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June 5, 2007

British Columbia Utilities Commission
6th Floor, 900 Howe Street
Vancouver, B.C. V6Z 2N3

Attention: Mr. R.J. Pellatt, Commission Secretary

Dear Sirs:

Re: Terasen Gas Inc. ("Terasen Gas")
Application for a Certificate of Public Convenience and Necessity (the "CPCN Application") for the Distribution Mobile Solution Project

Response to the British Columbia Utilities Commission ("BCUC" or the "Commission") Information Request ("IR") No. 1

Terasen Gas filed its CPCN Application for the Distribution Mobile Solution Project dated May 7, 2007. On May 29, 2007, the Commission issued BCUC IR No. 1.

Terasen Gas respectfully submits the attached responses BCUC IR No. 1.

If there are any questions regarding the attached, please contact Mr. Tom Loski, Director, Regulatory Affairs at (604) 592-7464.

Yours very truly,

TERASEN GAS INC.

Original signed by: Tom Loski

For: Scott A. Thomson

Attachment

1.0 Reference: Section 1.2 Executive Summary, p. 3

TGI mentions that it conducted research on its own as well as utilizing Gartner Research to provide insights into market experiences and analysis of potential vendors. In footnote 2 TGI cited two articles ("Magic Quadrant for Field Services", published April 3, 2006; and "Magic Quadrant for Multichannel Access Gateways", published October 6, 2006) by Gartner Research.

On page 30 it states: "The choice of vendors was validated with Gartner Research regarding their position in the market place and long-term outlook."

1.1 Please provide the two articles by Gartner Research. Please also file any recent updates to the two articles.

Response:

The response to this question has been submitted CONFIDENTIALLY under separate cover.

1.2 What is the selected vendor's position in the market place and long-term outlook?

Response:

The response to this question has been submitted CONFIDENTIALLY under separate cover.

1.3 How does TGI view and address any cautionary comments made by Gartner Research concerning the selected vendor?

Response:

There were no applicable cautionary comments in the research.

2.0 Reference: Section 1.4 Capital Expenditures, p. 6

Table 1 on page 6 shows the components of the $5,984,267 cost of the CPCN.

2.1 Please segment the project costs by internal and external resources. Please further break down external costs by vendors and by cost components (e.g. consulting, software, hardware, expenses, etc.)

Response:

Distribution Mobile Solution Cost Breakdowns

External						
	Consulting					**Role**
		R-Tech Technologies	$505,452			Project management / Solution Architect
		ClickSoftware	$1,078,794			System devoper and implementor - ClickSchedule
		Syclo	$627,246			System developer and implementor - Syclo Smart
		Habanero	$29,958			System devoper and support - Café
		Telus	$265,395			Infrastructure implemetation and support
		Clariteq	$5,500			Business Process Training
		Coral Consulting	$105,500			SAP ABAP development
		LakeView Services	$35,976			SAP Functional Analyst
		IBM	$61,610			Business Analysis
		SAP	$15,500			SAP Subject matter experts
		CNC Global	$246,540			SAP Functional Analysts
		Training Lead (TBD)	$131,210			Training development and coordination
				$3,108,681		
	Expenses					
		ClickSoftware	$160,000			
		Syclo	$100,000			
				$260,000		
	Licenses					
		ClickSoftware	$224,917			
		Syclo	$346,026			
		Netmotion	$23,112			
				$594,055		
	Hardware					
		Servers	$150,000			
		PCs	$162,000			
				$312,000		
					$4,274,736	
Internal						
	Labour					
		Business team lead	$366,131			
		Closing Process SME	$81,933			
		Dispatch / scheduling SME	$87,901			
		Reporting SME	$84,519			
		Field Rep	$95,448			
		Timesheet Rep	$82,016			
				$797,948		
	Expenses					
		Travel	$41,369			
		Facilities	$16,634			
		Training & Chg mgmt	$120,000			
				$178,003		
					$975,951	
						$5,250,687 *

** Note: includes the $256,000 spend for 2006 as per Table 1 in the Application*

2.2 Please provide further details of the $717,176 of Internal Labour. Is this from regular staff, contract staff, or overtime?

Response:

The labour charges associated with this project are for regular internal staff. Consistent with past practice, the costs reflect the standard charge rates for employees who are budgeted as capital and the cost of backfill for employees who typically charge their time to O&M expense. Please refer to the response to Question 2.1 for cost breakdown.

2.3 Please segment the Consulting costs by identifying the consultant, the amounts, and type of work performed.

Response:

Please refer to the response to Question 2.1.

2.4 Please provide a further breakdown of the Expenses of $435,786.

Response:

Please refer to the response to Question 2.1.

2.5 Please elaborate on the contingency amount of $394,869. Show the calculations for the contingency.

Response:

The contingency was calculated based on percentage values assigned to the individual line items within the project budget. The percentage values used ranged from 0% for fixed price items (such as negotiated license costs) to 25% for items with a lower degree of certainty. The total contingency value is the sum of the contingencies calculated for the individual line items.

While the actual calculations are more granular than below, the high-level approach can be characterized as:

Consulting (time & materials agreements)	20%
Labour	15%
Hardware	20%
Software	0%
Expenses	20%

2.6 What is the AFUDC rate? Please show the calculations for the AFUDC amount of $338,732.

Response:

The AFUDC rate used is 6%. The calculation of $338,732 is as follows:

$	5,645,535	Total capital expenditure before AFUDC
	6.00%	Multiplied by: AFUDC Rate
$	**338,732**	Total AFUDC

Detailed AFUDC calculations that were used to model the Revenue Requirements are calculated monthly and result in a total AFUDC of $317,570, a $21,162 difference. Details can be found on the electronic spreadsheet attached in response to Question 22.3.

Table 1 on page 6 and Table 2.4.2 on page 28 of the application would be revised as follows when using the AFUDC calculated on a monthly basis:

	2007	2008	Total
Internal Labour	**$337,329**	**$379,848**	**$717,176**
Consulting	**$1,219,679**	**$1,718,476**	**$2,938,155**
Hardware	**$150,000**	**$162,000**	**$312,000**
Software	**$568,436**	**$23,112**	**$591,548**
Expenses	**$144,136**	**$291,650**	**$435,786**
Contingency	**$78,974**	**$315,896**	**$394,869**
sub-Total	**$2,498,554**	**$2,890,981**	**$5,389,535**
2006 Spend			$256,000
Total (no AFUDC)			**$5,645,535**
AFUDC			$317,570
Total			**$5,963,105**

2.7 Is there any capitalized overhead attributed to this Project? If so, please quantify.

Response:

There is no capitalized overhead attributable to this project.

3.0 Reference: Section 2.2 Current Situation, p. 9-18

Customer Service ("CS") Work

On page 9 it states: "The existing technology used for dispatching the CS work has reached the end of its useful life and components within the system are experiencing increasing occurrences of system outages. To date system outages have been of short duration, allowing manual dispatch of customer service work orders to be sufficient."

On page 19 it indicates that the current system is increasingly unstable and causing increasing periods of downtime.

On page 26 it indicates that there have been outages of 76 hours for 2006 and 56 hours for 2005.

3.1 What was the in-service date of Mobile-Up? Please provide the frequency, the range and the average of duration of the system outages for each year since inception. Please identify TGI's acceptable threshold in terms of outage hours per year.

Response:

The in-service date for MobileUp version 5.4 was May 2001. It should be noted that the version of the application that was near the end of it's lifecycle at that time as the new version was scheduled to be released in 2002.

Terasen Gas does not retain historical information of system outages indefinitely. Two-years as provided is typical.

TGI has no documented acceptable outage levels by application. Time of day, time of year, type of call all factor into the severity of the impact of the outage.

3.2 Please elaborate further on the system outages. What are the various kinds of outages? What were the technical nature of the problems? What were primary reasons for becoming less stable? Does TGI have an internal support team to maintain and trouble-shoot the system? How were these outages resolved?

Response:

Outages have varied in nature caused by breakdowns of the individual components of the solution. The majority of issues are related to server operating failures. These will typically occur when server components fail and need to be replaced. Outages have also occurred when security patches to the operating system are installed which causes an incompatibility with the application or database services. There have also been

wireless network outages that will occur even with the new solution but these are less common. The outages to date have been able to be rectified by a combination of technicians from Telus and database support provided by various third party support arrangements.

Terasen Gas has chosen to mitigate further outage exposure of the application by deciding to not make any application changes or improvements mostly due to the fact that it is not confident that the application can be modified and still guarantee that it will come back online. Support from the vendor is "best efforts" and as Terasen Gas is the only customer on this version, support skills are very scarce.

Based on TGI's business model, the internal support is geared around resolving business problems and triaging the technical issues to determine where the breakdown is and who the appropriate support resource is. Each outage is considered unique in nature and is dealt with on an individual basis so the resolution of the outages is varied.

3.3 What is Mobile Gateway (shown in Figure 2.2.3 on page 13)? Could Mobile Gateway be replaced by SAP Mobile Infrastructure?

Response:

Terasen Gas conducted a pilot project to determine the suitability of SAP's Mobile Infrastructure as a possible replacement for MobileUp. The conclusion of the pilot and discussions with SAP about the direction and development roadmap for their product led to a joint decision that it would not be a suitable solution for Terasen Gas. The application is not robust enough to handle the real-time demands of Customer Service work, not efficient enough in its wireless communication protocols which would lead to dramatically higher network costs associated with the SAP solution, had gaps in the functionality that Terasen Gas requires and is too immature a product to have enough knowledge in their own support organization to provide the appropriate level of support that Terasen Gas would require. SAP has noted the deficiencies in their product and has taken steps to re-architect the solution. To meet the requirements that Terasen Gas has provided, SAP has indicated that they are "a generation away" from being able to appropriately meet Terasen Gas' requirements. This is interpreted to be 5 years away at best.

3.4 TGI notes that "the original vendor of the mobile dispatch application "MobileUp" component of the system sought Chapter 11 bankruptcy protection since the original implementation in 1999". Had TGI considered credit risk and financial stability of the vendor as part of its vendor selection and evaluation process?

Response:

Terasen Gas did consider the financial stability of the vendor.

The following points were considered at that time.

- 1999 annual sales of $20 million
- 30% owned by Southwest Gas
- Dun & Bradstreet credit rating: 3A2
- Comments extracted from D&B Business Information Report (May 3, 2000)
    - the credit rating was upgraded in May, 1999
    - a 'good' assessment was given because of the company's December 31, 1999 fiscal financial statement
- New customers since '98, such as Atlanta Gas Light, Cinergy and Duke Power, etc. obviously completed the same financial due diligence as did Terasen Gas (then BC Gas) and selected Utility Partners as their preferred vendor.

3.5 According to Figure 2.2.3: Current State Technology (page 13), there doesn't seem to be an interface between the Energy and the SAP R/3 systems. However, in Figure 2.3.1: Future State Technology Solution (page 22), it appears that an interface is built between the two systems. Please describe the nature and the significance of this change.

Response:

The interface between SAP and Energy in the Future State diagram (Figure 2.3.1) replaces the current interface between Energy and MobileUP as depicted in the Current State diagram (Figure 2.2.3). The interface will not be changed on the Energy side, it will simply be redirected and mapped to SAP, rather than MobileUp as it is today. In the current environment, customer service jobs raised in Energy are passed via an interface to MobileUP, and completion data is returned from MobileUP back to Energy. In the future, the same interface will be used, however it will now pass the customer service jobs raised in Energy to SAP, and will return the completion data from SAP to Energy.

4.0 Reference: Section 2.2 Current Situation, p. 10

On page 10 it describes the field work processes: customer service work, maintenance work, and construction work.

4.1 Please provide further examples of the types of work performed by the workers for each of the three field work processes.

