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MANAGING ORGANIZATIONAL CHANGE in Public Water Utilities

An outline
for the Strategic Concept Paper for Current and
Future Reform in the Cambodian Water Sector
Meng Saktheara
2006

Acknowledgement

These strategic concepts are possible because of the following people:

- ... I would like to express my great thanks and appreciations to Mr. Luiz Tavares, Senior Water and Sanitation Specialist Urban Development Unit, East Asia and Pacific Region and his team in the World Bank Group who have spent tremendous times and efforts to help development of the sector and provided me countless valuable knowledge and lessons learned/ experiences of the water sector in both Cambodia and elsewhere around the world...
- ... Special thanks to Ms. Yamamoto, Chief Adviser, and her team of the JICA Capacity Building Team, who provided me a lot of lessons learned in the capacity building and human resource development in the water sector...
- ... Great appreciation to H.E. Ek Sonn Chan, Director General of the PPWSA who has made a strong leadership and great success in the performance of the PPWSA which become a backbone inspiration for this paper...
- ... Gratitude to many other people and the team of MIME for their commitment and hard working with me for initiating a reform and making changes in the way we lead the water sector...

The Vision

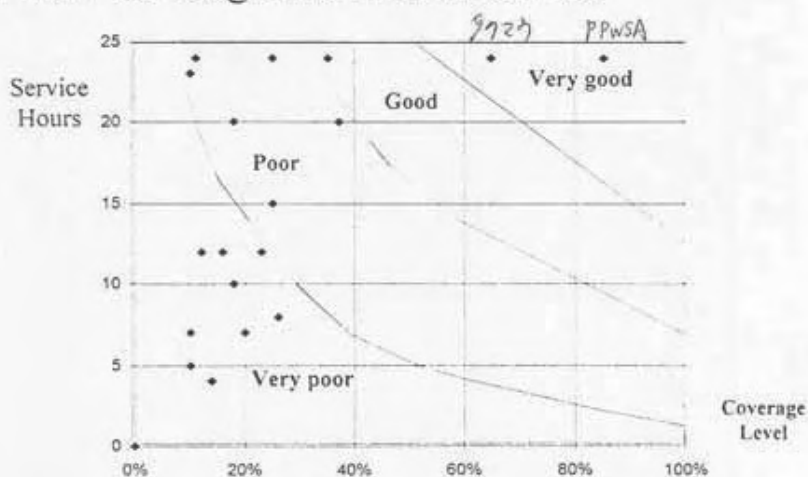
“Develop water supply systems, and service so as to have clean, ample and cheap water supply and promote public health and improve living environment to the people.”

What does this vision mean to water utilities?

- Expanse & Improve Service Coverage of Safe Water
- Improve the Level of Service Standard
- Improve Technical & Economic Efficiency and Financial Viability
- Address the Specific Needs of the Poor and Protection of the Environment

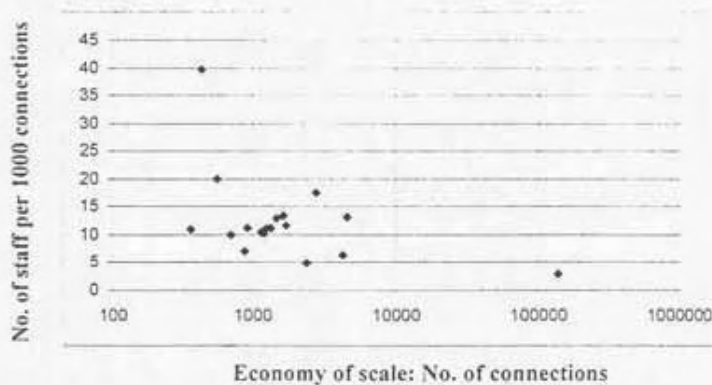
Sector performance...

- Low coverage and level of service



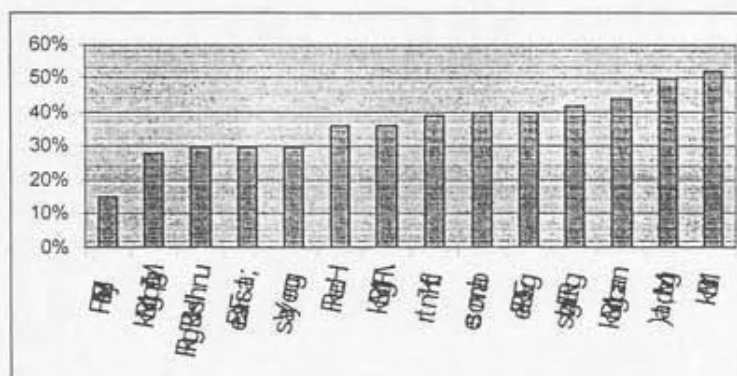
Sector Performance (2)

- Low service performance & efficiency



Sector Performance (3)

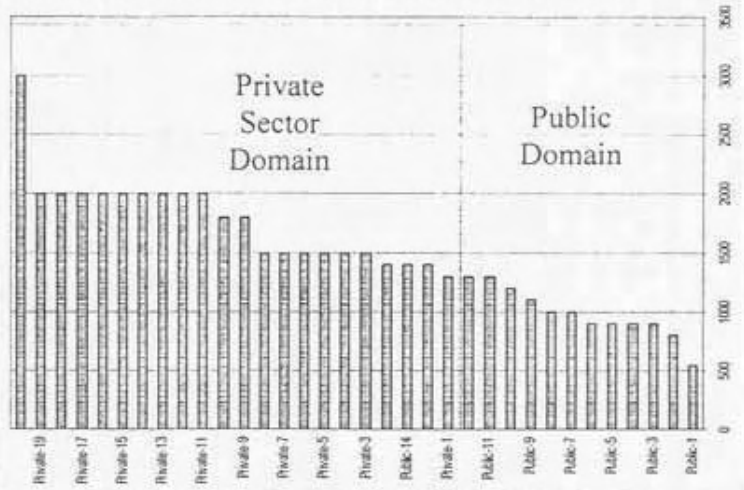
- High Un-accounted for Water



Sector Performance (4)

- The tariff is not always full cost recovery

Riels/M3



Impediments of the sector performance

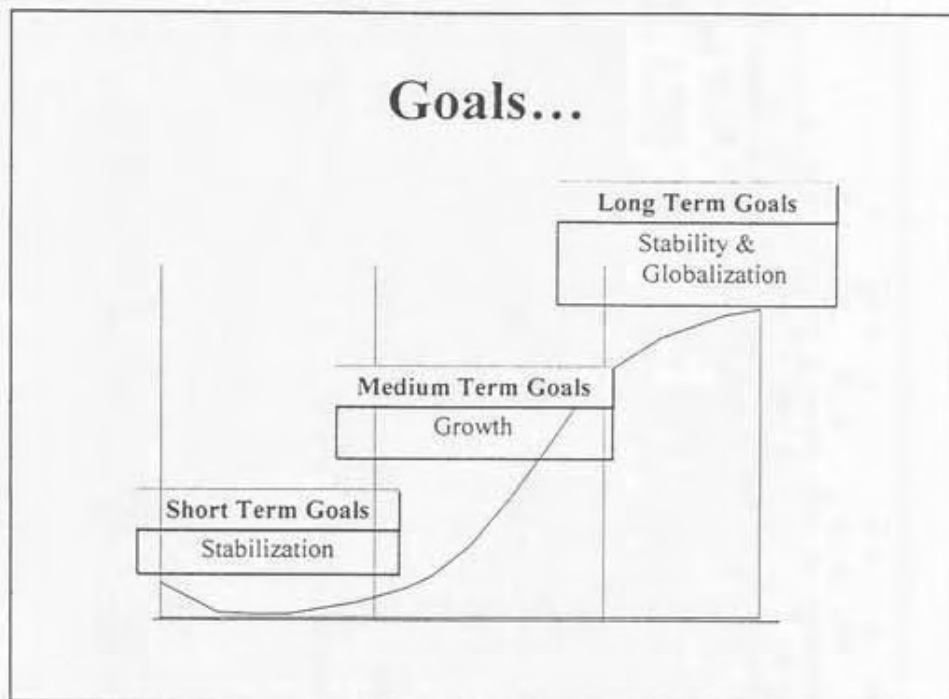
- Poor Human Resource and Competency
- Deteriorated State of Infrastructure
- Weak Sector Financing
- Unfavorable Institutional Environment

Lack of Stimulus...

