assets and in improving the value of PDAM's performance, good asset management is required. Asset management is an activity undertaken by management that does not escape from risk so that asset management considering risk is best practice / best practice. Stoner (1992) argued that the plan provides advice to the organization and establishes the best procedures for achieving company goals. So risk-based asset management planning is a good starting point for PDAMs that do not have asset management policies.

There have been several studies that have researched Risk Based Asset Management. What distinguishes this research from previous research, however, is that it examines international standards of asset management, government regulation, and incorporates Auditor's perception as PDAM Performance Evaluator.

LITERATURE REVIEW

Asset management is a strategy of continuous improvement processes to improve the availability, security, reliability, and longevity of assets in some aspects such as US systems, facilities, equipment, and processes (Davis, 2007).

The Australian Asset Management Collaborating Group (2012), asset management, such as general management activities, is the process of organizing, planning, designing and controlling acquisitions, maintenance, repair and disposal of infrastructure and asset engineering to

support services. It is a systematic and structured process that encompasses the entire life cycle of physical assets. The purpose of Asset management is to optimize the potential of asset delivery services and to minimize the risks associated with costs and ensure a positive increase in natural and social capital over the life cycle of assets. Good governance and intelligent use of business systems, processes and human resources are key aspects of this effort.

One of the standards for drawing up asset management is ISO 55000. ISO 55000 is an asset management standard that outlines reviews, concepts and terminology in Asset Management. Apart from ISO 55000, there is also another standard that is PAS 55: 2008. PAS 55: 2008 is a Physical Asset Optimization Management system where the main objective is to improve the performance of physical assets. One of the principles of asset management according to PAS 55 is Basis Risk / Risk Based.

Risk analysis methods are generally categorized as qualitative or quantitative. There is also an intermediate category (semi-quantitative) depending on how quantitative the risk analysis is to be used. The API suggested practice 580 (API publication, 2002) on a risk-based examination explaining the "continuum of approach" ranging from quantitative qualitative. There is an intermediate approach, which is a combination of qualitative and quantitative attributes.

According to Hidayat (2012), in the principle of integrated planning for asset management, the asset management planning

stage consists of procurement planning, operations planning, maintenance planning and removal planning. This plan consists of a). procurement plan, which describes the assets needed or replaced within the planning period and which prepares the sources and cost of funding for procurement, b). operational plan describes the existing asset usage policy and may include such things as hours of operation, usage, energy management and cleaning, c). maintenance plan sets standards for assets to be maintained, how standards will be achieved and how maintenance services will be provided, and d). deletion plan will describe all assets that will be eliminated within the planning period, the selected removal method and the expected results from the deletion.

There are many possible risks to asset management activities that must be considered in the preparation of an asset management plan. In the field of water and wastewater risk management based on structural performance and hydraulic risk focuses on prevention and mitigation of damage (Ugarelli, et al., 2007).

Based on the assessment of BPKP auditors of Aceh Province on the identification of risks that have impacts on 3q (s) (quantity, quality and continuity) that are closely related to asset management, and this 3K aspect is the main target of PDAM, it is found risk profile that threatens the operation of PDAM, among others risk of deficient raw water, risk of unit damage / water treatment plant (IPA), distribution network damage risk, real loss risk, apparent loss risk, water leak risk, drinking water tariff ratio smaller

PDAM than cost of goods sold or cost of production, risk cannot comply with liability, illegal connection risk, lack of supply / excess inventory, polluted water risk, pipeline relocation risk, risk of losing land control, risk of groundwater tariff lower water supply, risk of meter equipment not functioning well, risk of measuring water pressure measures on the network, less accurate water quality test result risk, unsecured / competent HR risk, political intervention risk, risk of payment of military and police bill account.

PDAM is a Regional Owned Enterprise (BUMD), in other words PDAM is a company owned by regional government so bound by government regulation. So the government regulation should be included in the preparation of the PDAM asset management plan. Government regulation as reference of asset management policy formulation for PDAM can be guided by SPAM Asset Management Guidance on Preparation of Guidelines for Assessment and Application of SPAM Asset Management from Ministry of Public Works, Regulation of Minister of Public Works Number 18 Year 2007 on Implementation of Development of Drinking Water Supply System, Government Regulations related to PDAM assets as State Property / Regional Property (BMN / BMD) such as PERMENDAGRI No. 17 of 2002 on Technical Guidelines for Management of BMD and PP No. 6 of 2006, Government Regulation No. 38 of 2008 and Government Regulation no 27 of 2014 Management of BMN / BMD.