Response:

Maintenance Work – 55,000 activities per year	Construction Work – 30,000 activities per year	Customer Service – 115,000 activities per year
Industrial meter repairs	New meter installs	Emergency Response – Gas Odour calls
Industrial meter exchange	New service installs	Emergency Response – Hit lines
Industrial meter install	New main installs	Emergency Response – CO calls
Station maintenance	Service alterations	Meter investigates
Electronic Control Equipment repair	Main alterations	High Bill complaints
Industrial meter upgrades	Service abandonment	Meter identification
Propane System upgrades	Main abandonment	Meter upgrades
Station abandonment	Service line repairs	Residential Meter Exchange
AMR installations	Meter repairs	Commercial Meter Exchange
Meter set consolidations	Leak survey	Disconnects
	Meter protection	Reconnects
	Valve repairs	Relighting of appliances
	Paving repairs	Above ground leak repairs
	Underground leak repairs	Meter Reads
	System improvements	

5.0 Reference: Section 2.1 History and 2.2 Current Situation, p. 8-18

Construction Work

Section 2.2.1.3 suggests construction work usually is the result of a customer request for a new service attachment to the gas distribution network

5.1 Please describe the history and functionalities of the Café application. How the Café application is integrated with the Customer Information System, or the "Energy" system, to look up customer information?

Response:

The Café application was implemented as a component of the Utilities Strategy Project that integrated TGI and TGVI's business processes and technologies. Prior to integration, TGVI's legacy work management application "MAST" (Mains And Services Tracking system) contained functionality for planning and pricing proposed mains and services that was not supported by TGI's SAP based "Order Fulfillment" process. Café was implemented to support TGVI's "MAST" requirements and to improve the TGI order planning and pricing capability. Café is used to support both TGI and TGVI, and provides order pricing functionality for all Customer driven construction activity. Café also interacts with ClickSchedule to book appointments based on crew availability. Once a customer has agreed with the quoted price and selected appointment for a job, the job is "submitted" to SAP, automatically raising the required sales order and work orders to complete the job execution and billing.

Café is integrated with Energy though a weekly batch interface that downloads premise and customer data from Energy to Café. The data is not editable in Café, and is provided to simplify the order entry procedure for work performed for existing customers or at existing premises.

5.2 Please discuss barriers that prevent ClickSchedule from scheduling Customer Service work?

Response:

The primary barrier is that MobileUP only contains work that is to be done on the current day and does not support a view of future dated work. Also, all of the current day work in Mobile UP is dispatched to technicians, who then have the ability to decide on the sequence in which they will perform the work. As a result, there is no scheduling for ClickSchedule to perform. In order for ClickSchedule to effectively schedule it needs to have a view of future dated work so it can optimize when the work should be performed and who should perform the work.

In order for Customer Service work to be scheduled in ClickSchedule, a custom interface would have to be developed between Mobile UP and ClickSchedule as no standard interface exists between the applications (as it does between SAP and ClickSchedule). Also, modifications to Mobile UP would be required to eliminate its assigning / skills matching functionality which would overlap with functions being performed by ClickSchedule.

With this model, the business would still need processes to manually coordinate which technicians are utilizing the various disparate mobile technologies. This would be very difficult as ClickSchedule would not take this into account in its scheduling (i.e. it could assign a job to a technician who does not have the correct mobile application to receive the work).

5.3 Please describe the functionalities of SAP Mobile Infrastructure and SAP Mobile Asset Management, depicted in Figure 2.2.3 (page 13). Discuss their roles in managing construction work.

Response:

SAP Mobile Infrastructure is the communication mechanism that allows SAP work orders to be synchronized between SAP Mobile Asset Management (the field mobile application) and SAP R/3 (the back-end work management system). Mobile Infrastructure is simply used to pass data back and forth between SAP Mobile Asset Management and SAP R/3; it does not modify the data in any way.

SAP Mobile Asset Management is the field application that the construction crews use to receive their assigned work orders and to provide status updates as the job progresses to completion. Technicians use SAP Mobile Asset Management to set the status of individual work orders to "En Route", "Arrived", and "Field Complete" as they are worked in the field. These status changes are transmitted immediately to SAP R/3 and then to ClickSchedule so that dispatchers and managers can track whether the jobs are being worked as planned. SAP Mobile Asset Management is also used to record delay information (i.e. why the job may have taken longer than planned) upon job completion, and to identify reasons if a job cannot be completed as planned.

6.0 Reference: Section 2.2.1.4 Work Process Summary, p. 11

On page 11 it indicates that the Company is moving to a more generic, less specialized workforce model.

6.1 What are the benefits and costs of a specialized workforce model?

Response:

Benefit:

- They are highly trained in a small scope of specific tasks which allows them to become proficient and therefore may allow them to deliver to a high level of quality and consistency.
- The specialized/technical positions are career path preferred by some; from an employee perspective they can offer the most challenge in day-to-day work and the most compensation.
- Having a specialized workforce available limits reliance on contractors for technical work i.e. line heater trouble-shooting

Cost:

- Specialists must be sent to work that falls within their scope; this means that economies of scale are lost as they travel to in-scope work while other resources deliver their out of scope functions. This specialized approach creates increased cost since one or more workers are either traveling to in-scope activities or are idle awaiting work, while other specialized activities are delivered by other specialized workers.
- From an employee perspective, there is less variety in the work which may contribute to job dissatisfaction, complacency, and productivity loss.
- Job classification jurisdictional issues can prevent work getting done where the specialized workforce has negotiated the right to complete certain types of work.

6.2 What are the benefits and costs of a generic workforce model?

Response:

Benefits:

- The worker becomes a flexible "variable" aligned to the work requirements and efficient delivery in the area in which they work. Training can then be targeted to align to area specific requirements without scope constraint. The resulting broader scope of work requirements delivered ensures optimal assignment and efficiency. Multiple activities can be aggregated for efficiency and economies of scale and the

generic workforce can be assigned to a broader scope of work which allows more flexibility for dispatch to fill their daily schedules to ensure idle-time is minimized.

- From an employee perspective, there is a greater variety of work which may lead to higher job satisfaction, higher interest in work, productivity improvements.
- With a generic workforce, Terasen Gas has been able to assign low end specialized/technical field work into the generic workforce which tends to be lower paying thereby lowering overall unit costs i.e. Pressure Factor Measurement meter maintenance work.
- The generic workforce group tends to be larger than the specialized workforce and gives the company a larger resource pool to which the work can be assigned. ...i.e. System Operations Technician group is much smaller than Customer Service Technician group.
- With a generic workforce, a variety of position classifications can be eliminated and rolled into one common generic "universal soldier" type of position which simplifies job postings, budgeting, HR administration, headcount tracking, etc.
- Training large groups of generic employees is significantly more efficient and generally easier than training specialized employees - class size economies of scale, complexity of course content, availability of instructors, etc.
- Increasing the scope of a generalist skills, knowledge and responsibilities provides increased flexibility for work assignment not currently available with senior, long term specialists. Expected increases in retirements of specialist employees over the next 5 years presents an opportunity to have them mentor and train new employees entering generalist roles.

Costs:

- While the benefits are substantial a "smart" scheduling/dispatch (or resource management) system is required to fully benefit from a generic workforce. This ensures that the employee that has been properly trained will be dispatched to the right location with the right tools and equipment. The multiple variables that will play a part in the efficient and cost effective assignment/deployment of resources can only be aligned and supported by an integrated resource management system (all work requirements/all resources). Both the generic workforce and the system to support it are required elements to ensure optimal workforce efficiency and cost effectiveness.
- With a generic workforce the ideal IT solution is to have all work, regardless of type, come to the employees on one IT platform as it reduces the number of systems the employee has to learn, the physical equipment required and the software required.
- With a generic workforce, more training is required to ensure the individual employees are able to handle a wider breadth of work.

7.0 Reference: Section 2.2.1.4 Work Process Summary p. 11

TGI notes that there are 230 discreet work order types associated with the 3 types of field work…with the annual number of work orders approximating 200,000 (CS at 115,000, PM at 55,000 and Construction at 30,000).

7.1 Please indicate in which system(s) these 230 work order types are currently stored.

Response:

Work order types are stored in the MobileUp system or SAP depending on work type. Any work type related to a customer premise and billing is stored in MobileUp. Maintenance and construction orders are stored in SAP.

With the new solution all work types and information will be stored in SAP.

7.2 Please identify inputs or parameters that exist in a typical work order for each of the three types of field work.

Response:

Maintenance Work

Inputs for maintenance work include customer contact information, work instructions, job location, meter information, meter size, regulator information, requirements for use, access instructions, specifications and completion dates based on Company and regulatory standards.

Construction Work

Inputs for customer generated construction work include customer contact information, work instructions, location, acceptance of terms and conditions, requirements for installation, length of installation, type of meter, material requirements, type of ground that it will be installed in, foreign utility information, permits, special requirements, expected work duration, number of resources to complete the work and, work start date based on customer requirements.

Inputs for company generated construction work include customer contact information, work instructions, location, requirements for installation, length of installation or change, meter size, timing for installation, permits, foreign utility information, expected work duration, completion dates and number of resources to complete the work.

Customer Service Work

For safety related Customer calls such as gas odour calls received and processed by CustomerWorks' call centre the inputs include; customer contact information, work instructions, location of odour, access instructions, meter information, and delivery pressure. Company standards determine the response criteria.

For billing related work such as disconnects and reconnections processed by CustomerWorks' Billing group the inputs include; customer contact information, work instructions, location, meter information, delivery pressure, access requirements and reason for disconnection/reconnection. Contractual obligations determine the timeframe in which the work can be completed.

For a relight of appliances as a result of an outage Customer calls are received and processed by CustomerWorks' call centre or generated from Terasen Gas' Dispatch group. Inputs include customer contact information, work instructions, meter location, meter type, delivery pressure, and appliances to be re-lit. Company standards determine the timeframe in which the work can be completed.

For residential meter work the inputs come from Measurement Canada requirements for compliance sampling and out of date meter exchange criteria and from CustomerWorks Billing if there appears to be a problem with billing or meter reading anomalies. Inputs include customer contact information, work instructions, meter type, delivery pressure, reading, location, instructions for meter handling, appointment date and time if required and completion date requested.

7.3 Some work types, such as emergency response and complex multi-family constructions, cross all three components. Please provide inputs or parameters that exist in these work orders.

Response:

Emergency response

When an emergency call is received by CustomerWorks' call centre a template is used to capture information for the work order. Work order inputs include the location, customer/damager contact information, whether or not gas is leaking and to what extent, information on other attending emergency resources such as fire departments, and all other pertinent details related to the specific emergency. This info is captured and passed in the work order from Energy to MobileUp for Terasen Gas' Dispatch group to assign to the appropriate field resource. For all emergency orders a verbal confirmation of receipt is required between CustomerWorks and Terasen Gas and between dispatch and the field. This order is then dispatched to the technician who is considered the first responder. For emergencies identified as a hit and damaged line, often more than one field resources will be dispatched. At the same time the Dispatch group will raise an

order in SAP to dispatch a construction crew to the site. All information that came from the Energy work order will be duplicated in the SAP work order. The Dispatch group will add notes to the Energy work order to reference the SAP work order. If a Maintenance Technician, who does not have a mobile system, is required, the work order information is verbally communicated to him and will be manually updated in all systems by the Dispatcher. If, as a result of the hit line there are significant outages at customer homes, Technicians will be sent a list of the homes that were affected (via voice, fax to nearest muster, or hand delivered). Once Technicians have attempted to re-light all the affected homes, they will radio in or fax in information on homes that were not re-lit. Dispatch will then raise orders on each of these homes in Energy as well as keeping the details on the SAP work order.

Furthermore, since repairs to hit lines are billable to the damager based on the cost to Terasen to complete the repair, it is important that all material, technician time, and vehicle costs are collected against the SAP work order. However, since MobileUP orders used for dispatching customer service technicians for the "first response" or to perform relights cannot be used to collect costs, the technicians must manually track these charges and enter them later on their timesheet to charge the SAP work order. Considerable back-end work is required to match the MobileUP work order history to the technicians' timesheets to ensure all damage related costs are collected accurately for billing. This complexity and manual processing will be eliminated with the proposed solution as all work will be managed via chargeable SAP work orders and all technician and vehicle time will be recorded automatically from the mobile application.

Multi-family construction

The complexity occurs because the piping components of these installations are performed by construction crews, and hence are dispatched through Mobile SAP, while the meter components of the projects are performed by Customer Service Technicians and hence are dispatched through MobileUP. As a result, although the overall job is planned and managed in SAP R3, duplicate Energy / Mobile UP orders must be raised in order to dispatch the meter work to the Customer Service Technicians. The dependencies between the piping and meter work must then be manually coordinated by the dispatchers to ensure they are sequenced and scheduled correctly. The Customer Service Technicians must then manually track the time worked and enter the appropriate SAP order number on their timesheets, rather than simply having MobileUP process their time charges as is their usual process. Finally, since the original meter tasks in SAP are not dispatched, a manual process is required to complete the tasks in SAP once the duplicate MobileUP tasks have been completed.