- All public owned water supply systems (probably with an exception of PPWSA to some extends)
 - Depend heavily on government funding
 - Characterized by weak organizational management and subject to high centralization and concentration
 - Non-autonomy
 - Low involvement of the Municipal Government and Communities
 - Weak Public Sector
 - No supporting public institutions and corporations
 - No networking among public water works

The Way Forward...

- **B**reak the barriers and change the way the sector is led...
- **B**uild good practices for improving sector performance, not the good papers...
- **A**ct now and together as a family...

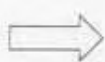


- ### Goals (2)
- | Short Term Goals | Medium Term Goals | Long Term Goals |
|--|---|--|
| <ul style="list-style-type: none"> ▪ Capacity building and development ▪ Organizational and institutional strengthening ▪ Maintaining of Infrastructure and Steadily expansion of service coverage ▪ Improving financial performance | <ul style="list-style-type: none"> ▪ Full commercialization and autonomy ▪ Safety & Quality of water ▪ Sustainability: strengthening water supply systems, preserving and developing practices and skills, improve customer service ▪ Full speed of development and expansion | <ul style="list-style-type: none"> ▪ Building a strong public sector ▪ Building a strong sector financing: self-reliant finance or "water for water" ▪ Stability : stable water supply, any time & anywhere ▪ Building strong supporting industry for water ▪ Globalization |

Achieving the short term goal (1)

- Putting Capacity and Human Resource Development at the forefront of reform...

set of activities aimed at



“Changing of Culture”

Reforms in the way...

- Education
- Motivation
- Discipline

Achieving the short term goal (1)

- Building Capacity and Human Resource Development needs to be linked to the broader context of organizational reform and the introduction of:
 - An adequate human resources policy at the utility level with salaries and bonus system
 - adequate access to resources, including for rehabilitation and investment to put in practice what has been learnt
 - Operational autonomy to make the right decisions with accountability for end results

Achieving the short term goal (1)

- Training must reach all levels of the utility
 - Classroom Training
 - On the Job Training
 - Better skill staff trains poorer skill staff
- Knowledge transfer through exchanges with peers
 - More interact and learn from peers
 - Exchange and study tours

Achieving the short term goal (1)

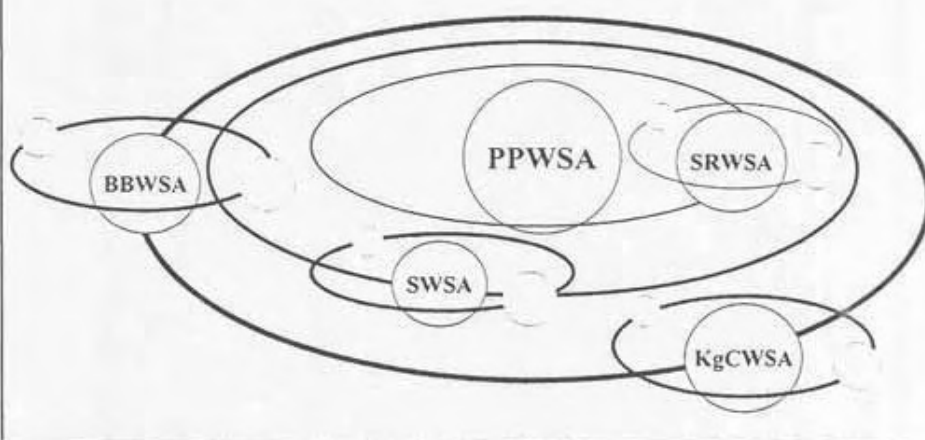
- Capacity Building must be fully internalized within the utility
 - Formalizing training function within the organizational chart
 - Creating a pool of internal trainers
- Balancing Broader Capacity Building of Stakeholders in the Sector
 - Public Education
 - Developing Capacity at Local Government Level

Capacity Building Strategy

- “Top Runner Catch Up” approach must be promoted and institutionalized
- Develop a body of mentors
presently, capacity building taskforce team in MIME
- Create a network of utilities, “CWWA” as vehicle for capacity building
 - Take leadership and management of the national training center
 - Authority for accrediting skill and supplies

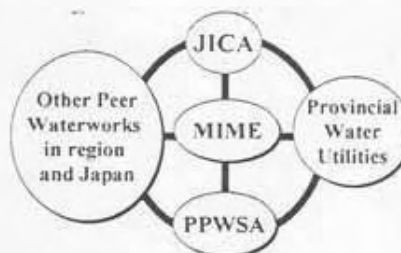
Capacity Building Strategy...

In overall sector the strategy is also to move toward a training network with regional satellite facilities...



Implementing Capacity Building Strategy

- MIME provides clear leadership and coordination for a national integrated capacity building program linked to the reform of the sector
- PPWSA as Peer Utility and Resource of Trainers
- JICA as principal donor and Provider of Technical Assistance



Achieving the Short Term Goal (2)

- Organizational and Institutional Strengthening
 - Establish Clear Commercial Objectives
 - Establish appropriate managerial authority and autonomy
 - Implement effective performance monitoring
 - Provide rewards and sanctions for performance

Achieving the Short Term Goal (2)

- Establish Clear Commercial Objectives
 - Set Utility Yearly Business Plan
 - Set Utility's Priority Investment Plan



For this short term period, focus on:

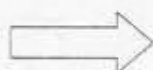
- Service Expansion
- Operation efficiency
- Unaccounted for water

Achieving the Short Term Goal (2)

- Establish appropriate managerial authority and autonomy
 - Performance Based Management
 - Utility management will be given greater responsibility and authority for accomplishing utility objectives within defined commercial objectives
 - Develop and apply good practice of clear division of role and decision making responsibility, through delegation of authority from MIME and PDIME
 - Implement the Performance Contract/Agreement
 - Pursue for a Full Autonomy, PPWSA model
 - Strengthen accountability to users (mainly in planning and advocacy)

Achieving the Short Term Goal (2)

- Establish appropriate managerial authority and autonomy...
 - Improving Financial Management
 - Standardize billing and accounting system for effective management
 - Standardize Improved Financial Management System
 - Accrediting Financial Reports and Data through auditing practice



Improve the accessibility to external financing

Achieving the Short Term Goal (2)

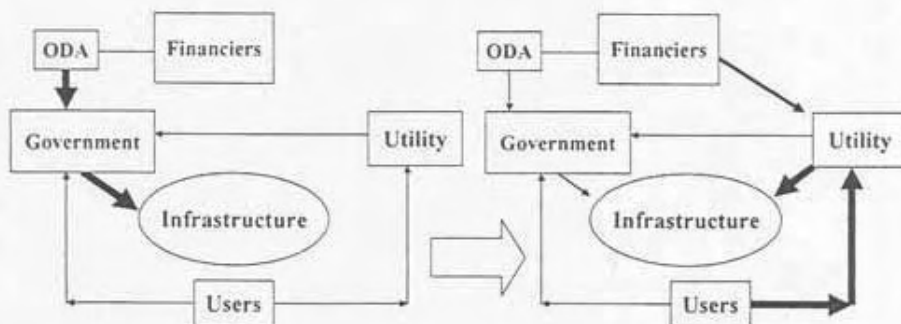
- Implement effective performance monitoring
 - The following three performance indicators will be set and used by MIME to monitor the progress of the utility:
 - Number of connection at year end
 - Operating ratio
 - Unaccounted for water
 - PDIME is responsible to monitor the utility monthly progress and approve monthly incentives according to the set targets, MIME will monitor the performance on a yearly basis
 - Supervision mission to review the utility performance will be carried out every 6 months by DPWS
 - Standardized reporting system and benchmarking will be established in DPWS

Achieving the Short Term Goal (2)

- Provide rewards and sanctions for performance
 - Incentives for reaching the target will be added into the allowance to each staff of the utility
 - Reward program for outstanding utility will be carried out (issuing appreciation certificate, medal, etc...)
 - Sanctions will be done by PDIME first and then MIME
 - Reduce the delegation of authority
 - Impose more control
 - Suspense from work or removal, etc...

