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IMPROVEMENT OF PERMIT TO WORK PROCESS TO ENHANCE PERFORMANCE OF BUSINESS PARTNER IN PT XYZ

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Abstract—*Operation and Maintenance (O&M) division as one of division in PT XYZ was chosen for efficiency project implementation. Since, it spends 35% of budget. O&M is faced by low performance of business partner. It is seen from time writing (TW) utilization and overtime ratio that are below standard. TW utilization is 61,7% and overtime ratio is 36%. And for this PT XYZ should spend cost of poor quality about USD 170.000 per annum. Excessive procedural of permit to work (PTW) has been found as one of the causes. Lead time of PTW will take 28 hours with execution time 3 hours and 30 minutes. With new proposed PTW process, lead time of PTW will take 27 hours with execution time 5 hours and 30 minutes. And it has resulted to new proposed contract for business partner where it will start work at 08.00 AM. Potential benefit is as much as USD 143.596 per annum.*

Keywords : Process Improvement, Excessicive Procedural, Cost of Poor Quality, Permit to Work, Contract

1. Introduction

PT ABC as the holding company of PT XYZ is one of admired and biggest energy company in the world. Its business mostly is moving on oil and gas industry. Beside this business, PT ABC's business also moving in renewable energy, one of them is geothermal. Geothermal is a form of energy that lies underneath the subsurface. It comes from two words, the geo and therme. Geo means earth and therme means heat. A lot of people nowadays use geothermal to produce electricity, to heat homes and buildings, and to provide hot water for a variety of uses.

When groundwater seeps below subsurface near a volcano, the water is heated by reservoirs of molten rock, usually at depths of up to 9,800 feet (3,000 m). The steam and hot water which are produced by the reservoir is distributed through wells. The wells are similar to those used to produce crude oil and natural gas. After being captured, steam and hot water are separated. The steam is cleaned and sent to the power plant. The separated hot water is returned to the reservoir, helping to regenerate the steam source, besides from the rain fall. (Baumann *et al,* 2011). PT ABC began geothermal operations during the 1960s in the western United States. In the 1970s, two discoveries of geothermal fields in Philippines led to the development of geothermal projects in the country. In Indonesia, PT ABC discovered the geothermal fields during the 1980s and began commercial production in the 1990s.

PT ABC's geothermal operations from the four projects in Indonesia and Phillipines currently have the capacity to produce 1273 megawatts (MW). PT XYZ started in 1984 in Indonesia to produce geothermal when PT XYZ got a joint operation contract (JOC) with Pertamina. The environment of PT XYZ is fulfilled by volcanic environment and vapor dominated reservoir. In 1994, PT XYZ began commercial when PT XYZ got contract with PT Perusahaan Listrik Negara (PLN). O&M division is a division in PT XYZ which is in charge for doing the daily operation and maintenance for the power plant. O&M division has the biggest responsibility to ensure the sustainability of a power plant. Since, if a power plant has been established, operations and maintenance will be a big matter.

Thus, it is non debatable if O&M division is the biggest spender of budget in PT XYZ. According to budgeting data in 2011 for contract with third party, O&M division got about 35% of total budget in PT XYZ, it is as much as USD 2,25 million or for exactly USD 2.250.499. According to the law of Pareto, if efficiency is made in this area, then it is expected that it will be a very worth number and the objective of the project to save USD 100.000,00 per year is predicted will be achieved. O&M division is faced by low performance of business partner's manhours utilization rate. The low performance of business partners can be seen from ratios that are used by PT XYZ :

a. Low time writing (TW) utilization ratio

TW utilization ratio is a ratio of total working hours divided by total available working hours. This ratio shows how much (in %) hours did PT XYZ's business partners works in a day. In average, from 2007 until April 2011 business partners has average of TW Utilization for 61,7%. Meanwhile, standards in PT XYZ, TW utilization should be more than 80%. And the formula of time writing is :

$$TW\ Utilization = \frac{Sum\ of\ Hour\ Worked}{Sum\ of\ Total\ Available\ Work}$$

b. Overtime ratio which is high even though in normal day

Overtime ratio is a ratio of how much hours of over time in day happens divided by 8 working hours. This ratio shows how much (in%) hours of over time happens in a day. In average, from 2008 until April 2011 over time ratio is 36% and sometimes it is almost 100%. The formula of over time ratio is shown below :

$$Over\ Time\ Ratio = \frac{Over\ Time\ Hours}{Normal\ Time\ Working\ Hours}$$

The low performance of business partners in PT XYZ is not comparable with the increasing of expense in O&M support labor contract services from year to year. The contract services expense of O&M third party contract services from year to year is increasing, meanwhile the value which is got by PT XYZ is almost the same in every year. In average the O&M budget from 2007-2011 is USD 1.847.126. Thus, PT XYZ needs an efficiency action to reduce the cost which is occurred.