8.0 Reference: Section 2.2.4.1 Regulatory Requirements, p. 15

8.1 Please provide a copy of Annex N of Canadian Standards Association Standard Z662.

Response:

Please refer to Attachment 8.1.

8.2 How does Terasen Gas plan to meet the standard?

Response:

Implementing the requirements of Annex N and an Integrity Management Program is not within the scope of the Distribution Mobile Solution Project. However, the proposed solution will be instrumental in ensuring and demonstrating that required work is scheduled and completed as outlined in Terasen Gas' Integrity Management Plan once implemented.

Specific to Terasen Gas' plan to meet the standard, a Questionnaire Response document that was prepared at the request of the British Columbia Oil and Gas Commission which assesses Terasen Gas' progress related to developing its Pipeline Integrity Management Program is included in Attachment 8.2.

9.0 Reference: Section 2.2.6 Field Mobile Workforce Strategy, p. 16-18

9.1 Please provide the revised 2006 Field Mobile Workforce Strategy, and its action plans for implementation.

Response:

In Attachment 9.1, the Workforce Strategy presentation document defines the overall approach to the whole workforce and the work type analysis summary document defines the requirements. This information was then used to develop the conceptual process scenarios and a summarized vision diagram. These documents form some of the background information that led to the business case, which is the action plan for implementation included in the response to Question 21.3.

9.2 TGI noted that "the Company is adapting its recruiting practices in light of changing workplace demographics… by replacing specialist positions with multi-skilled employees." (p. 12)

9.2.1 Please provide approximate training time required for training a competent specialist versus a multi-skilled generalist.

Response:

To clarify, Terasen Gas is expanding the number of multi skilled employees which will in turn reduce the number of specialists; however there will always be some specialist positions particularly at higher technical levels. Training requirements are dependent on the existing level of knowledge and skill of individuals and the entry level into the company.

Training path at minimum entry level:

An apprentice could become construction specialist after 3 years and a fully-trained multi-skilled generalist within 4-5 years. This includes; 4 weeks initial orientation training followed by 3 years of on the job training supplemented by 3 weeks per year structured refresher training. In addition, to obtain a "generalist" level position, structured training will include 124 hours to obtain a Gas Utility ticket and meter exchange skills, a combination of 108 hrs structured training on the job experience and accredited courses to obtain a Gas Fitter "B" ticket.

Individuals who have moved through the process described above that wish to move to a higher technical specialist level would be required to fulfill a 3 year System Operations Apprenticeship and obtain a Gas Fitter "A" license. "A" license qualifications require a minimum of 2 years experience with a "B" ticket and a combination of on the job experience and accredited courses. The time frame to progress from an entry level to a specialist would be a minimum of 7-8

years of on the job experience and training supplemented with formal accredited training.

Training path at higher entry level:

Employees who enter the company at a higher position level are required to have the appropriate qualifications for the position such as Gas Fitter "B" or "A" tickets and relevant experience. Specific training will be designed to supplement the knowledge that they bring. For both generalists and specialist positions that would include 4 weeks initial orientation training followed by peer on the job training during the first few months supplemented by 3 weeks per year structured refresher training.

9.2.2 It appears the recruiting shift towards multi-skilled employees indirectly compounds the scheduling and dispatching challenges. Please comment how this training and recruiting shift impact the quality, safety and efficiency of any "specialist" type of work.

Response:

The training and recruiting shift does not negatively impact the quality, safety and efficiency of "specialist" work in any way. The less complex tasks, previously done exclusively by specialists can now be assigned to the well trained and competent generalist position. A benefit on the specialists' side is that primary assignment of the smaller scope of specific highly technical tasks allows them to become proficient and therefore may allow them to deliver to a higher level of quality and consistency.

From an efficiency standpoint the options now open to assign less complex tasks to other less costly technicians will result in better utilization of the workforce as a whole. In some circumstances and geographic areas the less complex tasks will continue to be assigned to specialists when it's efficient to so and optimize the specialists day.

10.0 Reference: Section 2.3 Analysis of Project Options, p. 19

On page 19 it states: "The vendor for the current CS work dispatch component has no plans to update its mobile application in a direction that would meet Terasen Gas' needs."

10.1 Please elaborate further on the plans for the current vendor.

Response:

Based on conversations with the current vendor ViryaNet, they have taken a step back from their original plans to combine the MobileUp product, obtained with the acquisition of Utility Partners, and an existing ViryaNet product after what they termed as "a few false starts". They have described the vision as creating a new product with functionality that will be phased in over the next 5 – 6 years that would culminate in a self-contained Field Service system. This would include some level of functionality around scheduling, contract management, customer care, inventory management as well as a mobile component. Please refer to the response to Question 12.3 for more details with respect to Field Service systems.

10.2 How does the vendor's plan not meet Terasen Gas' needs?

Response:

Most of the functionality that is envisioned is a direct duplication of functionality that is currently delivered with SAP and ClickSchedule. There is no defined strategy to integrate their solution with SAP, and the timing is years away from what Terasen Gas requires. The vendor also does not have an established track record on delivering on plans.

11.0 Reference: Section 2.3 Analysis of Project Options, p. 18-20

Option 1 and Option 2

TGI identified Option 1 – a completely manual process and Option 2 – continued use of the current solution, as two alternatives.

11.1 Please elaborate your assumption to Option 1. Does a completely manual process imply none of SAP, ClickSchedule, MobileUp, Energy or Café application, except for word and spreadsheets?

Response:

The base assumption to Option 1 was to not replace the existing MobileUp system with another system but to repatriate the dispatching and field functionality associated with the Customer Service workforce to manual processes utilizing cellular, radio, fax and paper. The assumption was that SAP, Café, Energy and ClickSchedule would continue as today to support the construction, PM and backoffice functions as they do today.

11.2 With regard to Option 2, TGI noted that "the current mobile data application is failing…Major components of the current system are approximately 7 years old and are becoming increasingly unstable".

11.2.1 Please provide annual maintenance costs for MobileUp in the past two years. If this CPCN is not approved (i.e. MobileUp is not replaced in the near future), what is the expected annual cost to maintain MobileUp for 2007 and 2008?

Response:

From a technical perspective, annual MobileUp licensing costs are approximately $140,000. Server maintenance costs are approx $93,000 annually. Other support such as database, interface and application support not provided through the licensing agreement are time and materials and can vary greatly depending on the nature of the outage. While not all components of each of the applications are budgeted down to this level of granularity, TGI estimates third party support costs to cover all occurrences of ongoing corrective action to be between $40,000 to $70,000 annually over the last couple of years.

As stated previously, it is difficult to quantify the cost to the business during an outage since the cause and duration will be factors. The inefficiencies with having to implement the manual work-around processes as well as overtime to deal with the volumes can vary. Also, there will be the loss of the identified benefits which have been identified at $576,000 annually.

If nothing were done about the current situation, it can be expected that variable components of the support costs will go up as less and less expertise and parts will be available. It is not possible to quantify with any accuracy what that may be. It is also possible that the system could fail and unable to be restored and a reversion to a manual process for a prolonged period of time would be required. To reach even an approximation of the efficiency of an automated process, Terasen Gas estimates that an additional 10 office staff and 6 field staff would be required at an approximate cost of $1.1 million. Incremental non-labour operating costs for cellular, radio, fax and paper are estimated at $200,000 annually. These costs would be offset by the reduction in the operating costs but if forced to move to a manual dispatching system, increased operating costs in excess of $1 million should be expected.

12.0 Reference: Section 2.3.1 Solution Selection Approach, p. 20-22

12.1 Please discuss the pros and cons of Mobile SAP and why its pilot implementation "led to questions as to SAP's ability to support their product".

Response:

In July of 2005 – roughly six weeks after initially going live with Mobile SAP – a support issue was logged by TGI with SAP to report a technical issue with SAP's synchronization engine that was seriously impacting Terasen Gas' users. Despite ongoing attempts by SAP to resolve the problem, and repeated escalations of the issue within the SAP organization, by April of 2006, SAP was still unable to solve the problem. At that time, SAP offered to upgrade the Mobile Infrastructure component of the solution from version 2.1 to 2.5 as they believed this should solve the problem. SAP offered to complete the upgrade at no cost to Terasen Gas and estimated that the upgrade would take approximately 8 weeks to complete. During the upgrade, however, SAP encountered numerous other technical issues that they struggled to resolve and as a result the upgrade took them until the end of January 2007 to complete. From the initial reporting of the problem, it took SAP over 18 months to resolve the problem – during which time the problem continued to impact about 5% of the system's users each week. With the completion of the upgrade, the system has reached stability in the support of the construction process.

The conclusions from the pilot were that SAP does not have the requisite technical expertise in North America to adequately support the product in a manner that Terasen Gas expects; the functionality is still not adequate to support further investment in effort. The synchronization capabilities are poor; it lacks the ability to provide connectivity to the fields for any other system except SAP, limiting its growth potential and is not architected effectively. Post-mortem discussions with SAP have substantiated Terasen Gas' conclusions. SAP has recognized the deficiencies in their mobile product line and is in the process of re-architecting the entire solution. The responsibility of the product has been moved from product development to SAP's emerging technologies business, the only product to have every been moved in that direction. SAP have communicated to Terasen Gas that the product is a generation away from being in a position to meet Terasen Gas' current needs and historically, that has meant 5 to 6 years away. The only prevailing positive about an SAP solution is that the specific modules are included in the overall licensing agreement. But not utilizing it will not reduce the need for any SAP licenses as the field personnel will still need the licenses to manage the work orders, timesheets, etc.

12.2 Given that TGI has the experience and license of use of SAP Mobile Infrastructure (MI) and its Mobile Asset Management (MAM) module, would SAP MI and MAM become a viable alternative to replace MobileUp and Mobile Gateway for Customer Service work? Please discuss.

Response:

No. SAP's current mobile infrastructure uses a model of periodic synchronization of data with the back-end R3 system rather than one of real-time data messaging. In essence, Mobile SAP was designed to support a typical maintenance process where technicians periodically download assigned work orders and upload completed inspection readings (typically once a day or once a week). While technicians are in the field, however, there is no communication with the back-end system and hence no ability to react to real-time changes. In order to have the system support the current construction implementation, TGI had to customize SAP's synchronization model to allow some real-time data to be passed from the mobile to SAP for work order status updates. While these customizations are "good enough" for construction jobs which have relatively long durations and do not often change after they have been dispatched, they are not robust enough to support the highly dynamic nature of customer service work.

SAP is also aware of the shortcomings of their solution with regard to supporting customer service type work, and in April of 2006 told Terasen Gas of their plans to fully re-architect their mobile solution and replace the current periodic synchronization model with a real-time messaging based solution. To move to this re-architected solution at TGI would require a full re-implementation of the solution. Further, it is estimated that it will be 5 to 6 years before SAP has a robust and stable product in the market based on their planned re-architected solution.

12.3 In light of fragmentation and consolidation of the Field Services Management software marketplace, have TGI considered postponing this proposed investment, as a viable alternative, to be better positioned for taking advantage of the maturity of the field service management software industry and convergence of functionalities and standards?

Response:

No. TGI does not consider Field Services Management software as a technically viable solution to fully support the requirements. These applications provide functionality that overlaps with back-end work management systems such as SAP. Implementing a Field Services application would involve moving away from the current SAP R/3 solution, and would also require the development of complex interfaces with SAP to manage time sheet, costing and materials transactions. Field Service applications also only provide proprietary mobile communications within their own applications, essentially limiting the business to mobilizing the transactions the software vendor feels are required. In contrast, Multichannel Access Gateway solutions, such as Syclo, provide a mobile middleware platform that can be utilized to access any number of back-end enterprise applications.

12.4 If the scope of this project is limited to replacement of MobileUp and Mobile Gateway, would TGI's recommended solution change? Please comment.