Achieving the Short Term Goal (2)

- Maintaining of Infrastructure and Steadily expansion of service coverage
 - Reform how to finance maintaining of infrastructure



Achieving the Short Term Goal (2)

- Maintaining of Infrastructure and Steadily expansion of service coverage...
 - Capitalizing utility cash reserves (improved saving)
 - Review and improve tariff setting for maintaining infrastructure and steadily expansion of service coverage
 - Set utility operation priority in maintaining infrastructure and expansion of service coverage
 - Re-invest utility cash reserve in maintaining infrastructure and expansion of service coverage, "Water feeding Water"
 - Mobilize additional limited external funding

Achieving the Medium Term Goal

- Provide full autonomy to utilities (individually or collectively)
 - Advocacy for translating the policy into practice
 - Integration with decentralization program
 - Enhance priority of this policy action with support of donors (link autonomy and full commercialization of the utility with external assisted project)

Achieving the Medium Term Goal

- Safety and quality of water
 - Enhance National Laboratory Center
 - Strengthen the water quality and safety taskforce team in DPWS
 - Set and implement water quality and safety monitoring program by DPWS
 - Develop water quality and safety guidelines for utility
 - Apply the guidelines in utility operation

Achieving the Medium Term Goal

- Full speed of development and expansion
 - Develop and implement a sector wide investment program
 - Advocacy for external funding
 - Donor harmonization and coordination

**This goal
can be achieved only with
funding from external
financiers !...**

Unofficial translation

**KINGDOM OF CAMBODIA
NATION RELIGION KING**

**Council of Ministers
No. 492 S.Ch.N**

Deputy Prime Minister, Minister in Charge of the Council of Ministers
To
Minister of Ministry of Industry, Mines and Energy

Subject: Request for approval in principle by Sam Dach Prime Minister on the feasibility study on the water sources and proposal for investment in the construction of water supply system in Siem Reap phase 2.

Reference: - Letter No.169 U.R.Th. T.S.L.S dated on January 24, 2007 of Ministry of Industry, Mines and Energy.
- Official note of Sam Dach Prime Minister dated on April 06,2007

As mentioned in the above subject and reference, I have an honor to inform Your Excellency that Royal Government of Cambodia agreed in principal as follows:

1. Agreed on the request of Ministry of Industry, Mines and Energy for conducting the feasibility study with the fund from KTC Company.
2. Allow the company to invest in the water supply project by purchasing 51% of share from Siem Reap Water Supply Authority for the establishment of a public-private joint venture company under the technical supervision of APSARA and provincial authorities.
3. For the increase of effectiveness of the management, the chairman of the board directors must be selected from public agency; executive director must be selected from the company side but there are co-managers for the financial management.

As the above mentioned, please Your Excellency take your further action.

Phnom Penh, April 10, 2007

On behalf of Minister

Secretary of State

Seng Lim Nov

CC:

- Ministry of Economy and Finance
- Cabinet of Sam Dach Prime Minister
- H.E Director General of APSARA Authority
- H.E Governor of Siem Reap Province
- KTC Cable Co., Ltd.
- Archive



ព្រះរាជាណាចក្រកម្ពុជា

ទីស្តីការគណៈរដ្ឋមន្ត្រី

ជាតិ សាសនា ព្រះមហាក្សត្រ

លេខ: ៤៩២. សសណ

ឧបនាយករដ្ឋមន្ត្រី រដ្ឋមន្ត្រីទទួលបន្ទុកទីស្តីការគណៈរដ្ឋមន្ត្រី
ជម្រាបជូន

ឯកឧត្តមរដ្ឋមន្ត្រី ក្រសួងឧស្សាហកម្ម រ៉ែ និងថាមពល

កម្មវត្ថុ : ករណីសំណើសុំគោលការណ៍ឯកភាពពីសម្តេចនាយករដ្ឋមន្ត្រី ក្នុងការសិក្សាសមិទ្ធិលទ្ធភាពប្រភពទឹក និងលើក
គម្រោងវិនិយោគ សម្រាប់សាងសង់ប្រព័ន្ធផ្គត់ផ្គង់ទឹកស្អាត នៅខេត្តសៀមរាប ជំហានទី ២

- យោង : - លិខិតលេខ ១៦៩ ឧរថ.មស.លស ចុះថ្ងៃទី ២៤ ខែ មករា ឆ្នាំ ២០០៧ របស់ក្រសួង ឧស្សាហកម្ម រ៉ែ និង
ថាមពល
- ចំណាវដ៏ខ្ពង់ខ្ពស់របស់សម្តេចនាយករដ្ឋមន្ត្រី ចុះថ្ងៃទី ០៦ ខែ មេសា ឆ្នាំ ២០០៧

សេចក្តីដូចមានចែងក្នុងកម្មវត្ថុ និងយោងខាងលើ ខ្ញុំមានកិត្តិយសសូមជម្រាបជូនឯកឧត្តមរដ្ឋមន្ត្រី មេត្តាជ្រាប
ថា រាជរដ្ឋាភិបាលបានឯកភាពជាគោលការណ៍ ដូចខាងក្រោម :

- ១-តាមសំណើរបស់ក្រសួងឧស្សាហកម្ម រ៉ែ និងថាមពល ក្នុងធ្វើការសិក្សាសមិទ្ធិលទ្ធភាព ដោយក្រុមហ៊ុន KTC
ជាអ្នកចេញថវិកាចំណាយ
 - ២-អនុញ្ញាតឱ្យក្រុមហ៊ុន វិនិយោគលើគម្រោងទឹកស្អាតនេះ ដោយទិញភាគហ៊ុនចំនួន ៥១% ពីរដ្ឋាករទឹកស្វយ័ត
សៀមរាប ដើម្បីបង្កើតក្រុមហ៊ុនចម្រុះរដ្ឋ-ឯកជន ក្រោមការគ្រប់គ្រងបច្ចេកទេស របស់អាជ្ញាធរអប្សរា និងអាជ្ញាធរខេត្ត
 - ៣-ដើម្បីបង្កើនប្រសិទ្ធភាពគ្រប់គ្រង ប្រធានក្រុមប្រឹក្សាភិបាលមកពីភាគីរដ្ឋ នាយកប្រតិបត្តិមកពីភាគី
ក្រុមហ៊ុន ចំណែកការគ្រប់គ្រងផ្នែកហិរញ្ញវត្ថុ គឺមានសហប្រធានគ្រប់គ្រង ។
- សេចក្តីដូចបានជម្រាបជូនខាងលើ សូមឯកឧត្តមមេត្តាជ្រាប និងចាត់ចែងតាមការគួរ ។

ភ្នំពេញ ថ្ងៃទី ១០ ខែ មេសា ឆ្នាំ ២០០៧

- ចម្លងជូន :
- ក្រសួងសេដ្ឋកិច្ច និងហិរញ្ញវត្ថុ
 - ខុទ្ទកាល័យសម្តេចនាយករដ្ឋមន្ត្រី
 - ឯកឧត្តមប្រធានអាជ្ញាធរអប្សរា
 - ឯកឧត្តមអភិបាលខេត្តសៀមរាប
 - ក្រុមហ៊ុន KTC Cable Co., Ltd. ✓
 - ឯកសារ-កាលប្បវត្តិ



សេង លីមនេវ

Unofficial translation

Kingdom of Cambodia
National Religion King

Ministry of Industry, Mines and Energy
No 901 MIME. T. S. L. S

Phnom Penh 23 April 2007

Minister of Ministry of Industry, Mines and Energy
To
Samdech Prime Minister Hun Sen

Object : Request for additional advises to implement strategy for expansion of Siem Reap Water Supply Production Capacity.