METHODS

This research type is descriptive with qualitative approach. According to Moleong (2014), qualitative research with a natural paradigm that is different from the non-qualitative paradigm cannot use the criteria of validity and reliability. The technique of Validity and Reliability of this qualitative research data is using Triangulation. According to Bungin (2007), there are several Triangulation techniques, they are:

- a. Triangulation of the researcher's honesty
- b. Triangulation of data sources
- c. Triangulation of method

This research using Triangulation of data sources and Triangulation of method.

The data source are taken from BPKP National Auditor, BPKP Auditor of Aceh Province and PDAM Management perspective. Samples taken were 5 PDAMs (30%) from the population of 15 PDAM Aceh, two BPKP Aceh Auditors, and from BPKP National Provincial Representative.

Based on the results of the PDAM performance audit in the province of Aceh in 2016 by BPKP, it was found that 20% of PDAMs were categorized as Good Performance 40% were categorized as Less Good Performance and the remaining 40% were categorized as Poor Performance. So we use stratified sampling by taking sample of one good PDAM, two fair PDAMs and two poor PDAMs (totaling to five PDAMs).

Data analysis consists of sketching ideas and making notes, summarizing field notes

work with words, identify code / process coding. In this stage the researcher performs the process of abstract coding or concrete coding, calculating the frequency of the code, connecting categories, connecting categories with analytical framework in literature, creating point of view, and displaying data.

The expected results in this study are asset management plans based on risks as a concept model that can be applied in PDAMs in Aceh as asset management best practices to improve their performance.

RESULTS AND DISCUSSION

Data analysis is performed by describing the procedures involved in the analysis of interview transcripts through coding techniques. Coding is done for the code descriptive asset management planning practices, asset management planning according to standards and regulations, as well as risks in the management of PDAM assets. Interview sources consisted of management of PDAM Aceh and West Java, BPKP Aceh auditor as evaluator of PDAM performance in Aceh Province, and National BPKP taking BPKP auditor of other provincial representatives.

Appropriate Asset Management Planning International Standards and Government Regulations Related to PDAM Assets *Asset Management Planning Theory*

This asset management planning stage consists of procurement planning, operations planning, maintenance planning and removal planning. The

things that should be contained in each of these plans include:

Table 2. Points in each Asset Management Plan

No	Management plan	Point
1.	Procurement Plan	a. Explanation of required assets b. Explanation of replaced assets in the planning period c. Source of funding for procurement d. Funding costs for procurement
2.	Operational Plan	a. An asset usage policy b. Hours of Operation c. Use of Assets d. Energy Management
3.	Maintenance Plan	a. Standards for assets to be maintained b. Achievement of standards c. Maintenance services
4.	Removal Plan	a. List of assets to be written off within a certain period b. Method of deletion c. Expected results from deletion

Source: Processed data (2018)

International Standard Asset Management

Asset management enables companies to intensively use limited resources to achieve their business goals in the most efficient way. The Institute of Asset Management (IAM) has recently developed a framework for an organization in asset management, through PAS 55 or ISO 55000 compliance, and others for specific contexts in asset management (Kersley & Sharp, 2015). Aceh's PDAMs have no asset management policy at all, and from interviews to PDAM management are almost entirely unaware of the international standards of asset management such as ISO 55000 and PAS 55. In the absence of this asset management policy, it can be said that the implementation of the PDAM's asset management is inconsistent with international standards ISO

55000 and PAS 55 where in both standards there is an asset management cycle in which there is an asset management plan or Strategy, Objectives and Asset Management Plan.

Asset management planning in accordance with PAS 55 is an Asset Management plan that considers Risk, this is because one of the main principles of asset management according to PAS 55 is Risk Based. Likewise the asset management planning that complies with the international standard ISO 55000 is an asset management planning with risk management in Risk Management Planning (AM Plans) which considers the risk with the use of ISO 31000 as Risk Management standard.

Most of risk based asset maintenance models and methodologies derived from the basic risk management process that have been designed in ISO 31000: 2009 as shown in the figure 1 (Grobbelaar & Miya, 2015).