Response:

No. The recommended solution would remain the same. Terasen Gas would just not implement the additional functionality that the solution would be able to provide and would lose the opportunity to obtain the efficiencies and cost reductions as outlined in the benefits discussion. The components of the overall solution would still be the same.

12.5 Please confirm if the "Café" application in Figure 2.3.1 - Future State Technology Solution (page 22) would continue to support Construction work only? Please provide a reliability assessment of the Café application.

Response:

Confirmed. The use of Café will not change for its current use for initiating customer driven construction work.

Café is a very reliable application. In the past 7 months, Café has only suffered from 4 brief unplanned outages. Two of the outages were the result of human error when our technology service provider, Telus, mistakenly rebooted the wrong server.

12.6 Please file the Request For Proposal (RFP) that TGI issued to the three vendors, Antenna Software, Syclo and Sybase, and the Request for Quotation (RFQ) that TGI issued to the latter two vendors.

Response:

Included in Attachment 12.6 are the RFP and RFQ documents.

13.0 Reference: Section 2.3.1 Solution Selection Approach, p. 21-22

Syclo versus Sybase

In comparing Syclo with Sybase, TGI suggests that Sybase's solution is a more customized approach, hence considerably more complex and costly to implement while Syclo's model is more generic with common functionalities for all companies. Syclo's solution meets 100% of the core requirements with minor customization while Sybase meets 94% of the core requirements with minor customization.

13.1 Please provide non-confidential submissions/presentations by Syclo and Sybase.

Response:

There are no non-confidential submission / presentations by Syclo and Sybase.

13.2 What are the "Core requirements" that were met by Syclo? Please elaborate further on the 6% of core requirements not met by Sybase

Response:

For the requirements met by Syclo, please refer to the Appendix 1 of the RFQ "Functionality Checklist" provided in the response to Question 12.6.

Of the 94% functional fit for Sybase, they said they met 12% of the core items "out-of-the-box", 47% of the requirements with minor configuration, and 35% with minor customization. The 6% of the core requirements that were identified as requiring major customization are:

1.3.2	Crew Log-in: Entry of crew employee IDs and vehicle IDs	Core	Since many employees work as members of a crew that shares a single mobile device, the application must have the ability to enter the employee IDs of the members of the crew working that day. This information is used by the mobile timesheet application. For reference, a screen shot of the current Mobile Application screen is included as Figure 1 in the section after this table.
1.3.7	Entry of employee and vehicle position / charge out rate value	Core	Employee and vehicle time is charged out at a series of standard rates, referred to as "activity types" in SAP R3. Each employee must enter a valid charge out rate, or select from a drop-down list. Validation of the value entered should be done against a list of valid activity types synchronized from SAP R3.
1.3.9	Crew log-in: Selection of a "crew	Core	When logging in as part of a crew, the user must enter a "crew leader" to indicate which crew they are part of and hence which work orders to download (since there is no defined connection

	leader"		between a user's ID and the crew they are working with on any given day).
3.2.2	Dependency information display	Core	The current dependency information display is shown in Figure 5. The information displayed must include the name of the person assigned to the dependant operation, their contact number, whether the operation comes before or after the current one, and the current status of the dependant operation. Note: this involves some complexity in SAP to ensure that an update message is sent when a status update occurs to a dependant operation.
3.3.1	Status Flow Logic must be built into the application	Core	DISP jobs can go to ENRT. ENRT jobs can go to ARRV or SUSP. ARRV jobs can go to FCMP, SUSP, EDAY or PULL. FCMP jobs cannot be updated. SUSP jobs can go to ENRT. PULL jobs cannot be updated. EDAY jobs can go to ENRT
3.3.3	One job in progress at a time (Terasen Gas employee version only)	Core	While it is possible to navigate from a job in ENRT or ARRV status back to the order list display (current navigation buttons are shown in Figures 6 and 7 down the left hand side of the screen), it is not possible to move a second job into ENRT status. The current job must be moved to FCMP, SUSP, PULL, or EDAY before it is possible to begin processing another job.
3.4.1	Function to allow job re-dating	Core	The application must include a function to allow certain job types to be re-dated by the technician. This is currently triggered from the order list display by clicking on the date field for a job. This launches a simplified calendar view for the technician to select the new date from. The screen-shot of this date selection screen is shown in Figure 8.
3.4.2	Re-dating of jobs based on job type	Core	Only certain job types are allowed to be re-dated (e.g. emergencies cannot be re-dated). Which job types can be re-dated should be maintained in a configuration table. For jobs that cannot be re-dated, the option to re-date them should not be available.
3.4.3	Restriction of date selection for re-dating jobs	Core	Jobs can only be re-dated with in a set window of time. A job can be re-dated any date from the current date to the Friday of the following week, but not beyond this time. The application must limit the date selection to this range.

3.5.1	Calendar display function for work	Core	The application must provide a calendar type display that shows the current work list as if they were appointments in an Outlook calendar. A simplified screen-shot of the current application is shown in Figure 9.
3.9.6	Auto-paging for emergency work	Core	Upon the work order being dispatched to a technician, a pager message must also immediately be sent to the technician to notify them of the job.
4.4.1	Triggering of update message	Core	Upon confirmation of entered completion data, the application must trigger an update message to be sent to SAP R3. This will include the update of the order operation status to FCMP, and the update of the various closing data. The closing data will either be stored on confirmation documents or notification documents in R3 (this portion of the solution design has not been finalized).
5.2.1	Display of 3 level object structure	Core	The application must be able to display in a hierarchy view the current functional location, any sub-functional locations, and any installed equipment. Equipment may be installed in either of the functional locations.
6.2.1.1	Capture of service install length information	Core	Must have the ability to record the following length information: Main to property line (PL), PL to safe meter location, extended past safe meter location, and horizontal jog at meter location. For each item, must also be able to record the service material (from a drop down, either "Steel" or "PE") and service size (from a drop down of standard sizes).
6.2.3.1	Meter installation data capture	Core	The technician must be required to enter meter installation data including the meter number, the meter reading, the PFM number, and the Permit number, or select a reason code for why no meter has been installed.
6.2.4.6	Aborted visit charge	Core	When a crew either "Suspends" or "Pulls" they must be prompted as to whether an "Aborted site visit charge" should be applied to the job. If yes, a charge of $X (configurable value) should be added to the job. Note: have not yet modeled how to do this if occurs multiple times for the same job.
7.4.9	Condition left information	Core	Must be able to select one or more entries from a list describing the condition left upon completion of the job.

13.3 Please provide a multi-year (2007-2013) quantitative cost/benefit analysis between Syclo and Sybase. The analysis should include software acquisition costs (i.e. upfront capital purchase costs with components), periodic software upgrade costs, annual maintenance costs, annual licensing fees, additional user fees, annual O&M savings, user training costs (presumably customized solution would require less time to train new users), and product warranty period.

Response:

Terasen Gas did not conduct the above requested analysis. The Sybase solution was materially higher in initial capital and ongoing operating costs and ongoing support requirements and TGI determined that further detailed analysis was unnecessary.

13.4 Enterprise Resource Planning systems such as SAP can require the user to upgrade to the newest version or risk losing support and use of the application. Does Syclo require the user to upgrade to the newest version? Can TGI use the system without modification and upgrade for the next 7 years?

Response:

It is not anticipated that Terasen Gas will be able to use the system with no modifications or upgrades. Syclo does not require the user to upgrade to the newest version immediately upon release, it is expected that Terasen Gas remain current within reason (one or two versions behind current) or support will fall to "best efforts". It is likely that Terasen Gas' business requirements will change over the course of the next 7 years which may require modifications of the system to implement. These potential changes would be documented and submitted for approval by Terasen Gas management as with all enhancements.

13.5 Does Terasen Gas anticipate a major upgrade of the Syclo's Smart product in a future year such as year four? If so, what would the upgrade cost be?

Response:

At this point there have been no announcements from Syclo for a new version of their SMART product, therefore, there are no specific plans of Terasen Gas' to upgrade Syclo's SMART product. However, as new versions of the application are released, Terasen Gas will assess the business value of upgrading the application to take advantage of new functionality. TGI's preference is to take advantage of new releases where they provide business value rather than developing custom solutions. Any

upgrade project would be business cased through TGI's normal capital approval process.

The maintenance contract with Syclo provides for the new versions of the software, so the only cost associated with performing an upgrade would be the professional services required. It is not possible to estimate the cost of a potential upgrade project as no scope yet exists for such a project.

13.6 It seems that Syclo is a relatively small private company as compared to Sybase, an established large public-traded company. Please comment if TGI has taken into account risks of Syclo suspending its vendor support either due to run into financial distress (like the original vendor of MobileUp) or because of being acquired by another company that discontinues the Syclo's product offering in its existing form, in light of TGI's strategy of implementing package applications rather than maintaining the large in-house technical staff required to support custom developed applications.

Response:

The size of a company or whether it is private or public does not guarantee financial stability nor protection from acquisition. PeopleSoft and Siebel are two examples of large public companies that have changed ownership and made the future less certain. As discussed in response to Question 3.4, TGI has considered the longer-term viability of the company in its analysis, and based on information available today feels comfortable that Syclo will be a long-term player in this market. It is a risk to every customer of every software package and vendor that businesses are susceptible to the conditions of market and leadership of every company that they do business with. Terasen Gas is exploring the possibility of securing source code escrow with Syclo.

13.7 Has TGI considered migrating historical data from existing platforms to Syclo? Please also comment on the ease of data migration from Syclo to other software in case of Syclo suspending its vendor support due to circumstances described in 13.6.

Response:

Syclo does not store data, it is simply a conduit to move SAP R3 data to and from the field technicians. There is no requirement to move historical data into Syclo, nor is there a concept of later migrating Syclo data to another application as all the data is stored in SAP R3.

13.8 TGI notes that Syclo provides pre-defined base modules which would be easier for future product upgrades and evolution, while Sybase provides static TGI "specific solution that would not take advantage of ongoing product development" (p. 22). Please comment if the generality of Syclo's package application solution could compromise the sophistication required to meet TGI's ongoing specific operational requirements.

Response:

Syclo provides both pre-defined modules as well as a full development environment based on their Agentry platform (as opposed to Sybase which provides no pre-defined modules). It is Terasen Gas' preference to use standard "out-of-the-box" functionality wherever possible, however, customization can be done if it is determined a specific critical business requirement cannot be supported "out-of-the-box". TGI does not consider its business requirements to be significantly different than other distribution utilities, and so does not anticipate making major customizations to Syclo's product.

13.9 How will TGI's internal business processes have to change to accommodate the implementation of Syclo's package application solution?

Response:

TGI anticipates that the introduction of Syclo will allow the existing business processes to be changed in many positive ways. Many of the current processes have been designed to account for limitations with the existing technologies and the fact that there are multiple disparate technologies. The implementation of Syclo will eliminate such constraints.

A number of the business requirements used in the selection of Syclo were identified by the current users of Mobile SAP and MobileUP and reflect improvements they would like to see over the current applications.

13.10 Please name Syclo's customers in the electricity/natural gas distribution industry.

Response:

Some of Syclo's customers in the industry are:

- Scotia Gas, Scotland
- Texas Utilities
- Minnesota Power

There are other utility customers currently in the final stages of negotiation but can not be publicly identified at this time.

13.11 Given the uniqueness of work orders for Customer Services work, Construction work and Maintenance work, please explain how Syclo's solution could overcome the differences of 230 discrete work order types.

Response:

Our work consists of logical groups of work order types with similar process flows and information requirements. For example, the process flow for Preventative Maintenance work may have 13 different work types because of distinct characteristics such as type of customer, equipment, meter-set or station. Each of the work types would require discrete information to support and complete the work.

Syclo's solution supports

a) a standard process and status flows for each logical work group;

b) the display of appropriate information for different customer, equipment etc for the work order; and

c) the platform to capture maintenance data for the automated backend processing.

Fundamentally all work orders are the same – they identify a task to be performed at a certain place, at a certain time, by a certain individual – and they will all be managed the same way in SAP R3 (allowing for consistent back-end processes). The amount of additional data associated with each type of work does vary and Syclo will simply display the data provided in SAP – if the job contains the information, Syclo will display it.

The only real difference in processing the various work types is in the type and quantity of data required to be captured to complete the job. This will be handled through rules that define what completion forms are required to be filled out based on the job type in order for the technician to complete the order.