- Ref:
- Government Direction No. S.CH.N. 492 dated on 10 April 2007
 - Exchange of Note, dated on 18 May 2004, between the Government of Cambodia and the Government of Japan
 - Sub-decree No. 04 H.N.KR.B.K dated on 10 January 2007
 - MIME letter No. 169 H.R. T. T.S.L.S, dated on 24 January 2007

Respectfully Samdech Prime Minister,

Ministry of Industry Mines and Energy has received, in the afternoon of 13 January 2007 (this is a mistake, the correct one is 13 April 2007), the Government direction No.S.CH.N. 492 dated 10 April 2007 approving KTC Company to purchase 51% of shares in Siem Reap Water Supply utility and to establish a joint-venture company to provide water supply service in Siem Reap town. With reference to all the documents mentioned in the above references, I respectfully would like to inform Samdech as follows:

1- The provision of water supply service is a public service with both commercial and social-political characteristics. **Therefore, to continue maintaining advantages and benefits in this social and political aspect, strategically the government should continue strengthening public sector in major cities-towns with high political visibility such as: Phnom Penh, Siem Reap, Sihanoukville, Battambang, Kampong Cham, etc., and promote private participation or privatization in small towns where public sector does not perform.**

2- The water production and treatment facilities including most of the main distribution pipe networks in Siem Reap now are products of Grant Aid from the people and government of Japan. Based on the exchange of note between the two governments on this project, article 07 stated that: **"The two governments shall consult each other on any matter that may arise from or in connection with the present arrangement"**. Based on this exchange of note, representative of Japanese Embassy to Cambodia, representative of JICA Cambodia, my colleagues and I met on 13 April 2007 at JICA Cambodia Office to discuss the adoption of the strategy to promote KTC company's participation in Water Supply Sector in Siem Reap

Unofficial translation

Siem Reap according to the letter from Council of Minister No.S.CH.N. 492 dated on 13 April 2007. After a thorough discussion with Japanese Embassy and JICA, MIME would like to suggest to **Samdech Prime Minister** as follow:

- a- **Maintain the implementation of the Sub-decree issued by the government, signed by the Premier on 10 January 2007 on establishment of Autonomous Siem Reap Water Supply Authority as public utility with financial autonomy according to the rules of law.**
- b- **Approve KTC company to invest 100% on development study and construction of a new water treatment and production facility, independently and separately from the facilities constructed by Japanese Grant-Aid; and sell water in bulk to Siem Reap Autonomous Water Supply Authority through a BOT contract and with a water tariff acceptable in order not to impact greatly on the current policy and the Japanese assistance phase 2 on the capacity building for water supply system in Cambodia that will commence in the short coming future.**
- c- **To keep low investment cost and thus not have great impact on the current water tariff, the water source should be from "West Barray". According to JICA expert study and Department of Water Resources in Siem Reap, the water in West Barray is plenty and fully available for water supply provision in the whole Siem Reap city. If other source of water supply is selected, the treated water tariff charged by the company will be likely higher.**

If the company can do as mentioned in the item b, it would be good

(Prime Minister's comment)

Furthermore, on 22 April 2007 from 17:00 to 18:00, I met with KTC Director. He also agreed with the above mentioned formula and recommendation.

As the above mentioned, I respectfully would like to request further advises from Samdech Prime Minister in order to allow MIME to start communication with KTC company, Embassy of Japan and JICA for implementation of the proposal as soon as possible to response to the need by 2009.

Approve on the three requested points

(Prime Minister's comment)
on 23 April 2007

Minister of MIME

Suy Sem

CC

- Council of Ministers
- Ministry of Economy and Finance
- Archive

23/04 2007 16:58 FAX



ព្រះរាជាណាចក្រកម្ពុជា
ជាតិ សាសនា ព្រះមហាក្សត្រ
Kingdom of Cambodia
Nation Religion King

ក្រសួងឧស្សាហកម្ម រ៉ែ និង ថាមពល
Ministry of Industry, Mines and Energy
N° ៩០១ អនក្រ.បក.ស.ស.ស.

រាជធានីភ្នំពេញ, ថ្ងៃទី ២៣ ខែ សីហា ឆ្នាំ ២០០៧

រដ្ឋមន្ត្រីក្រសួងឧស្សាហកម្ម រ៉ែ និងថាមពល
សូមគោរពជូន
សម្តេចនាយករដ្ឋមន្ត្រី ជាតិគោរពដ៏ខ្ពង់ខ្ពស់

កម្មវត្ថុ: សំណើសុំគោលការណ៍បន្ថែមដើម្បីអនុវត្តយុទ្ធសាស្ត្រក្នុងការវិនិយោគសាងសង់ពង្រីកសមត្ថភាពផ្គត់ផ្គង់
ទឹកស្អាតនៅទីរួមខេត្តសៀមរាប ។

- យោង: - សេចក្តីជូនដំណឹងរបស់រាជរដ្ឋាភិបាល លេខ ៤៩២ ស.ជ.ណ. ចុះថ្ងៃទី ១០ ខែ មេសា ឆ្នាំ ២០០៧ ។
- លិខិតប្តូរសាររវាងរដ្ឋាភិបាលជប៉ុន និងរាជរដ្ឋាភិបាលកម្ពុជាចុះថ្ងៃទី ១៨ ខែ ឧសភា ឆ្នាំ ២០០៤ ។
- អនុក្រឹត្យលេខ ០៤ អនក្រ.បក ចុះថ្ងៃទី ១០ ខែ មករា ឆ្នាំ ២០០៧ ។
- លិខិតលេខ ១៦៩ ឧរជ.ទស.លស ចុះថ្ងៃទី ២៤ ខែ មករា ឆ្នាំ ២០០៧ របស់ក្រសួងឧស្សាហកម្ម រ៉ែ និងថាមពល ។

សម្តេចជាតិគោរពដ៏ខ្ពង់ខ្ពស់

ក្រសួងឧស្សាហកម្ម រ៉ែ និងថាមពលបានទទួលសេចក្តីជូនដំណឹងរបស់រាជរដ្ឋាភិបាល លេខ ៤៩២ ស.ជ.ណ. ចុះថ្ងៃទី ១០ ខែ មេសា ឆ្នាំ ២០០៧ កាលពីរសៀលថ្ងៃទី ១៣ ខែមករា ឆ្នាំ២០០៧ ដែលមានខ្លឹមសារអនុញ្ញាតិឱ្យក្រុមហ៊ុន KTC ទិញភាគហ៊ុន ចំនួន ៥១% ពីរដ្ឋដើម្បីបង្កើតក្រុមហ៊ុនចំរុះឯកជនក្នុងការធ្វើអាជីវកម្ម-សេវាកម្មផ្គត់ផ្គង់ទឹកស្អាតនៅទីរួមខេត្តសៀមរាប ។ ដោយពិនិត្យលើឯកសារដែលមានក្នុងយោងខាងលើ ខ្ញុំបានសូមគោរពអនុញ្ញាតរាយការណ៍ជូន សម្តេច មេត្តាជ្រាបថា :

១-ការផ្គត់ផ្គង់ទឹកស្អាត ជាសេវាសាធារណៈដែលមានចរិតលក្ខណៈសង្គមនយោបាយផង និងជំនួញពាណិជ្ជកម្មផង ។ ដូច្នេះដើម្បីបង្ការការប្រៀបធៀប និងចំណេញផ្នែកនយោបាយ និងសង្គមដងខោ ជាយុទ្ធសាស្ត្ររាជរដ្ឋាភិបាលគួររក្សា និងបន្តធ្វើការពង្រឹងកសាងផ្នែកសាធារណៈនៅតាមតំបន់ទីក្រុង-ទីរួមខេត្តផ្សេងៗ ដែលមានចំណុចរលីចនយោបាយសំខាន់ៗ ដូចជា : ក្រុងភ្នំពេញ សៀមរាប ក្រុងព្រះសីហនុ បាត់ដំបង កំពង់ចាម ។ល។ ហើយធ្វើការជំរុញការចូលរួមរបស់ឯកជន តាមរយៈរូបភាពឯកជនភ្ជាប់និយកម្មណាមួយ តែនៅតំបន់ទីប្រជុំជន-ទីក្រុងតូចៗ ដែលរដ្ឋពុំអាចធ្វើបាន ។

២-រោងចក្រសំអាតទឹក និងប្រព័ន្ធបណ្តាញមេមួយចំនួននៅទីរួមខេត្តសៀមរាបនេះ គឺជាសមិទ្ធផលនៃជំនួយឥតសំណងរបស់រដ្ឋាភិបាល និងប្រជាជនជប៉ុន ចំពោះរាជរដ្ឋាភិបាល និងប្រជាជនកម្ពុជា ។ យោងតាមមាត្រា ០៧