**Figure 1. Basic Risk Management Process
Based on ISO 31000: 2009**

Source: The International Organization for Standardization (ISO) 31000: 2009

The risk management process consists of risk identification, risk evaluation, Risk Control technique selection, and implementation and review of Risk Control decisions. So these four stages must be done to the whole process of asset management planning both in procurement planning, asset operating planning, asset maintenance planning and asset deletion planning.

Government Regulation Related to PDAM

Based on related government regulations, it can be formulated things that must be considered PDAM in asset management planning process, among others are shown in table 3.

Risks in the Management of PDAM Assets

In addition, table 4 shows the risks to the asset management plan according to the three groups of PDAM performance levels.

Table 3. Things to Look For PDAMs in Planning Management Based on Government Regulations

No	Planning activities	Planning activities to be attempted	
		Procurement Plan	Operational Plan
1	Procurement Plan	<ul style="list-style-type: none"> • Procurement planning is made taking into account the procurement of goods can be through the mechanism of solution purchasing assets, borrowing, lease, leasing, non-asset solutions or other mechanisms more effectively and efficiently according to the needs of government administration such as over the status of Users Other goods or grants • Planning is guided by: standard of goods; standard needs; and / or price standards • Basic principles that are efficient, effective, open, competitive, transparent, fair and accountable. • The PDAM is a Regional-owned Company, so in the procurement of its assets it must coordinate with the local government.. • Asset operational activities, in government regulations related to BMN, activities that can be included in this category of activities include: <ol style="list-style-type: none"> 1. Activities on the use of BMN, which can be differentiated into the determination of the usage status on the user of the goods, the determination of the use status operated by other parties, the transfer of usage status, and the determination of BMN in the form of idle land and / or buildings. 2. Activity of BMN utilization, which includes BMN lease, borrow use, cooperation of utilization, and wake up for handover or hand-over. 3. Moving activities of BMN, which may be made by way of sale, exchanged, granted, or included as government capital 	
2	Operational Plan	<ul style="list-style-type: none"> • Planning for the utilization of State / Regional Property can be done for a period of 1 (one) year and 3 (three) years • Planning is guided by: standard of goods; standard needs; and / or price standards • Planning of maintenance of State / Regional Property can be done for period of 1 (one) year and 3 (three) years • Planning is guided by: standard of goods; standard needs; and / or price standards • The Goods, Users, or Procurement Administrators of the Goods are responsible for the maintenance of State / Region Goods under their control. • Maintenance is guided by List of Goods Maintenance Requirement. • The cost of maintaining a State / Local Property shall be borne by the State / Regions Budget. • Planning for the elimination of State / Regional Property can be done for a period of 1 (one) year and 3 (three) years • In government regulations, Assets Removal Activities consist of: <ol style="list-style-type: none"> 1. Asset Abolition, consisting of deletion from User List and / or User Power List and Removal from BMN / D List. 2. Asset Destruction, is the act of destroying the physical and / or usefulness of BMN / D by burning, crushing, stockpiling, drowning or other means in accordance with the provisions of legislation. 	
3	Maintenance Plan	<ul style="list-style-type: none"> • Removal done: <ol style="list-style-type: none"> 1. Based on the decision and / or report of the Deletion of the Users of Goods, for State / Local Property located on the Users of the Goods; 2. Based on the decision of the Goods Manager, for the State Property located in the Goods Manager; or 3. Based on the decision of the Governor / Regent / Mayor, for the Regional Property located in the Goods Manager. 	
4	Removal Plan		

Source: Processed data (2018)

Table 4. Risk Identification in PDAM Asset Management Planning Activity According to Aceh Province