2. Business Issue Exploration

A. Conceptual Framework

The conceptual of the final project is done by adopting the lean six sigma framework, it is DMAI without C element. DMAI stands for : Define, Measure, Analysis, and Improve.

Figure 1. Conceptual Framework

B. DMAI Analysis

Based on the definition from Tayntor, C. B., 2005, DMAI are :

1. D stands for defining the problem and what is important.

   In D phase, business objective, project objective, and problem statement are defined.

   The business objectives from PT XYZ are to :

- Reduce operating expenses

  Operating expense is expenses that are incurred when a business is operating. It is expected that from the project, the operating expense will have a sufficient reduction.

- Reduce risk exposure

The project is expected to be implemented without ignoring the risk aspect.

The project objectives from PT XYZ are :

- Improve on Permit to Work

In O&M division, when a business partners wants to do a work, there will be a requirement for business partners to order a work to PT XYZ. It is expected that the permit to work process will be made efficiently.

- Reduce excessive procedural

Excessive procedural when business partners do daily works, especially when work order process is expected to be reduced in order to maintain an efficient daily operations.

The problem statement in PT XYZ is low performance of business partners. Performance of business partners in PT XYZ especially in manhours utilization rate is not good as expected and it can be seen that the performance is not consistent.

And from year to year there is an increasing in O&M expense and cost, especially from the contract service expense of O&M division at PT XYZ for business partners, meanwhile the value added which is got by PT XYZ is almost the same from year to year.

And in addition, O&M division in PT XYZ is the biggest expenditure for about 35% of annual budget. So, it is expected that efficiency will be needed.

2. M stands for measuring the current process.

   In M phase, the permit to work process, time writing utilization, over time ratio, and cost of poor quality (COPQ) are measured.

   - Permit to Work Process is needed to be measured since this the delay of a permit to work process could lead to a delay in daily operations.
   - Time writing (TW) utilization is a ratio of total hours worked divided by total available working hours in normal day. Time writing utilization has ambiguity in the calculation and the result. Since, when a time writing utilization is below 100% than it means there are several non value added activities in daily operations. But, when the value is more than 100% we can not say that there are a lot of value added activities, since there could be an over time.
   - Over time ratio is a ratio between over time and normal time working hours. Over time of business partners in PT XYZ has become a great issue, since over time in PT XYZ has become another additional salary for business partners. And not only business partners that will have the advantage of the over time, from several PT XYZ's employees also get the advantage of over time, especially for the non-staff employee.
   - Cost of poor quality (COPQ) is a cost that is occured when the system or process is not right. The low performance of business partner in PT XYZ certainly bring COPQ to PT XYZ. The low TW utilization ratio and high overtime ratio is contributing to the COPQ of PT XYZ

3. A stands for analyzing what is wrong and potential solutions.

   In the analyze phase, the possible root cause of the problem is reviewed. After the possible root cause is found, then the potential solutions is analyzed. And then the potential benefit from solutions is calculated.

4. I stands for improving the process by implementing solutions

   Implementation of the project could be one until two years depending on the leaderships of PT XYZ to its business partners. Implementation of the project will face several difficulties, from both PT XYZ and its business partner side.

   The affects :

   - PT XYZ will have a new standard operating procedure (SOP) and it can be a very challenging situation since PT XYZ is a big and mature company which has its own culture and daily habits in doing their works.
   - Several employees from PT XYZ especially from the non-staff employees and business partner will get their additional salary from over time being cut.
   -