14.0 Reference: Section 2.4 Project Benefits, Costs and Customer Impacts and Final Choice of Options, p. 23-29

14.1 TGI indicates it intends to use ClickSchedule for all work types. Please comment on the feasibility and a budget estimate of using ClickSchedule for all work types at the present time without the need to launch and implement Syclo's SMART software.

Response:

There is no workable solution that would allow all work types to be scheduled in ClickSchedule while keeping the existing three disparate mobile technologies (MobileUP for Customer Service, SAP Mobile Asset Management for Construction, and emailed spreadsheets for Maintenance). ClickSchedule would not be able to take into account which technology a specific technician is utilizing at a given point in time (it assigns work based on an individual's skills, their availability, and other optimization criteria such as minimizing travel time). As a result, manual processes would be required to manage which technicians are using which field technology at all times and to then manually schedule them work that is supported by the technology they are currently using. This would eliminate ClickSchedule's ability to automate scheduling and to optimize the schedule.

The only alternative to using Syclo's SMART application would be to migrate all users to SAP Mobile Asset Management, however, limitations with the current synchronization method used by SAP Mobile Infrastructure make it unable to support Customer Service work. While SAP Mobile Infrastructure's current synchronization method supports the relatively static construction work (which is scheduled and dispatched a week prior to its due date) it does not support the highly dynamic nature of Customer Service. While SAP has announced plans to re-architect its Mobile Infrastructure product to support dynamic environments, it is our understanding that this new product will not be available and stabilized within the next 5 to 6 years. SAP also does not have an efficient method of packaging the messages over a wireless network which results in materially higher network costs. To utilize SAP, Terasen Gas would be required to heavily customize the application on their own or to contract the customization to SAP. The cost would be prohibitive (SAP current pricing structure charges out senior technicians in excess of USD $450/hr). It is unlikely that SAP would agree to support the application with the level of customization required. It is unclear if this issue would be addressed in the next generation.

14.2 TGI estimates the project will enable annual O&M savings of $350,000 through "improved optimization of field resources". Savings come from less time charged to O&M expense and additional capacity to do planned capital work, resulting in a reduction of work performed by contractors.

14.2.1 Please provide the breakdown of the $350,000 savings.

Response:

Optimization of field resources will enable annual O&M savings of $350,000, broken down as follows:

Since ClickSchedule will optimize schedules and Dispatchers and Resource Schedulers can better track job status and deploy Preventive Maintenance field employees as needed, we are estimating Preventive Maintenance Technicians can complete one additional 2.5 hr. job per week. (~$100,000)

Part of this efficiency will materialize by eliminating 1,500 duplicate second site visits each year as meter data would be visible on the Mobile Solution. (~$100,000)

Part of this efficiency gain will materialize from Dispatchers / Resource Schedulers having immediate visibility of idle time and waiting for work time and adjust works plans accordingly to further optimize field efficiencies. (~$100,000)

Part of the efficiency gain will come from automating timesheets. The current process results in over-coding to customer service O&M accounts as these are the default codes built into the timesheet process; the Mobile Up system data rarely agrees with the timesheet submission and results in an O&M reconciliation account which we foresee being eliminated once the timesheet is automated. The reconciliation account hours belong in customer service O&M accounts and Capital accounts. (~$50,000)

14.2.2 What are the anticipated Full-Time Equivalent (FTE) labor changes as a result of this project?

Response:

There are no FTE IBEW (field) labour changes (headcount reductions) as a result of this project. The equivalent of approximately 4 FTEs would move from performing O&M activities to Capital activities. Assuming a constant volume of Capital work, actual field work completed by the contractors would decline in the same proportion.

Administrative and support labor changes are anticipated to be a reduction of 3.75 FTE. Please also refer to the response to Questions 14.3 and 14.4 below for further details.

14.2.3 Please provide actual and estimated annual contractor hours and budget before and after the project implementation for the period 2007-2013.

Response:

The actual annual Contracting hours are not available to Terasen Gas as installation and operations (leak survey) contract pricing is negotiated on a per unit basis. For example, the price to install a new service may be priced at $1,000 / service. The contractor could work 6 to 20 person hours on the installation, but, regardless of time spent, is required to invoice based on the unit pricing agreements. They are not required to provide hours worked under the terms of their current contract.

In 2006, the percentage of New Services Capital work completed by Installation Contractors in TGI was 50%. The remaining 50% was completed by the Terasen Gas workforce.

With implementation of the Mobile Solution, it is expected, assuming the same volume of Capital work in 2008 as in 2006, that O&M efficiency gains would allow more Terasen Gas workforce to complete Capital work. In other words, the headcount would remain the same for the IBEW field resources; however, there would be a shift from O&M activities to Capital activities, which, if at the same level as 2006, would result in a decrease in activity completed by the Installation Contractors.

14.3 TGI estimates the project will enable the following annual O&M savings:

- $41,000 through "elimination of complex, duplicated and error prone resource management processes" (section 2.4.1.2);
- $58,000 through "elimination of manual data validation and entry" (section 2.4.1.4); and
- $57,500 through "elimination of time and costing data reconciliation" (section 2.4.1.5).

14.3.1 Please confirm the above stated savings are accretive (i.e. no overlaps between components).

Response:

The above stated savings are accretive.

Specifically benefits will be achieved (section 2.4.1.2) through Resource Scheduling and Dispatch efficiencies resulting in reduction of .75 FTE.

Benefits will be achieved (section 2.4.1.4) through elimination of manual data validation and entry tasks and reduction of 1 FTE position in the Closing group.

Benefits will be achieved (section 2.4.1.5) through reduction in manual effort for timesheet entry and should eliminate 1 FTE position in the Payroll group.

14.3.2 Please indicate if TGI plans to realize the above savings by reducing the number of administrative and supporting staff over the five years after the project implementation (i.e. 2008-2013).

Response:

TGI anticipates that it should be able to realize the above savings by reducing the number of administrative and supporting staff after implementation. Please refer to the Table in the response to Question 14.3.3.

14.3.3 Please provide the actual and forecast number of full-time equivalent (FTE) staff in administrative and supporting capacity within TGI's mobile workforce from 2006 (actual) to 2013. Identify and quantify the FTE reduction that will result from the implementation of the new distribution mobile solution.

Response:

Administrative Support Headcount

	2006	2007		2008 Q1,2		2008 Q3,4	2009 - 2013
Department	Actual	Actual (May 3, '07)	Plan	Plan	Less FTE Benefits	Plan	Plan
IRM	32.5	30	29	29	(.75)	28.25	28.25
Closing	21	21	22	22	(2.0)	20	20
Payroll	8	8	8	8	(1.0)	7	7
Total	61.5	59	59	59	(3.75)	55.25	55.25

14.4 TGI estimates the project will enable annual O&M savings of $42,000 through "replacing the current three systems…with a single consistent system" (section 2.4.1.3). Please identify the underpinning assumptions and calculations that derive the $42,000 annual O&M savings. Do the benefits herein overlap those benefits stated under section 2.4.1.1 and 2.4.1.2? Please explain.

Response:

The benefit description in section 2.4.1.3 does not accurately describe this $42,000 savings unfortunately. The savings are more attributable to section 2.4.1.4 "Elimination of Manual Data Validation and Entry". Specifically the savings will be derived from System Survey work processing efficiencies resulting in reduction one FTE. These savings are in addition to savings described under sections 2.4.1.1 and 2.4.1.2.

14.5 TGI estimates the project will enable annual O&M savings of $27,500 through "improved communication between Dispatch and the Field" (section 2.4.1.6). Please identify underpinning assumptions and calculations that derive the $27,500 annual O&M savings.

Response:

There was an error in the table provided in the Application. The description for section 2.4.1.6 should have referred to the reduction of costs associated with a stand alone working alone system. Functionality within the new system will monitor employees working alone who have a mobile device. The stand alone system will be retained for employees who do not have mobile computers (i.e. managers, planners, etc). The $27,500 estimated annual O&M savings was derived from the system costs based on approximately 150 technicians X $15 per month X 12 months. The revised table is included in the response to Question 14.6 below.

14.6 It appears section 2.4.1.9 – Improved Communication between Dispatch and the Field is a repeat of section 2.4.1.6. Please explain the difference why section 2.4.1.6 claims an annual saving of $27,500, while section 2.4.1.9 shows "unquantifiable benefits".

Response:

Please refer to the response to Question 14.5.

Please also note that an additional correction to the table under section 2.4.1.3 Field Resources is necessary for allocation clarification as the annual savings amount originally noted in the Application of $42,000 should have been stated as "unquantifiable" and contributes to the savings identified in section 2.4.1.1 Improved Optimization of Field Resources. Therefore, the $42,000 originally stated under section 2.4.1.3 was to have been added to 2.4.1.4 Elimination of Manual Data Validation and Entry bringing that amount to $100,000.

The revised table identifying the corrections highlighted is provided below.

Operating Benefit	**Annual Savings**
2.4.1.1 Improved Optimization of Field Resources	$350,000
2.4.1.2 Elimination of Complex, Duplicated, and Error Prone Resource Management Processes	$41,000
2.4.1.3 Field Resources Using a Single System	unquantifiable benefit
2.4.1.4 Elimination of Manual Data Validation and Entry	$100,000
2.4.1.5 Elimination of Time and Costing Data Reconciliation	$57,500
2.4.1.6 Reduction of user fee costs for stand alone Working Alone System	$27,500
2.4.1.7 Automation of Preventive Maintenance Processes	unquantifiable benefit
2.4.1.8 Access to Additional Data in the Field	unquantifiable benefit
2.4.1.9 Improved Communication between Dispatch and the Field	unquantifiable benefit
2.4.1.10 Simplification of Reporting	unquantifiable benefit
2.4.1.11 Stable and Supportable Systems	unquantifiable benefit
2.4.1.12 Enhanced Safety for Working Alone	unquantifiable benefit
2.4.1.13 Integrity Management Plan Audit Evidence	unquantifiable benefit

15.0 Reference: Section 2.4.2 Project Capital Expenditures, p. 27

On page 27 TGI states: "In the 2005 Annual Review, MobileUp is listed as a potential project with a capital cost of $2.0 million and again in the 2006 Annual Review, section 2.1.10 at a cost of $4.6 million."

15.1 Please explain how the cost has increased from $4.6 million to now $5.98 million.

Response:

The two major contributors to the cost increase is the failure of the pilot of the SAP mobile solution to provide the required technical stability and functionality that Terasen Gas required for the mobile component of the overall solution which necessitated the acquisition of another product and the decision by Terasen Gas management to implement the additional functional improvements that would drive the increased benefits.

15.2 Commission Order No. G-33-07 approved extension of the TGI 2006-2007 Negotiated Settlement Agreement Terms for 2008-2009. In the extension terms CPCN expenditures are excluded from the capital formula. Please explain and quantify the revenue requirements effect in 2009 of the change from inclusion of the project in Base Capital Expenditures compared to a CPCN capital expenditure.

Response:

There has not been a "change from inclusion of the project in Base Capital Expenditures compared to a CPCN capital expenditure" as stated in the question. Commission Order No. G-33-07 approved a two-year extension, for 2008 and 2009, of the Settlement Agreement for Terasen Gas' 2004-2007 Multi-Year Performance Based Rate Plan, which was approved in Commission Order No. G-51-03. As outlined on page 2 of Commission Order No. G-51-03, , the Commission stated, *"Although the Terasen Gas application included incentives on all capital additions, including CPCN's, the parties agree that CPCN applications should continue to be outside of the incentive formula and approved separately by the Commission.*" In Commission Order G-51-03 and G-33-07 the terms of the Settlement Agreement state *"CPCN's will not be filed for projects below $5 million"*. As a result, Terasen Gas has applied for CPCN approval for Capital Projects in excess of $5 million during the course of the 2004 – 2007 PBR Period. As the capital expenditures of this project are in excess of $5 million Terasen Gas has submitted a CPCN for Commission approval. Terasen Gas cannot change the terms of the Settlement Agreement to include this as base capital as implied in the question.