6:58 FAX

នៃលិខិតប្តូរសាររវាងរដ្ឋាភិបាលនៃប្រទេសទាំងពីរ ក្នុងការអនុវត្តនីតិវិធីរោងចក្រសំណងនេះ បានចែងថា
" រដ្ឋាភិបាលទាំងពីរត្រូវធ្វើការពិគ្រោះយោបល់គ្នាទៅវិញទៅមក ចំពោះរាល់ការប្រែប្រួល ដែលខុសពីការរៀបចំ
ពេលបច្ចុប្បន្ន " ។ ផ្អែកលើលិខិតប្តូរសារនេះ នៅថ្ងៃទី ១៣ ខែ មេសា ឆ្នាំ ២០០៧ កន្លងទៅនេះ ស្ថានទូតជប៉ុន និង
អង្គការ JICA បានអញ្ជើញខ្ញុំបាទ និងសហការីដើម្បីជួបពិភាក្សានៅការិយាល័យអង្គការ JICA អំពីការអនុវត្ត
ជ្រើសរើសយុទ្ធសាស្ត្រជំរុញការចូលរួមរបស់ក្រុមហ៊ុនឯកជន KTC ក្នុងវិស័យទឹកស្អាតនៅខេត្តសៀមរាប តាមស្មារតី
របស់លិខិតទិញសិទ្ធិការពាររដ្ឋមន្ត្រីលេខ ៤៩២ ស.ជ.ណ ចុះថ្ងៃទី ១០ ខែ មេសា ឆ្នាំ ២០០៧ ។ ក្រោយការពិភាក្សា
យ៉ាងល្អិតល្អន់ជាមួយស្ថានទូតជប៉ុន និងអង្គការ JICA ក្រសួងសូមគោរពជូនយោបល់ សម្តែងនាយករដ្ឋមន្ត្រី
ដូចតទៅ :

ក) រក្សា និងបន្តការអនុវត្តនីតិវិធីសេចក្តីសំរេចរបស់រាជរដ្ឋាភិបាល ដែលទើបនឹងអនុវត្តថ្មីៗ ដោយ
សម្តែងនាយករដ្ឋមន្ត្រី តាមរយៈអនុក្រឹត្យលេខ ០៤ អនក្រ.បក ចុះថ្ងៃទី ១០ ខែ មករា ឆ្នាំ២០០៧ ស្តីពីការបង្កើត
អង្គការរដ្ឋាករទឹកស្អាតសៀមរាប ជាគ្រឹះស្ថានសាធារណៈមានលក្ខណៈសេដ្ឋកិច្ច ស្របតាមគោលការណ៍ និង
លក្ខខណ្ឌអន្តរជាតិ។

ខ) អនុញ្ញាតឱ្យក្រុមហ៊ុន KTC បោះទុនវិនិយោគ ១០០% តែម្តងលើការសិក្សា និងសាងសង់
រោងចក្រសំអាតទឹកថ្មីមួយ ជាចំណោយឱ្យក្រុមហ៊ុនកម្ពុជា និងប្រព័ន្ធបណ្តាញ ដែលជាជំនួយពីសំណងរបស់
ជប៉ុន ហើយធ្វើការលក់ទឹកដុំមកអង្គការរដ្ឋាករទឹកស្អាតសៀមរាប តាមរូបភាព BOT និងថ្លៃទឹកសមស្រប
ដែលអាចទទួលបានបាន ដើម្បីជៀសវាងផលប៉ះពាល់ច្រង់ច្រាងដល់នយោបាយ និងជំនួយជប៉ុនជំរុញការ
កសាងធនធានមនុស្សក្នុងវិស័យផ្គត់ផ្គង់ទឹកស្អាត ដែលនឹងត្រូវចាប់ផ្តើមឆាប់ៗ ខាងមុខនេះ ។

គ) ដើម្បីរក្សាការវិនិយោគលើប្រព័ន្ធសំអាត និងផលិតកម្មថ្មីនេះឱ្យមានតម្លៃទាប ហើយមិនប៉ះ
ពាល់ច្រង់ច្រាងដល់ថ្លៃទឹកបច្ចុប្បន្នផង ប្រភពទឹកស្អាតជ្រើសរើសយកពីបារាយណ៍ខាងលិច ។ យោងតាមការសិក្សារបស់
ជំនាញការជប៉ុន និងមន្ទីរធនធានទឹកខេត្តសៀមរាប បរិមាណទឹកនៅបារាយណ៍ខាងលិចនេះ មានបរិបូណ៌គ្រប់គ្រាន់
សំរាប់ធ្វើការផ្គត់ផ្គង់ទឹកស្អាតនៅក្រុងសៀមរាបនេះទាំងមូល ។ បើសិនជាជ្រើសរើសប្រភពទឹកផ្សេងពីនេះក៏បាន
ប៉ុន្តែថ្លៃទឹករបស់ក្រុមហ៊ុនអាចខ្ពស់ជាង ។

លើសពីនេះទៀត នៅថ្ងៃទី ២២ ខែ មេសា ឆ្នាំ ២០០៧ វេលាម៉ោង ០៥:០០ ដល់ម៉ោង ០៦:០០ រសៀល
ខ្ញុំបាទបានជួបពិភាក្សាជាមួយប្រធានក្រុមហ៊ុន KTC ហើយក្រុមហ៊ុនក៏បានឯកភាពតាមរូបមន្ត និងអនុសាសន៍ខាង
លើនេះដែរ ។

សេចក្តីដូចបានគោរពជំរាបជូនខាងលើនេះ ខ្ញុំបាទសូម សម្តែង មេត្តាផ្តល់មតិណែនាំដល់ខ្ញុំខ្ពស់ ដើម្បី
ក្រសួងឧស្សាហកម្ម រ៉ែ និងថាមពលបន្តធ្វើកិច្ចការនេះជាមួយក្រុមហ៊ុន KTC អង្គការ JICA និងស្ថានទូតជប៉ុន
ដើម្បីអាចឆ្លើយតបបានតាមតម្រូវការទឹកស្អាតនៅឆ្នាំ ២០០៩ ខាងមុខនេះ ។

សូម សម្តែង មេត្តាទទួលនូវការរីកក្តី និងការគោរពដ៏ខ្ពង់ខ្ពស់បំផុតអំពីខ្ញុំបាទ ។

- ចម្លងជូន :
- ទីស្តីការគណៈរដ្ឋមន្ត្រី
- ក្រសួងសេដ្ឋកិច្ច និងហិរញ្ញវត្ថុ
- ឯកសារ-កាលប្បវត្តិ

Handwritten notes and signature:
 13.4.07
 [Signature]



ស៊ុយ ច័ន្ទ

各アウトプット（分野）の研修アプローチの違い ver.1 (2007.2.16)

	アウトプット1	アウトプット2	アウトプット3	アウトプット4	アウトプット5
分野	水質試験の改善	浄水施設の操作・維持管理	電気施設の操作・日常保守	機械施設の日常保守	配水施設の維持管理
指導（研修）科目	(a) 各 TPW に必要な試験項目に関する試験	(a) 運転日誌 (b) 需要に応じた水生産 (c) 薬品注入技術・操作 (d) 塩素制御技術・操作 (e) ろ過池維持管理 (f) 沈殿池維持管理 (g) ポンプ設備操作	(a) 自家発電操作・日常保守 (b) 受配電設備操作・日常保守 (c) 電動設備日常保守 (d) 計装設備日常保守	(a) 塩素注入設備日常保守 (b) 薬品注入設備日常保守 (c) ポンプ設備日常保守	(a) 管路更新施工管理 (b) 無収水（UFA）対策
研修アプローチ	一般研修・地方研修（年1回）と巡回指導（年1回） 1. 暫定マニュアルに基づく第1回集合研修（1週間）と地方研修（1週間） 2. 研修直後の巡回指導（合計2～3ヶ月） 3. カ側による暫定マニュアル試行とモニタリング（最低2年） 4. フォローアップ研修（年1回：1週間*4回） 5. 巡回指導（年1回：合計2～3ヶ月*4回） 6. 最終マニュアル作成巡回指導（合計3ヶ月）	TPW ごととの直接指導（8TPW） 1. 0JT と暫定マニュアル作成指導（各科目を一連の流れとして指導）。（3ヶ月*8ヶ所） 2. カ側による暫定マニュアル試行とモニタリング（最低2年） 3. 乾季・雨季の巡回指導（合計3ヶ月*3回） 4. 最終マニュアル作成巡回指導（合計3ヶ月）	科目ごとの集団研修と巡回指導（4科目）（別紙1参照） 1. 各科目の集団研修（1週間） 2. 0JT と暫定マニュアル作成巡回指導（平均9ヶ月*4科目） 3. カ側による暫定マニュアル試行（最低1年） 4. 最終マニュアル作成巡回指導（合計3ヶ月*?科目）	科目ごとの集団研修と巡回指導（3科目）（別紙1参照） 1. 各科目の集団研修（1週間） 2. 0JT と暫定マニュアル作成巡回指導（平均9ヶ月*6科目） 3. カ側による暫定マニュアル試行（最低1年） 4. 最終マニュアル作成巡回指導（合計3ヶ月*?科目）	全体集団研修と TPW ごととの直接指導（8TPW を1～IV にわたける） 5. 管路更新の集団研修（1週間） 6. 管路更新の0JT（9ヶ月*8ヶ所） 7. UFA の集団研修 8. 0JT（年2回）
備考	・研修には PPWAS のプログラム利用 ・TPW からスペシャリスト 2 名活用 ・長期の 0JT がいないのは？	・いきなり 0JT なのは？	・TPW ごとでないのは？ ・優先順位の高い科目を先に ・全てをカバーする専門家の不在 ・電気と機械は 1 人のスタッフが兼任しているケースがあり、つめて研修を行うより、間をあけて行うほうが効率的		