C. Analysis of Business Situation

1. Work order process by business partners in the O&M
   Every time business partners want to do a job in O&M division, they need to get a "permit to work" (PTW) license. If they do not get the PTW, they will not be allowed to do the work even though the job they are doing is an important job in O&M.
   Since, PT XYZ always stick to the safety slogan : Do it safely or not at all, there is always time to do it right. So, scheduling is really a matter in PT XYZ. For minimum, one day before the work will be done, business partners should create the PTW.
2. Time writing utilization
   TW utilization is a ratio of total working hours divided by total available working hours. This ratio shows how much (in %) hours did PT XYZ's business partners works in a day (8 hours of working). In average, from 2007 until April 2011 business partners has average of TW Utilization for 61,7%. Meanwhile, standards in PT XYZ, TW utilization should be more than 80%.
3. Over time ratio
   Overtime ratio is a ratio of how much hours of overtime in day happens divided by 8 working hours. This ratio shows how much (in%) hours of overtime happens in a day. In average, from 2008 until April 2011 over time ratio is 36%, meanwhile the maximum overtime allowed in PT XYZ is 20%. And even though the maximum overtime is 20%, PT XYZ still pay full the overtime that is happens even when the overtime is almost 100%. In the future, management of PT XYZ is expecting that the overtime will be paid is only 10%.
4. Cost of poor quality
   Cost of poor quality (COPQ) is a cost that is occurred when the system or process is not right. (Cieslinski, 2008). Budget for business partners in O&M division in PT XYZ in the year 2010, is about IDR 5 billion, for exactly it is IDR 5.048.918.647,00. The budget is only the budget for business partners' salary, not including the materials or tools or anything else that is needed during the works.

- For the low TW utilization
  TW Utilization in PT XYZ is 61,7%, then COPQ for a year is :
  $$COPQ = CGI\ Standard - TW\ Utlization\ Happens$$
  $$COPQ = 80\% - 61{,}7\%$$
  $$COPQ = 18{,}3\% * IDR\ 5.048.918.647$$
  $$COPQ = 18{,}3\%$$
  $$COPQ = IDR\ 923.952.112$$

- For the high over time ratio
  Over time ratio in PT XYZ is about 36%, then COPQ for a year is :
  $$COPQ = Over\ Time\ Happens - CGI\ Standar$$
  $$COPQ = 36\% - 20\%$$
  $$COPQ = 16\%$$
  $$COPQ = 16\% * IDR\ 5.048.918.647$$
  $$COPQ = IDR\ 807.826.894$$

Thus, the total COPQ of PT XYZ is about IDR 1,7 billion or for exactly is IDR 1.731.779.096. If the COPQ could be eliminated then PT XYZ will achieve more saving than the targeted, which is USD 100.000 per annum.

D. Problem Identification

1. PTW lead time

   The lead time of current PTW process is about 28 hours. And according to current PTW process, the PTW permit should have been approved by operation supervisor as the job owner at around 8.15 AM. A delay in this activities will lead to a delay in O&M works. And a delay in O&M works, could lead to an overtime, thus will lead to a low performance of business partner And in the PTW process also there is a waste that can be seen from the scheduler who brings the PTW documents to the persons in charge back and forth. PTW process is along process way to go. And without it, business partners can not work to do the O&M activities.

   The lead time of current PTW process is about 28 hours. And according to current PTW process, the PTW permit should have been approved by operation supervisor as the job owner at around 8.15 AM. A delay in this activities will lead to a delay in O&M works. And a delay in O&M works, could lead to an overtime, thus will lead to a low performance of business partner. If an efficiency can be made around this area, by leaning the business process, it sure will have a big savings for PT XYZ. And the target to save USD 100.000 per annum wil be reached.

2. Overtime regulation

   In a day, normal working hours is 8 hours a day excluded lunch time. If necessary, business partners can ask for overtime to the person in charge. And the process is relatively simple. A 15 minutes process and the overtime will be granted. And for the overtime, business partners will get paid. According to the contracts and regulation, maximum overtime that will be paid is 20% overtime from normal working hours in a day, which means about 1,6 hour. But, often that even the overtime is more than 20%, the business partners will be paid for as much as the overtime that is happens, even though the over time is almost 100%.

   Thus, since the lack of indecision in PT XYZ, the overtime has become a habit in PT XYZ. Overtime is considered as additional salary for both business partners. And this matters is believed as one of the causes of the low performance of business partners in PT XYZ.And, not only business partners that will have the benefit from the overtime. The PT XYZ employee, especially the non staff employee, will be paid if there is an overtime.