On a hypothetical basis, if this project did not meet the threshold criteria for a CPCN that was approved by the Commission in the respective Orders noted above, and included in

the Base Capital Expenditures, the revenue requirement for 2009 would be approximately $1,125,000 ($0.007/GJ) lower than what it is when included as a CPCN. This difference in revenue requirement would decrease over 2010 and 2011. This revenue requirement impact translates into a minimal earnings difference of approximately $112,000 in 2008, which is eliminated in 2010 and 2011. The results are set out in the following tables, the last table being a summary of the revenue requirement and earnings differences between the two treatments.. .

TERASEN GAS INC.
REVENUE REQUIREMENT IMPACT
FROM TGI DISTRIBUTION MOBILE SOLUTION CPCN
($000's)

Capital Expenditures from Appendix A, Page 40 of the Application

	2006					2007				
Particulars	Direct	2006 Spend thru Contingency	AFUDC	Total	TGI Portion @ 90%	Direct	2006 Spend thru Contingency	AFUDC	Total	TGI Portion @ 90%
Computer Hardware	$ -	$ -	$ -	$ -	$ -	$ 150.0	$ -	$ -	$ 150.0	$ 135.0
Computer Software	-	256.0	-	256.0	230.4	568.4	1,780.1	56.6	2,405.1	2,164.6
2006 Spend	256.0					-				
Internal Labour	-					337.3				
Consulting	-					1,219.7				
Expenses	-					144.1				
Contingency	-					79.0				
AFUDC	-					56.6				
Total	$ 256.0	$ 256.0	$ -	$ 256.0	$ 230.4	$2,555.1	$ 1,780.1	$ 56.6	$2,555.1	$2,299.6

2006 - 2008 expenditures are not included in the Rate Base / Revenue Requirements for 2006 - 2008 as the project does not enter service until August 31, 2008; but the costs are included in opening balance of 2009.

TERASEN GAS INC.
REVENUE REQUIREMENT IMPACT
FROM TGI DISTRIBUTION MOBILE SOLUTION CPCN
($000's)

Capital Expenditures from Appendix A, Page 40 of the Application

2008						
Direct	2006 Spend thru Contingency	AFUDC	Total	TGI Portion @ 90%	Total Project Cost	TGI Portion @ 90%
$ 162.0	$ -	$ -	$ 162.0	$ 145.8	$ 312.0	$ 280.8
23.1	2,705.9	261.7	2,990.7	2,691.6	5,651.8	5,086.6
-						
379.8						
1,718.5						
291.7						
315.9						
261.7						
$ 3,152.7	$ 2,705.9	$ 261.7	$ 3,152.7	$ 2,837.4	$5,963.8	$ 5,367.4

	Gas Plant In Service		Accumulated Dep'n		Rate Base Impact
Rate Base / Cost of Service Impact for 2009	2006 - 2008 CPCN Expend.	Mid-Year	Provision	Mid-Year	
Computer Hardware	$ 281	$ 281	$ (35)	$ (18)	$ 263
Computer Software	5,087	5,087	$ (636)	$ (318)	4,769
CIAOC - Computer Softward	(1,640)	(1,234)	103	52	(1,182)
Total	$ 3,727	$ 4,134	$ (568)	$ (284)	$ 3,850
Revenue Requirement Impact					
Capital Structure & Rate of Return for 2007					
Short Term Debt		5.60%	4.750%	0.266%	$ 10
Long Term Debt		59.39%	7.020%	4.169%	161
Common Equity		35.01%	8.370%	2.930%	113
Total / Earned Return		100.00%		7.366%	284
Net Operating & Maintenance Expenses Savings					
Depreciation Expense					568
Income Tax Expense					274
Total Incremental Revenue Requirement Impact					$ 1,125
Total Forecast Non-Bypass Sales & Transport Volume 2007 (TJ) [1]					164,571.2
Incremental Impact / GJ					$ 0.007

1 2006 Annual Review - Advanced Materials, Section A, Tab 4, Page 14, Column 3, Line 37.

TERASEN GAS INC.
COMPARISON OF REVENUE REQUIREMENT AND RETURN ON EQUITY
CPCN VS OTHER BASE CAPITAL EXPENDITURE

Particulars	2007	2008	2009	2010	2011	Total
Revenue Requirement						
CPCN	$ -	$ -	$ 1,125	$ 469	$ 439	$ 2,034
Other Base Capital Expenditure	0	(0)	2	194	273	468
Difference	$ (0)	$ 0	$ 1,123	$ 275	$ 167	$ 1,565
Total Forecast Non-Bypass Sales & Transport Volume 2006 (TJ) [1]	164,571.2	164,571.2	164,571.2	164,571.2	164,571.2	493,713.6
Difference / GJ	$ (0.000)	$ 0.000	$ 0.007	$ 0.002	$ 0.001	$ 0.003

2006 Annual Review - Advanced Materials, Section A, Tab 4, Page 14, Column 3, Line 37.

Return on Equity					
CPCN	$ -	$ -	$ 112.8	$ 85.8	$ 72.1
Other Base Capital Expenditure	0.0	(0.0)	0.7	98.6	70.8
Difference	$ (0.0)	$ 0.0	$ 112.1	$ (12.9)	$ 1.3

16.0 Reference: Section 2.4.2 Project Capital Expenditures, p. 28

On page 28 it states: "Consistent with Order No. G-112-04, where 10% of the Terasen Gas SAP related costs were allocated to TGVI, the Company proposes that the same 10% proportional allocation of all costs for the Distribution Mobile Solution be used."

16.1 Should Terasen Gas (Vancouver Island) Inc. ("TGVI") in this Application be requesting to add 10% of the project costs into its rate base?

Response:

Terasen Gas has made the application for a CPCN for the Distribution Mobile Solution as per Order No. G-33-07, approving the Company's two-year extension of the Multi-Year PBR Agreement, which requires the Company to submit a CPCN application for capital expenditures in excess of $5 million.

As this application was made by Terasen Gas. TGVI's allocation of the Capital Expenditure would be less than $600,000 and thus does not require TGVI to apply for a CPCN.

17.0 Reference: Section 2.4.3 Revenue Requirement Impact, p. 28

On page 28 it states: "Revenue Requirements are expected to increase marginally with the implementation of this project."

17.1 What would be the Revenue Requirement Impact of Option 2 Continued Use of the Current Solution with minimal further investment?

Response:

The Company is of the view that it is currently making the minimum amount of investment necessary to maintain the Current System.

Given the state of the Current System, investment beyond the minimum required to maintain it would not be in the public interest or in the interest of Terasen Gas.

The incremental Revenue Requirement associated with continuing to use the Current Solution with minimal further investment is the current situation as described in Section 2.3. and characterized as a "do nothing scenario". The implications of "do nothing" forces the continued exposure of TGI to the risk of system failure without the ability to recover and to be unable to achieve any process improvements or the benefits outlined.. This would force TGI into the manual scenario until such time as the proposed replacement solution could be re-planned, renegotiated with all the appropriate vendors, resubmitted for approvals and executed at what would be a higher cost than is presently being requested.

Although a detailed analysis of the total impacts of reverting to manual processes was not undertaken, the benefits the Company has already achieved through automation would not be sustainable with the use of manual processes. It is estimated that at a minimum 10 additional office staff and 6 additional field staff would be required at a cost of $1.1 million per year, in current dollars. Increases in non-labour operating costs such as additional use of cellular, radio, fax and paper would total approximately $200,000 per year. The total increase would be somewhat offset by a reduction in technology licensing and support costs of $270,000 for a total net cost increase of approximately $1.03 million per year. In addition, future operating expense savings would not be attainable. The Company is also concerned that this approach could compromise its ability to meet its SQI targets.

The "minimal investment" that Terasen would consider to be prudent is to replace the existing system with the new solution to provide "like for like" functionality, reducing the scope of the proposed solution. The incremental revenue requirement are identified in the response to 17.2

17.1.1 Please discuss the operational and financial impact of continuing the current system for another one or two years.

Response:

TGI does not see any advantage to continuing with the current situation for another one or two years. There is nothing to be gained by deferring the decision at the risk of increasing the window of exposure to system supportability issues if what will be implemented at the end of the deferral period would be the same.

From both an operational and financial perspective, deferral would be lost opportunity costs of the identified benefits and the increased lost productivity and efficiencies that come with the unplanned outages. Terasen Gas would also stand to lose the concessions it has gained from the vendors with regards to pricing and commitment of resources.

The end result is that Terasen Gas would be exposed to major business risk, lose up to the two years of $576,000 quantified annual benefit as well as the non-quantifiable efficiencies outlined in the benefits discussion (as would the customer), and would still require the recommended changes at what would be a greater cost.

17.2 What would be the Revenue Requirement Impact of Option 2 Continued Use of the Current Solution with further investment to maintain the current system?

Response:

Terasen Gas is of the view that it cannot use the current solution and invest in it further as suggested. See response to IR No. 17.1.1.

The option of simply replacing the current system with a like for like replacement would involve capital expenditures of approximately $4.6 million. Under this scenario the quantifiable and un-quantified benefits associated with the proposed solution would not be possible.

The Revenue Requirement Impact of a like for like replacement option is estimated as follows:

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Option 2 Revenue Requirement	$ 859	$ 693	$ 658	$ 629	$ 599	$ 569	$ 538	$ 506	$ 475

18.0 Reference: Section 3.1 Project Schedule, p. 30

18.1 On April 19, 2007 TGI met with Commission staff and provided notice of TGI's planned imminent filing of this CPCN Application, probably in the following week of April 22-27. TGI requested an expeditious review by the Commission to be concluded by the end of June 2007. However, the Commission has not received this CPCN Application which was dated May 7, 2007 until the end of the day on Thursday May 10, 2007.

18.1.1 Please indicate the reasons for TGI's filing delay with the knowledge of a very tight timeline for an expedited Commission review requested by TGI. Also provide costs associated with this delay.

Response:

TGI took the time necessary to incorporate the valuable feedback received from Commission staff on April 19, 2007 in order to ensure a more thorough application.

There are no additional costs associated with filing the Distribution Mobile Solution on May 19, 2007 versus April 27, 2007.

18.1.2 TGI indicates that "if work does not commence by the first week of July 2007, the Company believes that the Project schedule as outlined will be unattainable and the Project costs will rise" (section 3.2.3). Please identify current contracts and commitments that would be impacted if the approval of this CPCN Application is delayed beyond June 30, 2007. Provide an estimate of project cost increases accordingly.

Response:

Terasen Gas currently has negotiated fixed price contracts for software, services and expenses that are predicated on start and completion dates with Syclo and Clicksoftware. It also has a similar contract duration with R-Tech Technologies. The cost increase is dependent upon the delay. The project is organized in phases that optimize the resources to work on the project as well as to support the stabilization of the rollout to the field to ensure a smooth transition to production support and to be best equipped to be fully stable prior to heavy volume construction and customer service seasons. Any material delay jeopardizes the optimization of the sequence and runs the risk that the vendors will be unable to slide their schedules to accommodate Terasen Gas at the risk of not being able to commit to other projects after Terasen Gas'.

18.1.3 Please provide reasons why TGI could not file this CPCN Application earlier in the year (e.g. in March 2007), which would allow for an orderly (as compared to expeditious) review and approval process by the Commission.

Response:

On February 26,2007, Fortis Inc. ("Fortis") announced it had entered into an agreement with Kinder Morgan Inc. to acquire Terasen Inc. On March 1, 2007 Fortis applied for an Order approving the acquisition of all of the issued and outstanding shares of Terasen Inc., which was approved on April 30,2007, by Commission Order No. G-49-07.

Terasen Gas felt it prudent to delay any filings with the Commission until a decision was reached in the acquisition application, which would allow the Company to consider the implications of the acquisition Order No. G-49-07 and allow Fortis the opportunity to review the Distribution Mobile Solution CPCN.

TGI applies a tremendous amount of effort and due diligence in filing its CPCN Applications while considering the regulatory workload of both its employees and Commission staff. In March 2007, along with the acquisition application being outstanding, TGI had not yet completed the Commission Staff consultation and due diligence that it felt was necessary to ensure a complete application.

The Company believes the Regulatory Timetable for the written proceeding of Terasen Gas' Distribution Mobile Solution CPCN Application as outlined by Commission Order G-54-07 is both reasonable and appropriate for the review of an application of this nature.

19.0 Reference: Section 3.2.2 Employee & Process Risk, p. 31

TGI expects that there will be significant process changes that will affect the resourcing and dispatching group.