NO	Asset Management Planning Activities	Good Performance PDAM	Less Good Performance PDAM	Poor Performance PDAM
		1. The difficulty of eliminating assets due to long and complicated mechanisms. 2. Damage / theft of assets from people who are not responsible 3. Unrecoverable assets / difficult to record assets. 4. Damage to assets due to natural disasters 5. Unavailability of sufficient funds to reimburse / replace assets 6. Decrease in asset performance not yet	1. Unsecured asset purchases with the required 2. The risk of asset life is more quickly damaged than its economic life. 3. Lack of employee understanding about asset management in PDAM	1. Damage / theft of assets from people who are not responsible 2. Unable to rehabilitate / replace the asset because no funds are available. 3. Proposed errors for asset disposal due to non-performing asset condition analysis according to procedure
	Risk Management of the Company's Most Major Assets			
1	Procurement Plan	Activity of Asset Procurement An increase in the price of water provider infrastructure assets - (may occur due to increases the inflation rate, the rise of foreign exchange rate against rupiah, and the increase of fuel price).	1. Increase in asset price of water supply infrastructure of fuel oil). 2. Mismanagement of asset requirement (asset requirement plan not prepared based on survey of consumer needs). 3. Failure of forest settlement and financial failure of the company 4. Budget Plan Cost of asset procurement at mark up; no cheap source of finance available; 5. Suppliers deliver assets with different specifications, below quality standards, and late delivery time	1. Increased pricing of water provider infrastructure - (may occur due to increases the inflation rate, the rise of foreign exchange rate against rupiah, and the increase of fuel price). 2. Budget Plan The cost of asset procurement at mark up; no cheap source of finance available; 3. Suppliers deliver assets with different specifications, below quality standards, and late delivery time.

2	Operational Plan	<ol style="list-style-type: none"> 1. Lack of raw water availability. 2. Actual loss of water - 3. Clear water loss (apparent loss) - 4. Not optimal use of assets / Many assets are not productive / idle 5. Less than optimal planning and use of operational costs effectively and efficiently 	<ol style="list-style-type: none"> 1. Lack of raw water availability. 2. Actual loss of water - 3. Clear water loss (apparent loss) - 4. Not optimal use of assets / Many assets are not productive / idle 5. Less than optimal planning and use of operational costs effectively and efficiently. 	<ol style="list-style-type: none"> 1. Appropriate loss of apparent water - 2. Not optimal use of assets / Many assets are not productive / idle 3. Less than optimal planning and use of operational costs effectively and efficiently
3	Maintenance Plan	<ol style="list-style-type: none"> 1. Damage / theft of assets from irresponsible persons; 2. Unable to rehabilitate / replace the asset because no funds are available. 3. Data information systems such as PDAM asset inventory data are disrupted / lost due to natural disasters 	<ol style="list-style-type: none"> 1. Damage / theft of assets from irresponsible persons; 2. Delays routine condition checking of assets. 3. Unable to rehabilitate / replace the asset because no funds are available 4. Asset Abolition Activities. 	<ol style="list-style-type: none"> 1. Damage / theft of assets from irresponsible persons; 2. Delay of routine condition checking of assets. 3. Unable to rehabilitate / replace the asset because no funds are available
4	Removal Plan	<ol style="list-style-type: none"> 1. Long asset removal activities due to long and complicated deletion mechanisms. 2. Proposed errors for asset disposal due to non-performing asset condition analysis; 	<ol style="list-style-type: none"> 1. Proposed errors for asset disposal due to non-performing analysis of the condition of the assets according to the procedure; 2. Long asset removal activities due to long and complicated deletion mechanisms. 3. There is a violation of the law because the mechanism for the elimination of assets is not in accordance with the rules / legal provisions; 4. There is an unilateral effort to eliminate assets without involving matters related to asset deletion. 	<ol style="list-style-type: none"> 1. Proposed errors for asset disposal due to non-performing analysis of the condition of the assets according to the procedure; 2. Long asset removal activities due to long and complicated deletion mechanisms.

Risk Evaluation

From identified asset management risks, interviews with BPKP Auditors and PDAM management of which risks are most likely to threaten asset management. From the results of this risk evaluation the following lists of risks are identified:

Table 5. Key Risk Evaluation in PDAM Asset Management

No.	Asset management activities	Risk in asset management activities
1	Procurement Plan	<ol style="list-style-type: none"> 1. Mismanagement of asset requirements 2. Failure of forest settlement and financial failure of the company 3. Less strong commitment of local governments in the provision of asset procurement budget.
2	Operational Plan	<ol style="list-style-type: none"> 1. Actual loss of water 2. Clear water loss (apparent loss) 3. Environmental pollution 4. Less than optimal planning and use of operational costs effectively and efficiently 5. Lack of subscribers due to the still dominant people who use the ground water impact on the reluctance of the community in buying water through PDAM
3	Maintenance Plan	<ol style="list-style-type: none"> 1. Unable to rehabilitate / replace the asset because no funds are available. 2. Other risks, i.e. the condition of existing assets has not been recorded well.
4	Removal Plan	Long asset removal activities due to long and complicated deletion mechanisms.