3. Business Solution

E. Business Issues Solution

It can be seen that there are two root causes for the low performance of business partners in PT XYZ, they are :

1. PTW lead times
2. Overtime regulation

It is expected that from the finding of the solution of business issues, PT XYZ will get a saving for as much as USD 100.000 per annum. The scheme of business issues solution is shown below :

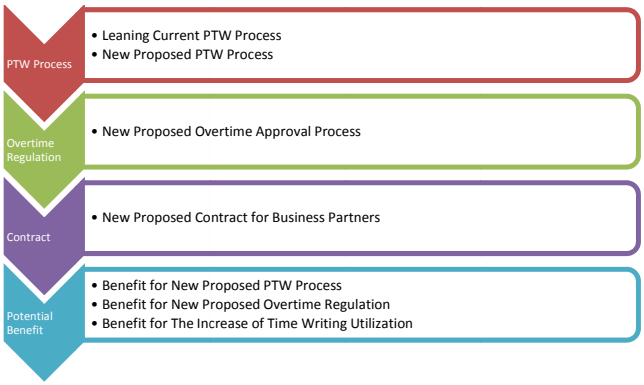

Figure 2. Business Solution

F. PTW Process Analysis

From aleanjourney.com, it is needed to detect the waste from a process before analyze it. The waste can be divided into acronym of DOWNTIME, they are : defects, over production, waiting time, non-utilized resources, transportation, inventory, motion, and excess processing. And according to Gasperz, there is an extra "E" letter in front of "DOWNTIME" word. The E stands for environment, health, and safety. The current PTW process takes about 28 hours and 30 minutes. It is a long way to go. Looking back to the current PTW process, there are several area improvement in the PTW process, they are :

1. Repetition of scheduler back and forth to bring the PTW document to achieve approval from person in charge.
   The improvement is proposed by a process where of approval that can be done in one place and no need the scheduler to bring back and forth the PTW documents. Which means the scheduler, the authroized person, and performing person need to be in one place to do the approval of PTW documents
2. Repetition of transportation back and forth to transport the field executor.
   Transportation is a non value added activities but required to complete a job. But, with such a lot of repetition in transportation, it sure will bring a waste in a process. It is proposed that the transportation will be reduced by having a break lunch in the field and the coordination and progress report, especially when there will be an overtime will be done by radio.
3. Material and tools preparation.
   Material and tools preparation need 30 minutes to prepare. If the material and tools preparation can be paralleled, it sure can save 30 minutes. So, the field executor just need to do the work after the PTW is approved.
   It is proposed that the list of material and tools that is going to be needed by the field executor to execute the job is given before the PTW document is out. The proposed time for the warehouse man preparing the material and tools is proposed at 07.00 AM.

The new proposed of PTW process will take about 27 hours. With execution time about 5 hours and 30 minutes. Which mean it is an additional 2 hours of available hours in a day for job execution.

G. New Proposed Overtime Approval Process

Approval process of overtime in PT XYZ is relatively easy to be approved. Since, the performing person as the person in charge for the job execution basically is their direct boss. And in PT XYZ, closeness between direct boss and direct subordinate is inevitable. Even though according to businessjournal.gallup.com a positive leadership will accomplish greater engagement among team member. The overtime approval process needs to be renewed. Because in PT XYZ overtime is almost always happen. And it is not only just because the PTW process, but also because the mind of having an additional salary. It is proposed that the approval of overtime need to be changed structurally. It is proposed that the approval should also be approved by Operation Manager of PT XYZ. Operation manager is the person who is in charge for the operation in PT XYZ. In PT XYZ, operation manager is the second of top management under Asset Manager.

It is expected that by renewing the approval process of overtime by having Operation Manager as the second top leader in PT XYZ the results are :

1. Subjectivity can be reduced
2. Performing person will not carelessly giving approval to the overtime
3. Field executor will not carelessly asking an overtime

H. New Proposed Contract for Business Partner

According to the contract, business partners :

1. Start work at 07.00 AM.

   Based on government regulation from "Kepmenkertrans No. 102/MEN/VI/2004 article 1 paragraph 1", maximum working hours in a week is 40 hours for both 5 days of working or 6 days of working. Thus, if a work is started at 07.00 AM, then it will finish at 16.00, excluding the break for lunch time.

   And if it is looked from new proposed PTW process, business partners effectively starts working at 8.00 AM, even though it is not real job execution, it is only having a tool box meeting.
2. Maximum overtime will be paid is 20%.

   Based on government regulation from "Kepmenkertrans No. 102/MEN/VI/2004 article 1 paragraph 3", maximum overtime for a day is 3 hours or for a week is 14 hours. Which means the maximum of overtime is 37,5%.

   According to PT XYZ regulation the maximum overtime will be paid is 20%. Even further, in the future, maximum overtime is expected at 10% by management of PT XYZ. Which means it is about a half of 1,6 hours a day for the current overtime allowed.

   Meanwhile, the overtime in PT XYZ in average from Janury 2008 until April 2011 is 35% and sometimes it is more than 37,5%. Based on the data also the maximum of overtime ever happen is almost 100% in a month.