19.1 Please elaborate on the change management efforts, work process changes, and the training for the resourcing and dispatching group.

Response:

The primary changes to the resourcing and dispatch group revolve around scheduling automation and organizational structure changes to support all work types and resources. Implementing ClickSchedule technology for all work and resources will take care of the majority of daily dispatching decisions and the roles will change from deciding who does what and when, to only managing exceptions (emergency work, appointments missed, tech calls in sick etc.). As well increased emphasis will be placed on forward planning to ensure that gaps in future day's schedules are addressed. As ClickSchedule is already used by many of the employees for construction work and resources the system training is expected to be straight forward. Estimate 1-3 days of systems and process training dependant on current experience. Change management, coaching and support will have emphasis on business process requirements and "letting go" of tasks now automated.

Described below are the Change Management objectives and deliverables.

Objectives

- People and organization will be aligned with the new business model and process;
- Individual roles and accountabilities will be clearly defined and understood. Key stakeholders impacted by the change (change targets) will be engaged and accepting the change;
- Change agents will actively support program objectives to "sustainment" phase Union Executives will buy-in to the change ;
- Sufficient knowledge will have been developed to support adoption of the change;
- Business user community will endorse and accept deployment of the change;
- Transition phase to sustainment will be actively managed and problems effectively mitigated; and
- Employees will be supported and coached through transition.

Deliverables

- Stakeholder Analysis;
- Impact to Stakeholder Assessment;
- Change Management Plan;
- Business Advisory Team acceptance Criteria;

- Communications Strategy & Tactical Plan;
- Communication tactics (i.e. Bulletins, Q&A, Workshops etc.);
- Communications Log;
- Readiness for Change Assessment (Go-No Go Decision Input);
- Post Implementation Review Assessment / Transition Log; and
- Project Close Report (Transition to Sustainment Recommendations).

19.2 Please describe the action plan for the switchover, implementation, and stabilization of the new system.

Response:

Detailed cut-over, implementation and stabilization plans will not take place until late in 2007. Elements of those plans will include:

- Detailed plans for distribution and implementation of hardware;
- Detailed end user training plans, schedules and materials;
- Detailed cutover plans for live production data to the new applications;
- Identification of stabilization team and support plans for users; and
- Utilization of standard gate keeper process to ensure all critical readiness activities are in place prior to go live.

20.0 Reference: Section 3.2.3 Budget & System Failure Risk, p. 31

20.1 If Commission approval was granted as anticipated in the Application's timeline what is the risk and probability of the project costing more than the $5,984,267?

Response:

Terasen Gas has already completed a tremendous amount of work to ensure clarity of scope and to have negotiated fixed-price agreements with the key vendors. Terasen Gas has consistently met its budget targets with CPCN IT-oriented projects and has well established and experienced project management skills and disciplines in place. Terasen Gas considers the risk and probability of the project exceeding the proposed budget to be low assuming approval in line with the request.

20.2 TGI mentions Click Software has completed two sets of onsite requirements workshops. Please elaborate on the requirements and the role and use of Click Software in relation to the project.

Response:

ClickSoftware are the application developers and implementation experts of the Click Schedule application. Their key role is to translate the Terasen Gas requirements into system functionality, implement the functionality through configuration and customization activities, install the solution in Terasen Gas' development, testing, training and production environments, support the testing and implementation phases of the project and provide assistance in the stabilization of their system after go-live and the transition ongoing support to the appropriate parties.

21.0 Reference: Section 3.9 Conclusion, p. 35-36

21.1 TGI notes that it has performed an appropriate level of analysis in determining which option and alternative best meet its needs and has vetted those with an impartial third-party consultant. Please identify the "impartial third-party consultant", describe the process of vetting, and provide the consultant's findings and conclusions.

Response:

The "third-party consultant" was Gartner, Inc. The documents have been provided in the response to Question 1.1, however the discussions were not recorded.

21.2 Please describe internal project approval process and identify executive sponsor for this project. Report the current status of internal approval for this project.

Response:

The executive sponsor for this project is Dwain Bell, Vice President of Distribution.

The internal project approval process is as follows:

The Business Unit prepared a short concept document for the project in order to obtain funding to engage outside resources as required to complete the requirements definition and full business case. Following this, the business case was completed and presented to the IT Governance group, a committee of senior business managers. Once recommended by this group, it was presented to the Capital Steering Committee, made up of all of the Terasen Gas Vice Presidents. Once approved, it was presented to the President of Terasen Gas for approval. This process is generally followed for all significant capital projects.

At the point in time that the project was presented for final approval, the announcement of the acquisition of Terasen Inc. by Fortis Inc. was made. Given that it was a pending deal, the project was presented to both the Office of the Chairman of Kinder Morgan, Inc. as well as Fortis Inc. Both approved the project and approved the submission of the CPCN to the Commission. The current status is that all internal executives have approved the project.

21.3 Please provide a complete business case, Project Charter and other project submissions required for the approval of TGI senior management and executive sponsor.

Response:

In Attachment 21.3 please find a redacted version of the Business Case as certain comments attributable to Gartner, Inc. are commercially sensitive in nature. Also included in Attachment 21.3 are the Project Charter and a presentation slide made to the executives of both Kinder Morgan, Inc. and Fortis Inc.

21.4 Utilities usually undertakes a post-implementation review ("PIR") 6-12 months after a project is completed to confirm if the project has been executed according to the plan, its objectives have been met and expected benefits have been realized. Does TGI have a similar post-implementation review process in place? Please describe TGI's review process and methodology for post-implementation project performance evaluation.

Response:

Post-implementation reviews are not a standard practice across the utility industry for all projects. Terasen Gas does not perform formal PIR's for every project. In cases where it feels it is appropriate or required, Terasen Gas will have a self-assessment done by the project management team focusing on lessons learned and opportunities for improvements to processes. In cases where a formal PIR is required, Internal Audit would perform the review through a series of interviews with the various stakeholders, a review of the project documentation and financials and provide a written report to Senior Management. Senior Management would then determine if further review of the findings was required.

22.0 Reference: Appendix A: Financials, p. 38

22.1 Please provide the amounts of O&M expenses by activity (e.g. change management efforts, user training expenses, etc.) for this project during its implementation phase.

Response:

Terasen has budgeted $120,000 for the initial development of training material and cost for training logistics. While a detailed plan does not yet exist, the categories that would be covered under this would be:

- Travel expenses as per company policy;
- Facilities costs (classrooms with equipment, snacks, water, etc);
- Training materials (binders, paper, copying, etc); and
- Admin help with training material preparation and development.

Costs that are not included in the project costs would be:

- Labour charges for training attendees or trainers who are not backfilled; and
- Ongoing maintenance of training material.

22.2 Please provide the supporting schedules for the Income Tax and ROE calculation for TGI and TGVI.

Response:

TGI REVENUE REQUIREMENT

in thousands of $	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Operating & maintenance	-	-	-	(436.1)	(436.1)	(436.1)	(436.1)	(436.1)	(436.1)	(436.1)	(436.1)
Depreciation & amortization	-	-	574.9	478.9	466.9	453.3	439.7	426.1	412.5	398.9	(214.6)
Interest	-	-	166.0	125.5	101.2	77.1	53.6	30.7	8.4	(13.6)	(22.4)
Income tax	-	(29.7)	278.6	253.7	240.1	232.5	222.3	210.9	198.8	185.6	(91.2)
ROE	-	-	115.1	87.0	70.1	53.4	37.2	21.3	5.8	(9.4)	(15.5)
Incremental Revenue Requirement	-	(30)	1,135	509	442	380	317	253	189	125	(780)

INCOME TAXES

Income taxes for revenue requirement

Depreciation & amortization	-	-	574.9	478.9	466.9	453.3	439.7	426.1	412.5	398.9	(214.6)
CCA	-	(63.2)	(97.9)	(53.9)	(29.6)	(16.3)	(9.0)	(4.9)	(2.7)	(3.3)	-
Income Tax Overhead Exp.	-	-	-	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
ROE	-	-	115.1	87.0	70.1	53.4	37.2	21.3	5.8	(9.4)	(15.5)
Subtotal	-	(63.2)	592.1	539.0	534.4	517.4	494.9	469.4	442.6	413.1	(203.1)
Tax rate / (1 - tax rate)	47%	47%	47%	47%	45%	45%	45%	45%	45%	45%	45%
Income tax	-	(29.7)	278.6	253.7	240.1	232.5	222.3	210.9	198.8	185.6	(91.2)

TGVI REVENUE REQUIREMENT

in thousands of $	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Operating & maintenance	-	-	-	(48.5)	(48.5)	(48.5)	(48.5)	(48.5)	(48.5)	(48.5)	(48.5)
Depreciation & amortization	-	-	63.9	53.2	51.9	50.4	48.9	47.3	45.8	44.3	(23.8)
Interest	-	-	13.1	9.9	8.0	6.1	4.2	2.4	0.7	(1.1)	(1.8)
Income tax	-	(3.3)	32.4	29.3	27.5	26.5	25.1	23.7	22.2	20.5	(10.3)
ROE	-	-	15.8	12.0	9.6	7.4	5.1	2.9	0.8	(1.3)	(2.1)
Incremental Revenue Requirement	-	(3)	125	56	49	42	35	28	21	14	(87)

TGVI INCOME TAXES

Income taxes for revenue requirement

Depreciation & amortization	-	-	63.9	53.2	51.9	50.4	48.9	47.3	45.8	44.3	(23.8)
CCA	-	(7.0)	(10.9)	(6.0)	(3.3)	(1.8)	(1.0)	(0.5)	(0.3)	(0.4)	-
Income Tax Overhead Exp.	-	-	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
ROE	-	-	15.8	12.0	9.6	7.4	5.1	2.9	0.8	(1.3)	(2.1)
Subtotal	-	(7.0)	68.8	62.2	61.2	58.9	56.0	52.7	49.3	45.7	(23.0)
Tax rate / (1 - tax rate)	47%	47%	47%	47%	45%	45%	45%	45%	45%	45%	45%
Income tax	-	(3.3)	32.4	29.3	27.5	26.5	25.1	23.7	22.2	20.5	(10.3)

22.3 Please provide a fully functional spreadsheet that calculates the financials in Appendix A.

Response:

Please find attached with this submission the electronic, fully functional spreadsheet that calculates the financials in Appendix A.

23.0 Reference: Appendix A: Financials, p. 38

Commission Order No. G-34-07 approved the TGVI 2006-2007 Negotiated Settlement Terms for 2008-2009. The Order approved fixed OM&A expense as indicated in Table #1 on page 12.

23.1 Since the TGVI OM&A is fixed for 2007, 2008 and 2009, should the TGVI Revenue Requirement Operating & Maintenance savings on page 38 be zero for 2008 and 2009?

Response:

Yes, a revised Appendix A and Table 2.4.3 is included in response the response to Question 26.6.

23.2 Since the TGVI OM&A is fixed, and there is expected OM&A savings for 2008 and 2009 should the provision for taxes be higher to cover the higher income tax payable if the OM&A savings were realized?

Response:

Yes, a revised Appendix A and Table 2.4.3 is included in response the response to Question 26.6.

24.0 Reference: Appendix A: Financials, p. 39

24.1 Page 39 shows the TGVI and TGVI Contribution and Grants. Please explain the nature of the contribution and grants and how they were calculated. What is the amortization rate?

Response:

The Contribution and Grants amount results from the BCUC Order No.G-99-95 directing Terasen Gas to remove the full effect of tax savings from software capital projects and depreciate the tax savings at the same rate as the asset, in this case 8 years. This treatment reduces the revenue requirement volatility created by high CCA rates for software.

25.0 Reference: Appendix A: Financials, p. 40

25.1 Page 40 shows the accumulated depreciation for TGI and TGVI. Please provide the TVGI supporting schedule for depreciation. What is the life of the asset and the depreciation rate?