Risk Based Asset Management Planning Which Adopts International Standards Asset Management and Related Government Regulations

Table 6 shows the asset management planning of PDAM.

Table 6. PDAM Asset Management Planning

Notes	Procurement plan	Operational plan	Maintenance plan	Removal plan
Asset Management Concept Review	Explanation of required assets Explanation of replaced assets in the planning period Source of funding for procurement Funding costs for procurement	An asset usage policy Hours of Operation Use of Assets Energy Management Cleaning	Standards for assets to be maintained Achievement of standards Maintenance services	List of assets to be written off within a certain period Method of deletion Expected results removal plan
Standard of Asset Management	One of the principles of asset management in PAS 55 is risk consideration. And in ISO 55000 in the asset management plot is the Asset Management Plans stage using Risk Management (Risk Management) that is ISO 31000 standard.			
Government Regulations related to PDAM Assets	Can be done with: Asset solutions, such as buying, building or leasing (leasing) Non-asset solutions such as changing the status of other Users of Goods or grants Basic principles consisting of efficient, effective, open, competing, transparent, fair and accountable. PDAM is a Regional-owned Company, so in the procurement of its assets must coordinate with the local government.	Asset operational activities, in government regulations related to BMN, activities that can be included in this category of activities include: BMN usage activities, which can be differentiated into the determination of the usage status on the user of the goods, the determination of the usage status operated by other parties, the transfer of usage status and the determination of BMN in the form of idle land and / or buildings. Activity of BMN utilization, which includes BMN lease, borrow use, cooperation of utilization, and wake up for delivery or wake of handover. Transfer activities of BMN, which may be made by way of sale, exchanged, granted, or included as government capital	Budget planning includes budget for procurement activities and maintenance budget of BMN / D.	In government regulations, Assets Removal Activities consist of: Asset Deletion, consists of deletion from User List and / or User Power List and Removal from BMN / D List. Destruction of Assets, is the act of physical destruction and / or the use of BMN / D by burning, crushing, stockpiling, drowning or other means in accordance with the provisions of legislation.
The risks involved in the asset management cycle	Mistakes of asset-requirement planning (asset-requirement plan not prepared based on consumer demand survey). Failure of forest settlement and financial failure of the company Lack of strong commitment of local government in providing asset procurement budget.	Actual loss of water Clear water loss (apparent loss) Environmental pollution Less than optimal planning and use of operational costs effectively and efficiently The dominant community that utilizes ground water has an impact on people's reluctance to buy water through PDAM.	Unable to rehabilitate / replace the asset because no funds are available. The condition of the existing assets has not been properly recorded.	Long asset removal activity due to long and complicated deletion mechanisms.
Risk Control	Develop asset policies and be implemented properly, and coordinate with the Central / Local government to obtain assets, given the company's unfeasible financial condition. Data collection of all assets from the beginning of the company stands, whether fixed or temporary assets must be recorded Management is involved in planning procurement of assets, the handover of goods to be assets in the process in cooperation with local governments.	Effective Improvement of network leakage by preparing a list of priority to the condition of the assets that must be repaired immediately. And perform routine maintenance of strategic assets. The implementation of deliberation and commitment of both local government and companies (PDAM) to improve and find solutions to all problems that occur in PDAM	Conduct an asset inventory and compile a complete asset list with its conditions, and list the assets that are prioritized for improvement by considering the remaining useful life of the asset and its important functions to the company's operations. By billing the water account to the customer through Door to the door for a little better shade then do the purchase (Stock) tool for acceleration in the effort of snack leakage Control and follow up on any person who utilizes assets outside the company's interests and conduct regular asset checks	Record of assets must be clear and recorded Routine care for assets that require care such as Pumps, IPA, and others The availability of funds and human resources can all be controlled and the company's commitment to record assets that have been built Should be coordinated so there will not be erased productive asset. Repair the network by searching for leakage points and improving for normal distribution to be maintained

CONCLUSION

Based on the results of the above discussion it can be concluded risk-based asset management plans considering the government regulation and international standards need to be implemented by PDAM. These plans are required to attract more consumers to use the services provided by PDAM.

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