[仮]電気・機械OJT研修のスケジュール パターン

2010/6/17

<パターンA> 基本的に一つの科目が全TPW終了して次の科目へ[現行PO(ver 4.8)]

- 1 * 効率性: TPWの科目間(受配電→電動→計装)が5ヶ月あく(研修のぞく)
- 2 * 研修関係期間: 研修IIとIVは2科目を1ヶ月で準備・実施・評価。余裕がないのでは?
- 3 * ポンプへの影響: 暫定マニュアル完了は2011年4月。最終マニュアルまで5.5~7.5ヶ月の試行期間。
- 4 * ぎりぎりのスケジュール: たとえばBTBの場合、暫定マニュアル作成後、間をおかずに研修を受ける
また、SVRの薬品では、OJTのすぐあとに暫定マニュアルが入る
また、後ろにのびたらポンプ暫定の試行期間がさらに短くなる
- 5 * 集合研修: TPWの関連スタッフ全員が一度に研修を受ける。意見交換の場にもなる。
研修I、II,IVは一度に2科目を習う。研修を受けてから実際のOJTまで6ヶ月かかるところもある
- 6 * 専門家の配置:
自家発、受配電、電動、計装: 各分野9ヶ月連続(研修+OJT) あるいは長期専門家
ポンプ: 6. 5ヶ月連続
塩素、薬品は研修とOJTの間に3ヶ月ほどあくので2度の派遣
(例) 塩素=1ヶ月(研修)+9.5ヶ月(OJT)

WTのOJT	Yr	M	SIEM	SHV	KP	KTM	KCM	SVR	PUR	BTB	
(BTB) (PUR)	2007	Sep	集団研修I(キックオフ&自家発と塩素)								
		Oct	自家発1							(WT)	
				自家発1						(WT)	
		Nov			自家発1					(WT)	
						自家発1				(WT)	
	Dec	自家発2							(WT)		
				自家発2					(WT)		
	2008	Jan				自家発2					(WT)
				塩素1			自家発2				(WT)
		Feb			塩素1			自家発1			(WT)
						塩素1			自家発1		(WT)
		Mar					塩素1			自家発1	(WT)
							自家発2			(WT)	
SHV	Apr			塩素2						自家発1	
					塩素2			自家発2			
	May					塩素2			自家発2		
KP	Jun	研修II(受配電)+(塩素)									
	July	受配電1					塩素1				
			受配電1					塩素1			
	Aug			受配電1					塩素1		
					受配電1					塩素1	
	Sep	受配電2					塩素2				
			受配電2					塩素2			
SIEM	Oct	(WT)			受配電2				塩素2		
		(WT)				受配電2				塩素2	
	Nov	(WT)					受配電1				
		(WT)						受配電1			
KTM	Dec	(WT)							受配電1		
		(WT)								受配電1	
	2009 Jan						受配電2				
								受配電2			
	Feb								受配電2		
SVR	Mar	研修III(電動)									
	Apr	電動1									
			電動1								
	May			電動1							
					電動1						
	Jun	電動2									
KCM				電動2							
	July				電動2						
						電動2					
	Aug						電動1				
								電動1			
	Sep								電動1		
										電動1	

[仮)電気・機械OJT研修のスケジュール パターン

2010/6/17

<パターンA> 基本的に一つの科目が全TPW終了して次の科目へ[現行PO(ver 4.8)]

Yr	M	SIEM	SHV	KP	KTM	KCM	SVR	PUR	BTB	
2009	Oct					電動2				
							電動2			
	Nov							電動2		
	Dec								電動2	
研修IV(計装・薬品)										
2010	Jan	計装1								
			計装1							
	Feb			計装1						
3年了	Mar	計装2			計装1					
			計装2							
	Apr			計装2						
2011	Apr	薬品1			計装2					
	May		薬品1			計装1				
				薬品1			計装1			
	Jun	薬品2	薬品2		薬品1			計装1		
									計装1	
	July			薬品2		計装2				
					薬品2		計装2			
	Aug					薬品1		計装2		
							薬品1		計装2	
	Sep					薬品2	薬品2			
	Oct	研修V(ポンプ)								
		ポンプ1								
Nov		ポンプ1								
			ポンプ1							
Dec	ポンプ2									
		ポンプ2								
Jan			ポンプ2							
				ポンプ1						
Feb					ポンプ1					
						ポンプ1				
Mar					ポンプ2					
						ポンプ2				
Apr							ポンプ2			
May										
Jun										
July										
Aug										
Sep										
Oct	マニュアル最終版									
Nov										
Dec										
Jan										
Feb										
Mar										

[仮] 電気・機械OJT研修のスケジュール パターン

2010/6/17

<パターンB> TPWの科目間(受配電→電動→計装)を5ヶ月(研修のぞく)から1.5ヶ月に短縮

- 1 * 効率性: TPWの科目間の時間を1.5ヶ月程度に短縮。
- 2 * 研修期間: 研修IIとIIIは新規2科目を1ヶ月で準備だが、短期専門家が別なのでOK?
- 3 * ポンプへの影響: 暫定マニュアル2010年8月完了予定。最終マニュアルまで1年以上
- 4 * 比較的余裕のスケジュール: BTBでは1科目終了から次の研修まで1ヶ月ほど?あく(ただし、専門家が非効率)後ろにのびても少しは余裕あり
- 5 * 集合研修: ほぼ毎回、全体研修と分科会研修にわかれるイメージ。(G2はADB関係4TPW) ほぼ毎回、新規2科目を習う。研修を受けた科目の実際のOJTまで5ヶ月かかるTPWがある
- 6 * 専門家の配置: 科目OJT時期が重なるので短期専門家でまわす。
 自家発、受配電、計装: 9ヶ月連続(研修+OJT)
 ポンプ: 6.5ヶ月連続
 塩素、電動、薬品は、研修からOJTまで3~4ヶ月期間があくので数度の派遣。
 同じ人間を確保できるか? (例)塩素=1ヶ月(研修)+4ヶ月(OJT)+4ヶ月(研修+OJT)