   But, even though it is happen like that, PT XYZ still pay it. Thus, it is better for business partners for having an overtime rather than not having an overtime.

From the new proposed PTW process can be seen that :

1. Business partners effectively working at 08.00 AM.
2. The execution time is 5 hours and 30 minutes without overtime. From current PTW process the execution time has been delayed by the PTW process and thus lead to a bigger chance for having an overtime. The execution time is 3 hours and 30 minutes with over time, if necessary, 1 hour and 30 minutes even sometimes is more than that. Which mean a total of 5 hours working which is less time than the new proposed PTW process even the normal time and overtime combine.

Thus, it is proposed that the new contract will have the clause to change time of business partners working hours. Business partners will start work at 08.00 AM and end work at 17.00

I. Potential Benefit

1. Potential Benefit for New Proposed PTW Process.

   From the budget of business partners salary, which is about IDR 5 billion or for exactly is IDR 5.048.918.647,00, it can be seen that :

$$Budget\ an\ Hour = \frac{Total\ Budget}{Total\ Working\ Hours\ a\ Year}$$

$$= \frac{IDR\ 5.048.918.647}{12\ months \times 22\ days \times (8\ hours + 2{,}88\ hours)}$$

$$= \frac{IDR\ 5.048.918.647}{12\ months \times 22\ days \times 10{,}88\ hours}$$

$$= IDR\ 1.757.784$$

   From the new proposed PTW process, it can be seen that the PTW has an additional 2 hours of execution time. If it is converted to budget of salary for the business partners' workforce in PT XYZ, it could save :

$$\begin{aligned} Potential\ Benefit &= Budget\ an\ Hour \times Hours\ Saved \times Total\ Working\ Days\ a\ Year \\ &= IDR\ 1.757.784 \times 2hours \times 22\ days \times 12\ months \\ &= IDR\ 928.110.045\ per\ annum \end{aligned}$$

2. Potential Benefit from New Proposed Contract.
   From the new proposed overtime regulation, the business partners will starts work at 08.00 AM, which means it is an additional 1 hours. If it is converted to the salary budget of business partners' workforce, it will save an additional :

$$\begin{aligned} \text{Potential Benefit} &= \text{Budget an Hour} \times \text{Hours Saved} \times \text{Total Working Days A Year} \\ &= \text{IDR } 1.757.784 \times 1 \text{ hours} \times 22 \text{ days} \times 12 \text{ months} \\ &= \text{IDR } 464.055.023 \text{ per annum} \end{aligned}$$

3. Total Potential Benefit.
   From data above, it can be seen that the total potential benefit both from new proposed PTW process and new proposed contract are :

$$\begin{aligned} &Total\ Potential\ Benefit \\ &= Potential\ Benefit\ of\ New\ Proposed\ PTW\ process \\ &+ Potential\ Benefit\ of\ New\ Proposed\ Contract \\ &= IDR\ 928.110.045 + IDR464.055.023 = IDR\ 1.392.165.068\ per\ annum \end{aligned}$$

   Or if it is converted to the USD according to USD/IDR exchange rate at December 11th 2012 from finance.yahoo.com, it will benefit for as much as USD 143.596 per annum, with exhange rate at IDR 9.695 per USD.
   The number is more than the target that is desired by the management, it is USD 100.000 per annum

4. Conclusion and Implementation Plan

Based pn dictionary.com, contract is an agreement between two or more parties for doing or not doing of something specified. Contract is supposed to be based on symbiotic mutualism. If one party does not do what should be done, it sure will bring loss to the other party. And sometimes problems occured from one party, and sometimes problems occured from both party. For the case of low performance of business partners in PT XYZ, the problems occured from the delay of PTW process approval, which will lead to delay in working, and thus will lead to overtime that should be paid by PT XYZ.

And even though the overtime that will be paid by PT XYZ is limited to 20%, PT XYZ still pay it. In average the overtime is 36% from the data 2008 up until April 2011 and sometimes it is almost 100% of overtime. And it will lead to a habit like it is better for having an overtime rather than not having overtime. So, firmness from PT XYZ is needed to control the habit and reducing the subjectivity. And in the implementation of the process also needed a broad understanding of the desired outcome. Since, a leader who exhibits passion about the future state, and takes the time to articulate that vision in such a way that all stakeholders share it, will be a powerful driving force for successful change. (Sye, 2011).