WTのOJ	Yr	M	G1 (JPN, WB, ADB)				G2 (ADB)				
			SIEM	SHV	KP	KTM	KCM	SVR	PUR	BTB	
(BTB) (PUR)	2007	Sep	研修I(キックオフ&自家発と塩素)								
		Oct	自家発1						(WT)		
				自家発1					(WT)		
		Nov			自家発1				(WT)		
		Dec	自家発2			自家発1			(WT)		
				自家発2					(WT)		
	2008	Jan				自家発2				(WT)	
			塩素1				自家発2			(WT)	
		Feb		塩素1			自家発1			(WT)	
					塩素1			自家発1		(WT)	
		Mar				塩素1			自家発1	(WT)	
			塩素2							(WT)	
SHV	Apr		塩素2			自家発2			自家発1		
				塩素2			自家発2				
	May				塩素2			自家発2			
KP	Jun								自家発2		
	Jul	研修II (1)受配電(全員) (2)電動 (G1) と塩素(G2)に分かれる									
		受配電1				塩素1					
	Aug		受配電1				塩素1				
				受配電1				塩素1			
	Sep				受配電1				塩素1		
SIEM	Oct	受配電2				塩素2					
		(WT)	受配電2				塩素2				
	Nov	(WT)			受配電2			塩素2			
	Dec	(WT)	電動1 (WT)			受配電1					
KTM	Jan	(WT)			電動1			受配電1			
		電動2				受配電2			受配電1		
	Feb		電動2				受配電2				
				電動2				受配電2			
	Mar				電動				受配電2		
SVR	Apr	研修III (1)計装(全員) (2)薬品 (G1) と電動(G2)に分かれる									
	May	計装1				電動1					
			計装1				電動1				
KCM	Jun			計装1				電動1			
					計装1				電動1		
	July	計装2				電動2					
			計装2				電動2				
	Aug			計装2				電動2			
					計装2				電動2		
	Sep					計装1					
							計装1				

[仮)電気・機械OJT研修のスケジュール パターン

2010/6/17

<パターンB> TPWの科目間(受配電→電動→計装)を5ヶ月(研修のぞく)から1.5ヶ月に短縮

Yr	M	SIEM	SHV	KP	KTM	KCM	SVR	PUR	BTB
2009	Oct							計装1	
		薬品1							計装1
	Nov		薬品1			計装2			
Dec				薬品1			計装2		
		薬品2	薬品2		薬品1			計装2	計装2
2010	Jan			薬品2	薬品2				
	Feb	研修IV (1)ポンプ(全員) (2)薬品 (G2のみ)							
3年了	Mar	ポンプ1						薬品1	
			ポンプ1						薬品1
				ポンプ1				薬品2	
3年了	Apr	ポンプ2							薬品2
			ポンプ2						
	May			ポンプ2					
					ポンプ1				
	Jun							ポンプ1	
									ポンプ1
	July					ポンプ2			
									ポンプ2
	Aug								ポンプ2
	Sep								
	Oct								
	2011	Nov							
Dec									
Jan									
Feb									
Mar									
Apr									
May									
Jun									
July									
Aug									
Sep									
Oct		マニュアル最終版							
Nov									
Dec									
Jan									
Feb									
Mar									

[仮]電気・機械OJT研修のスケジュール パターン

2010/6/17

<パターンC> TPWの科目間の期間短縮、研修からOJTまでの時間短縮、1回の研修1科目(研修を2グループ

- 1 * 効率性: TPWの科目間の時間を1.5ヶ月程度に短縮。
- 2 * 研修期間: 1科目1ヶ月。各科目の2回目の短期専門家の準備期間は実質2週間。
- 3 * ポンプへの影響: 暫定マニュアル2010年12月完了予定。最終マニュアルまで9~11ヶ月
- 4 * 比較的余裕のスケジュール: どのTPWでも1科目終了から次の研修まで1ヶ月ほど?あく(専門家配置に影響
また、中間で全体研修を設けることも可能(後ろに少しのびるが)
- 5 * 集合研修: 科目研修では全TPWが集まるのは初回のみ。ただし、2010年12月以降、全体研修可。
新規は1科目に集中できる。研修を受けた科目の実際のOJTまで最長1.5ヶ月(研修Iをのぞく)
- 6 * 専門家の配置: 科目OJT時期が重なるので短期専門家でもわす。(飛び飛びの派遣ではない)
自家発.: 9ヶ月 配電、電動、計装: 9.5ヶ月連続(研修+OJT)
ポンプ+薬品: 7.5ヶ月連続

7 * WTのOJTのシムリアップ中に研修とOJTがはいる。(WTでSIEMとKTMと入れられると比較的余裕)

ke	WTのOJ	Yr	M	G1 (JPN, WB, ADB)				G2 (ADB)						
				SIEM	SHV	KP	KTM	KCM	SVR	PUR	BTB			
(BTB) (PUR)		2007	Sep	研修I(キックオフ&自家発)										
			Oct	自家発1								(WT)		
					自家発1							(WT)		
			Nov			自家発1						(WT)		
								自家発1				(WT)		
			Dec	自家発2								(WT)		
						自家発2						(WT)		
			SHV	2008	Jan			自家発2						(WT)
									自家発2					(WT)
					Feb	G1 研修 II (塩素)				自家発1				(WT)
										自家発1				(WT)
					Mar	塩素1						自家発1		(WT)
		塩素1						自家発2			(WT)			
KP	2008	Apr			塩素1						自家発1			
		May	塩素2			塩素1			自家発2					
				塩素2							自家発2			
SIEM	2008	Jun			塩素2						自家発2			
		July	G1 研修 III (受配電)				G2 研修 II (塩素)							
		Aug	受配電1					塩素1						
				受配電1					塩素1		塩素1			
KTM	2008	Sep			受配電1						塩素1			
						受配電1	塩素2							
		Oct	受配電2					塩素2						
			(WT)	受配電2					塩素2		塩素2			
KCM	2009	Nov	(WT)		受配電2						塩素2			
			(WT)			受配電2			G2 研修 III (受配電)					
		Dec	(WT)											
		Jan	G1 研修 IV (電動)				受配電1							
								受配電1						
		Feb	電動1						受配電1					
				電動1						受配電1	受配電1			
		Mar			電動1			受配電2						
SVR	2009	Apr	電動2					受配電2						
				電動2					受配電2					
		May			電動2					受配電2				
					電動2									
KCM	2009	Jun	G1 研修V (計装)				G2-研修 IV(電動)							
							電動1							
		July	計装1						電動1					
				計装1							電動1			
		Aug			計装1			電動2						
KCM	2009	Sep			計装1			電動2						
			計装2						電動2					
				計装2						電動2				