For the low performance of business partners, PT XYZ should pay the COPQ about IDR 1,7 billion per anum. Thus to eliminate or for minimum reduce the cost, it is proposed that PT XYZ and business partners to have a new PTW process and contract. The potential benefit from the project itself is estimated at IDR 1,39 billion per annum which is above the target.

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Exhibit 1.1 Current PTW Process

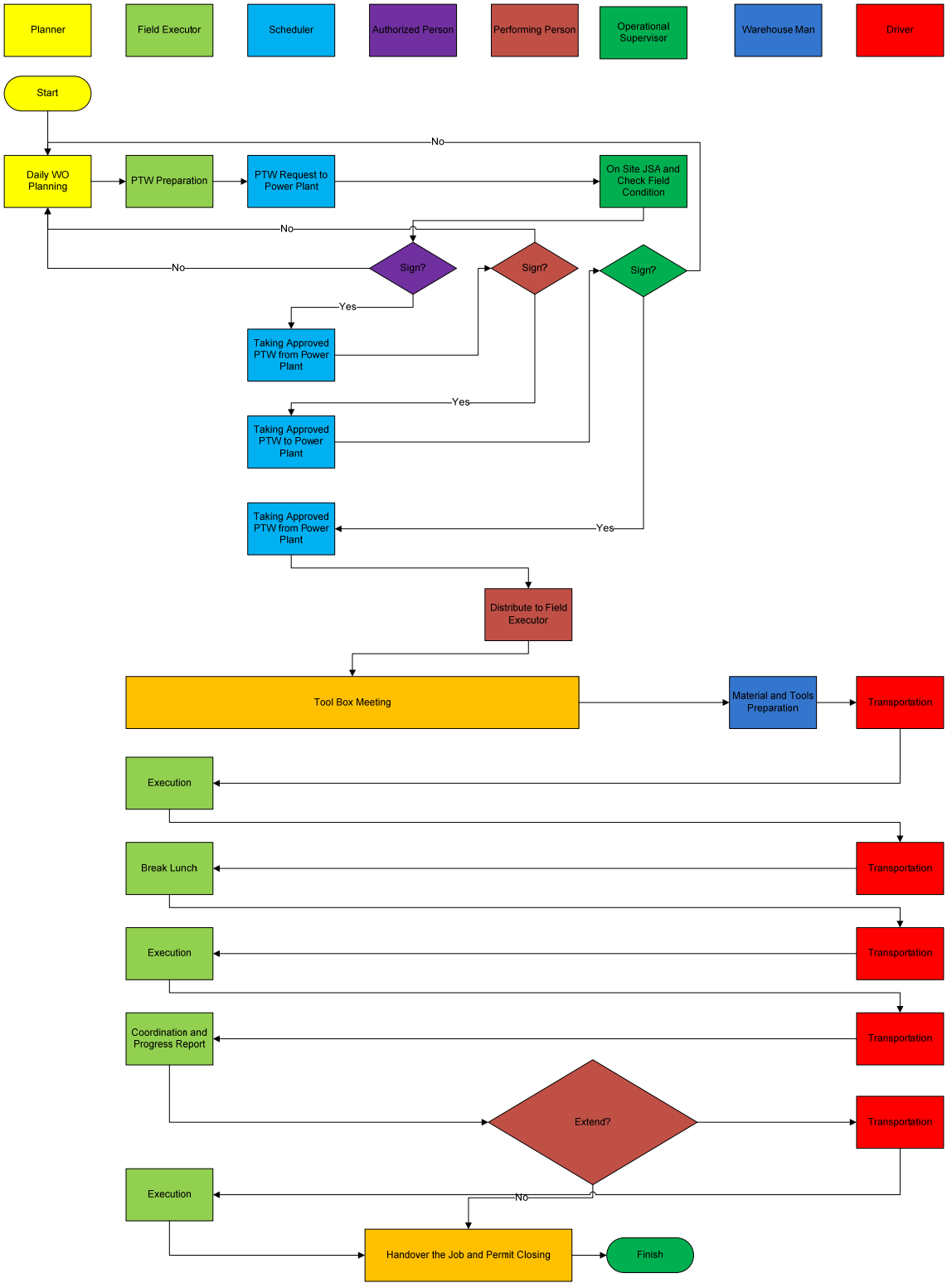

Exhibit 1.2 Detail of Current PTW Process

No.	Task List	Task Timing		
		Start Time	Stop Time	Duration
1	PTW preparation	15:00	15:45	0:45
2	PTW request to power plant	15:45	16:00	0:15
3	On site JSA and check condition, approval by authorized person	16:00	7:00	15:00
4	Scheduler take approved PTW from power plant to performing person	7:00	7:15	0:15
5	Approval by performing person	7:15	7:30	0:15
6	Scheduler bring approved PTW to power plant	7:30	7:45	0:15
7	Approval by operation supervisor	7:45	8:00	0:15
8	Scheduler bring approved PTW to performing person again	8:00	8:15	0:15
9	Tool box meeting	8:15	8:30	0:15
10	Material and tools preparation	8:30	9:00	0:30
11	Transportation to the working area	9:00	9:30	0:30
12	Execution	9:30	11:30	2:00
13	House keeping and transport to go back to head office	11:30	12:00	0:30
14	Break	12:00	13:00	1:00
15	Transport to go back to working area	13:00	13:30	0:30
16	Execution	13:30	15:00	1:30
17	House keeping and transport to go back to head office	15:00	15:30	0:30
18	Coordination and progress report	15:30	15:45	0:15
19	Permit extention process	15:30	15:45	0:15
20	Transportation to the working area	16:00	16:30	0:30
21	Execution	16:30	18:00	1:30
22	House keeping and transport to go back to head office	18:00	18:30	0:30
23	Handover the job and closing	18:30	19:00	0:30