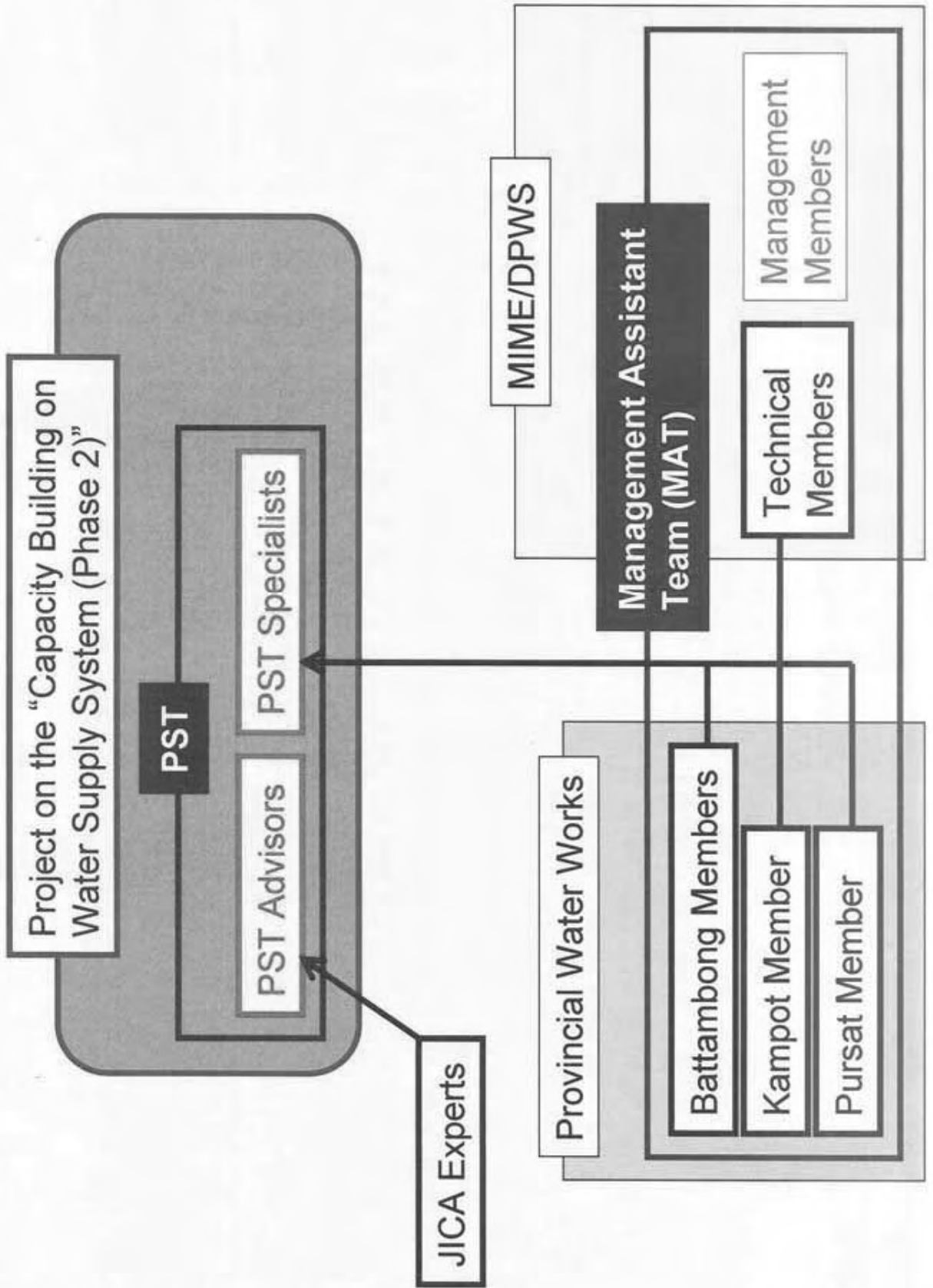
[仮]電気・機械OJT研修のスケジュール パターン

2010/6/17

<パターンC> TPWの科目間の期間短縮、研修からOJTまでの時間短縮、1回の研修1科目(研修を2グループ

Yr	M	SIEM	SHV	KP	KTM	KCM	SVR	PUR	BTB
2009	Oct			計装2					
	Nov				計装2	G2-研修 V (計装)			
	Dec					計装1	計装1		
2010	Jan	G1 研修VI (薬品)						計装1	
		薬品1				計装2			計装1
	Feb		薬品1				計装2		
3年了	Mar	薬品2		薬品1				計装2	
	Apr		薬品2						計装2
	May	G1 研修VII (ポンプ)				G2 研修VI			G2 研修VI (薬品)
2011	Jun	ポンプ1			薬品1			薬品1	
	July		ポンプ1			薬品2			薬品1
	Aug	ポンプ2		ポンプ1				薬品2	
	Sep		ポンプ2						薬品2
	Oct			ポンプ2	G2 研修VII				G2 研修VII (ポンプ)
	Nov				ポンプ1				
	Dec							ポンプ1	ポンプ1
	Jan								
	Feb								
	Mar								
	Apr								
	May								
Jun									
Jul									
Aug									
Sep									
Oct	マニュアル最終版								
Nov									
Dec									
Jan									
Feb									
Mar									

The Establishment of Project Supporting Team (PST)



早期終了の影響 (2月14日)

3年終了パターンの影響

	影響を受ける活動 (影響の大きい順)	影響
1	<u>アウトプット3</u> 計装設備の日常保守に係る技術指導が全くできない(OJT、暫定マニュアルの作成、暫定マニュアルに基づく保守、マニュアルの最終化)	<ol style="list-style-type: none"> 計装設備は浄水場の運転操作に必要な情報を運転者に伝える施設である。 設備の日常保守に係る技術指導が行われない場合、例えば <ul style="list-style-type: none"> メンテナンス不足により、ろ過池の日常保守(=洗浄)に必要な水位計の信号が運転者に正しく送られてこない場合がある。その結果、洗浄に係る判断に誤りが生じ、ろ過機能が落ち、プロジェクト目標で掲げた指標の一部(=水質濁度の基準値を満たす)の達成を担保できなくなる。プロジェクト目標の指標(b)から濁度を落とす必要がある。
2	<u>アウトプット4</u> 薬品設備の日常保守に係る技術指導が全くできない(OJT と暫定マニュアルの作成、暫定マニュアルに基づく保守、マニュアルの最終化)	<ol style="list-style-type: none"> 薬品注入設備は浄水場の水を浄化するために必要な薬品を注入する施設である。 設備の日常保守に係る技術指導が行われない場合、例えば <ul style="list-style-type: none"> メンテナンス不足により、設備の運転が不安定になる可能性がある。その結果、プロジェクト目標で掲げた指標の一部(=水質濁度と pH の基準値を満たす)の達成を担保できなくなる。プロジェクト目標の指標(b)から濁度と pH を落とす必要がある。(残留塩素だけになる)
3	<u>アウトプット4</u> ポンプ設備の日常保守に係る技術指導がまったくできない(OJTと暫定マニュアルの作成、暫定マニュアルに基づく保守、マニュアルの最終化)	<ol style="list-style-type: none"> ポンプ設備は原水を取水し、浄水を配水する施設である。 設備の日常保守に係る技術指導が行われない場合、例えば <ul style="list-style-type: none"> メンテナンス不足により、故障が起こる可能性がある。ポンプ設備の運転が不能となり、需要に応じた取水・配水ができなくなる。その結果、(1)慢性的な断水にいたる可能性がある。毎日の浄水計画通りの浄水生産ができなくなり、プロジェクト目標の指標(c)の達成を担保できなくなる。指標(c)を削除する必要がある。さらに、(2)ポンプ設備の運転が不能になると、適正水圧が保持できなくなり、プロジェクト目標の指標(d)の達成を担保できなくなる。指標(d)を削除する必要がある。
4	<u>アウトプット5</u> 8州都公営水道局(TPW)中、6TPWでしか、管路更新に係る活動が完了しない。(2TPWでは管路更新の図面はできるが、布設技術の指	<p>残りの2都市のTPWについて</p> <ol style="list-style-type: none"> 技術移転：プロジェクト期間中に、関連TPWスタッフを6TWPの管路布設工事に派遣することで対応は可能。 管路教材：OJTの機材として6都市に供与した管路教材を購入することができない。 専門家への影響は宿題 「もっと短縮できるんじゃないの?」「最初から2都市や

	導が行われない)	れば？」への反論 宿題
5	<u>アウトプット3</u> 受配電設備の日常保守に係る技術指導の一部のみ完了(OJTと暫定マニュアルの作成まで)	→ 暫定マニュアルの施行期間が短く、最終マニュアル作成にいたらない。このため、フォローアップとして新たに短期専門家の派遣が必要。
6	<u>アウトプット3</u> 電動設備の日常保守に係る技術指導の一部のみ完了(OJTと暫定マニュアルの作成まで)	→ 暫定マニュアルの施行期間がほとんどなく、最終マニュアル作成にいたらない。このため、フォローアップとして新たに短期専門家の派遣が必要。

4年終了パターンの影響

	影響を受ける活動	影響
1	<u>アウトプット3</u> 受配電設備の日常保守に係る技術指導の一部のみ完了(OJTと暫定マニュアルの作成まで)	→ 暫定マニュアルの施行期間が短く、最終マニュアル作成にいたらない。このため、フォローアップとして新たに短期専門家の派遣が必要。(3ヶ月程度)
2	<u>アウトプット3</u> 電動設備の日常保守に係る技術指導の一部のみ完了(OJTと暫定マニュアルの作成まで)	→ 暫定マニュアルの施行期間がほとんどなく、最終マニュアル作成にいたらない。このため、フォローアップとして新たに短期専門家の派遣が必要。(3ヶ月程度)
3	<u>アウトプット3</u> 計装設備の日常保守に係る技術指導が一部のみ完了(OJT、暫定マニュアルの作成)	→ 暫定マニュアルの施行期間が短く、最終マニュアル作成にいたらない。このため、フォローアップとして新たに短期専門家の派遣が必要。(3ヶ月程度)
4	<u>アウトプット4</u> 薬品設備の日常保守に係る技術指導が一部のみ完了(OJTと暫定マニュアルの作成まで)	→ 暫定マニュアルの施行期間が短く、最終マニュアル作成にいたらない。このため、フォローアップとして新たに短期専門家の派遣が必要。(3ヶ月程度)
5	<u>アウトプット4</u> ポンプ設備の日常保守に係る技術指導が一部のみ完了(OJTと暫定マニュアルの作成)	→ 暫定マニュアルの施行期間が短く、最終マニュアル作成にいたらない。このため、フォローアップとして新たに短期専門家の派遣が必要。(3ヶ月程度)