Exhibit 2 Map of Root Cause

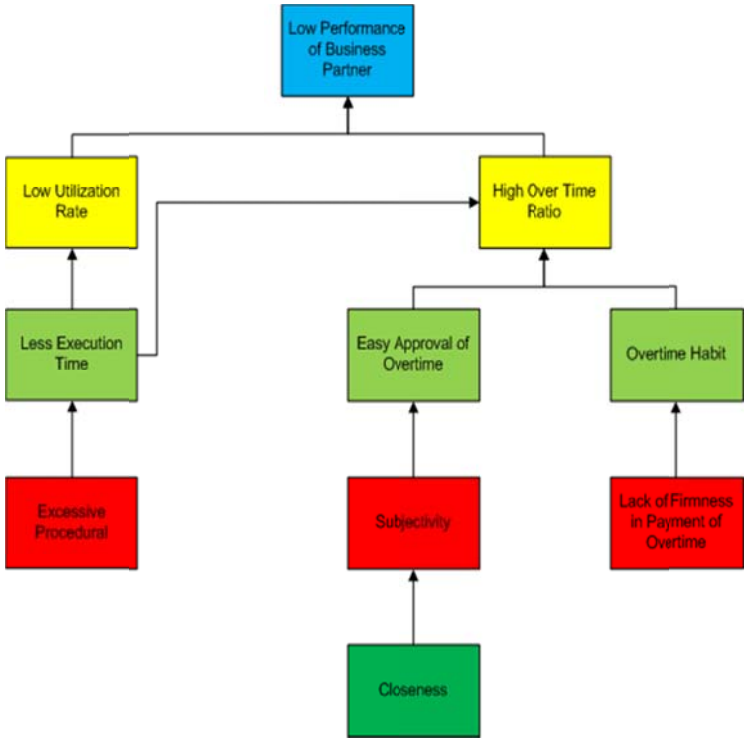

Exhibit 3.1 New Proposed PTW Process

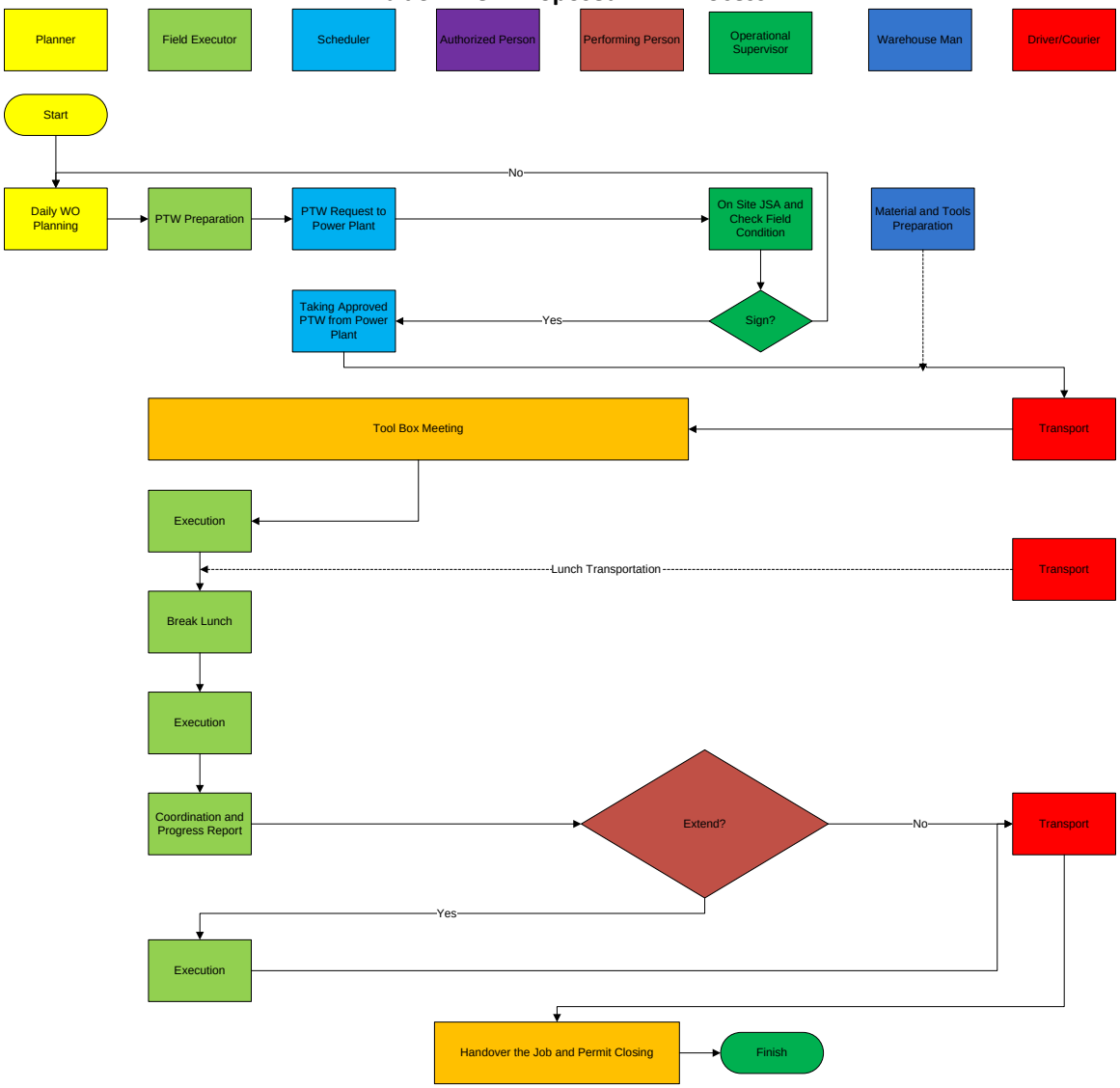

Exhibit 3.2 Detail of New Proposed PTW Process

No.	Task List	Task Timing		
		Start Time	Stop Time	Duration
1	PTW preparation	15:00	15:45	0:45
2	PTW request to power plant	15:45	16:00	0:15
3	Check as Area Controller	16:00	7:00	15:00
4	Approval by Operational Supervisor	7:00	7:15	0:15
5	Scheduler take Approved PTW from Power Plant	7:15	7:30	0:15
6	Transportation	7:30	8:00	0:30
7	Tool Box Meeting and approval by authorized person and performing person	8:00	8:30	0:30
8	Execution	8:30	12:00	3:30
9	Break	12:00	13:00	1:00
10	Execution	13:00	15:00	2:00
11	Coordination and progress report by radio	15:00	15:15	0:15
12	Permit extention process	15:15	15:30	0:15
13	Execution	15:30	17:00	1:30
14	House keeping and transport to go back to head office	17:00	17:30	0:30
15	Handover the job and closing	17:30	18:00	0:30

Exhibit 4. Schedule Development

No	Activity	Process	Sept	Oct	Nov	Des	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
1	Define the problem													
		Business Objective	■											
		Project Objective	■											
		Problem Statement	■											
		Progress Report	■											
2	Measure													
		Current PTW Process		■										
		TW Utilization		■										
		Over Time Ratio		■										
		Cost of Poor Quality		■										
		Progress Report		■										
3	Analysis													
		Root Causes			■									
		Develop Solutions			■									
		Progress Report			■									
4	Implementation													
		Capture Process Implementation				■	■	■	■	■	■	■	■	■
		Finalize project presentation		■	■	■	■	■	■	■	■	■	■	■
		Re-Measure and Project Savings				■	■	■	■	■	■	■	■	■