Response:

The asset life and depreciation rate for accounting purposes are 8 years and 12.5% respectively. A revised Appendix A and Table 2.4.3 is included in response the response to Question 26.6. The TGVI schedule is as follows:

TGVI	**CCA**	in thousands $		**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
	Opening	Class 12			-	267	-	(5)	(5)	(5)	(5)	(5)	(5)	-
	Additions			-	533	-	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
	CCA	Rate	100.0%	-	(267)	(267)	5	9	9	9	9	9	14	9
	Ending			-	267	-	(5)	(5)	(5)	(5)	(5)	(5)	-	-
	Opening	Class 45			-	24	13	7	4	2	1	1	0	-
	Additions			-	31	-	-	-	-	-	-	-	-	-
	CCA	Rate	45.0%	-	(7)	(11)	(6)	(3)	(2)	(1)	(1)	(0)	(0)	-
	Ending			-	24	13	7	4	2	1	1	0	-	-
Total	in thousands $													
	Opening			-	-	291	13	3	(1)	(2)	(3)	(4)	(4)	-
	Additions			-	565	-	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
	CCA			-	(7)	(11)	(6)	(3)	(2)	(1)	(1)	(0)	(0)	-
	Ending			-	558	280	(2)	(10)	(12)	(13)	(13)	(13)	(14)	(9)

TGVI	**ACCUMULATED DEPRECIATION**			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Opening	Software		-	-	-	(71)	(141)	(211)	(279)	(346)	(412)	(477)	(541)
	Depreciation	12.5%		-	-	(71)	(71)	(69)	(68)	(67)	(66)	(65)	(64)	
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(71)	(141)	(211)	(279)	(346)	(412)	(477)	(541)	(541)
	Opening	Hardware		-	-	-	(4)	(8)	(12)	(16)	(20)	(23)	(27)	(31)
	Depreciation	12.5%		-	-	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(4)	(8)	(12)	(16)	(20)	(23)	(27)	(31)	(31)
	Total													
	Opening			-	-	-	(75)	(149)	(222)	(295)	(366)	(436)	(505)	(572)
	Depreciation			-	-	(75)	(75)	(73)	(72)	(71)	(70)	(69)	(68)	-
	Retirement costs			-	-	-	-	-	-	-	-	-	-	-
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(75)	(149)	(222)	(295)	(366)	(436)	(505)	(572)	(572)

25.2 Should the year 2017 accumulated depreciation for TGI be ($5,367.4) instead of ($6,038.3)? Should the year 2017 accumulated depreciation for TGVI be ($596.4) instead of ($670.9)?

Response:

Yes, a revised Appendix A is included in response to Question 26.6.

25.3 Please show the supporting amortization of the contribution and grants schedule and the capital additions schedule for TGI and TGVI.

Response:

The TGI and TGVI amortization of capital additions and contribution and grants is as follows:

TGI ACCUMULATED DEPRECIATION		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening	Software	-	-	-	(636)	(1,272)	(1,897)	(2,512)	(3,117)	(3,711)	(4,295)	(4,869)
Depreciation	12.5%	-	-	(636)	(636)	(625)	(615)	(605)	(594)	(584)	(574)	-
Retirements		-	-	-	-	-	-	-	-	-	-	-
Ending		-	-	(636)	(1,272)	(1,897)	(2,512)	(3,117)	(3,711)	(4,295)	(4,869)	(4,869)
Opening	Hardware	-	-	-	(35)	(70)	(105)	(140)	(176)	(211)	(246)	(281)
Depreciation	12.5%	-	-	(35)	(35)	(35)	(35)	(35)	(35)	(35)	(35)	-
Retirements		-	-	-	-	-	-	-	-	-	-	-
Ending		-	-	(35)	(70)	(105)	(140)	(176)	(211)	(246)	(281)	(281)

TGVI ACCUMULATED DEPRECIATION		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening	Software	-	-	-	(71)	(141)	(211)	(279)	(346)	(412)	(477)	(541)
Depreciation	12.5%	-	-	(71)	(71)	(69)	(68)	(67)	(66)	(65)	(64)	
Retirements		-	-	-	-	-	-	-	-	-	-	-
Ending		-	-	(71)	(141)	(211)	(279)	(346)	(412)	(477)	(541)	(541)
Opening	Hardware	-	-	-	(4)	(8)	(12)	(16)	(20)	(23)	(27)	(31)
Depreciation	12.5%	-	-	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
Retirements		-	-	-	-	-	-	-	-	-	-	-
Ending		-	-	(4)	(8)	(12)	(16)	(20)	(23)	(27)	(31)	(31)

TGI CONTRIBUTION & GRANTS
in thousands $

TGI ACCUMULATED AMORTIZATION		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening		-	-	-	96.0	288.0	481.7	678.6	878.7	1,082.0	1,288.5	1,498.3
Depreciation	12.5%	-	-	96.0	192.0	193.7	196.9	200.1	203.3	206.5	209.8	214.6
Retirements												
Ending		-	-	96.0	288.0	481.7	678.6	878.7	1,082.0	1,288.5	1,498.3	1,712.9
TGI NET CONTRIBUTION & GRANTS		-	(768.0)	(1,440.1)	(1,261.3)	(1,093.4)	(922.3)	(747.9)	(570.4)	(389.6)	(218.4)	(29.6)

TGVI CONTRIBUTION & GRANTS
in thousands $

TGVI ACCUMULATED AMORTIZATION		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening		-	-	-	10.7	32.0	53.5	75.4	97.6	120.2	143.2	166.5
Depreciation	12.5%	-	-	10.7	21.3	21.5	21.9	22.2	22.6	22.9	23.3	23.8
Retirements												
Ending		-	-	10.7	32.0	53.5	75.4	97.6	120.2	143.2	166.5	190.3
TGVI NET CONTRIBUTION & GRANTS		-	(85.3)	(160.0)	(140.1)	(121.5)	(102.5)	(83.1)	(63.4)	(43.3)	(24.3)	(3.3)

25.4 How is "Rate Base (opening)" calculated? Should it be labeled "Rate Base (mid-year)"?

Response:

"Rate Base (opening)" should be labeled "Rate Base (mid-year)" and is calculated as follows: Rate base is calculated by dividing by 2, the sum of Prior Year Rate Base at end of the period plus Current Year Rate Base at the end of the period.

26.0 Reference: Application, Appendix A: Financials, p. 41

Page 41 shows TGI CCA additions of $4.8 million for Class 12 and $0.281 million for Class 45.

26.1 What costs are included in Class 45 general-purpose electronic data processing equipment?

Response:

Hardware costs associated with the Distribution Mobile Solution are included in CCA Class 45. The $281,000 represents 90% of the total hardware costs with the balance of $31,000 reflected in TGVI's CCA Class 45 for a total hardware cost of $312,000.

Hardware costs required to implement the Distribution Mobile Solution are as follows:

Hardware	
6 new Servers	$150,000
PC related Hardware	
Handheld devices	51,360
Docking stations	77,040
Installation	33,600
Total Hardware	**$312,000**

26.2 Reconcile the total CCA additions of $5.081 million to the total project cost of $5,984,267 shown in Table 2.4.2 on page 28.

Response:

$5,984,267	Total capital expenditure requirements per table 2.4.2
338,732	LESS: AFUDC
5,645,535	Total capital expenditure before AFUDC
90.00%	Multiplied by: TGI allocation
$ 5,080,982	Total TGI CCA additions

Please also refer to the response to Question 2.6, showing revised AFUDC.

26.3 The TGVI CCA and Accumulated Depreciation schedule has not been included. Please provide the TGVI schedules.

Response:

The TGVI schedules follow:

TGVI	**CCA**	in thousands $		**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
	Opening	Class 12			-	267	-	(5)	(5)	(5)	(5)	(5)	(5)	-
	Additions			-	533	-	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
	CCA	Rate	100.0%	-	(267)	(267)	5	9	9	9	9	9	14	9
	Ending			-	267	-	(5)	(5)	(5)	(5)	(5)	(5)	-	-
	Opening	Class 45			-	24	13	7	4	2	1	1	0	-
	Additions			-	31	-	-	-	-	-	-	-	-	-
	CCA	Rate	45.0%	-	(7)	(11)	(6)	(3)	(2)	(1)	(1)	(0)	(0)	-
	Ending			-	24	13	7	4	2	1	1	0	-	-
Total		in thousands $												
	Opening			-	-	291	13	3	(1)	(2)	(3)	(4)	(4)	-
	Additions			-	565	-	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
	CCA			-	(7)	(11)	(6)	(3)	(2)	(1)	(1)	(0)	(0)	-
	Ending			-	558	280	(2)	(10)	(12)	(13)	(13)	(13)	(14)	(9)

TGVI	**ACCUMULATED DEPRECIATION**			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Opening	Software		-	-	-	(71)	(141)	(211)	(279)	(346)	(412)	(477)	(541)
	Depreciation	12.5%		-	-	(71)	(71)	(69)	(68)	(67)	(66)	(65)	(64)	
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(71)	(141)	(211)	(279)	(346)	(412)	(477)	(541)	(541)
	Opening	Hardware		-	-	-	(4)	(8)	(12)	(16)	(20)	(23)	(27)	(31)
	Depreciation	12.5%		-	-	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(4)	(8)	(12)	(16)	(20)	(23)	(27)	(31)	(31)
	Total													
	Opening			-	-	-	(75)	(149)	(222)	(295)	(366)	(436)	(505)	(572)
	Depreciation			-	-	(75)	(75)	(73)	(72)	(71)	(70)	(69)	(68)	-
	Retirement costs			-	-	-	-	-	-	-	-	-	-	-
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(75)	(149)	(222)	(295)	(366)	(436)	(505)	(572)	(572)

26.4 A comparison between Figure 2.2.3: Current State Technology (page 13) and Figure 2.3.1: Future State Technology Solution (page 22) suggests that a number of assets (for example, MobileUp, Mobile Gaterway, SAP Mobile Infrastructure, SAP Mobile Asset Management, etc) will be replaced and retired as a result of this project. Please identify all the assets that are to be retired and the expected retirement date.

Response:

Terasen Gas intends to re-utilize as much as possible through this project. The MobileUp application and supporting servers will be retired. The Mobile SAP components are not individual assets but components of the overall application. The overall application will continue to be used. The expected retirement date, assuming the requested start date, is expected to be May 31, 2008.

26.4.1 For these assets, identify in a schedule the in-service date, gross capital additions, expected life, and depreciation rate.

Response:

Assets referenced in the response to Question 26.4 have the following in-service date, gross capital additions, expected life and depreciation rate:

Asset	In Service Date	Asset description	Gross Capital Addition	Expected Life	Depreciation Rate
10016486	5/1/2001	Integrated Resource Management- Hardware	$ 975,844	5years	20%
10016486	5/1/2001	Integrated Resource Management- Hardware	774,143	5years	20%
10016486	5/1/2001	Integrated Resource Management- Hardware	705	5years	20%
Asset class 48310		**GP Computer H/W Expected Life 5 years Depn Rate 20%**	**1,750,691**		
10016487	5/1/2001	Intergrated Resource Mgmt	3,054,721	8 years	12.5%
10016487	5/1/2001	Intergrated Resource Mgmt	722,599	8 years	12.5%
10016487	5/1/2001	Intergrated Resource Mgmt	140,506	8 years	12.5%
Asset class 48320		**GP Computer S/W Expected Life 8 years Depn Rate 12.5%**	**3,917,826**		
10014076	5/1/2001	Telephone Communications Equipment	10,131	20 years	5%
10014076	5/1/2001	Telephone Communications Equipment	2,470	20 years	5%
Asset class 48810		**GP Telephone Equip Expected Life 20 years Depn Rate 5%**	**12,601**		
Grand Total			**$ 5,668,517**		

26.4.2 For these assets, please provide the gross plant, accumulated depreciation, and the net book value as of January 1, 2004.

Response:

Assets referenced in the response to Question 26.4 have the following gross plan, accumulated depreciation and net book value as of January 1, 2004.

			Balances as at December 31, 2003/Jan 1, 2004		
Asset	Asset description		Acquisition Value	Accumulated Depreciation	Book value
10016486	Integrated Resource Management- Hardware		$ 975,844	-$ 585,506	$ 390,337
10016486	Integrated Resource Management- Hardware		774,143	- 309,657	464,486
10016486	Integrated Resource Management- Hardware		705	- 141	564
Asset class	**00048310**	**GP Computer H/W**	**1,750,691**	**- 895,304**	**855,387**
10016487	Intergrated Resource Mgmt		3,054,721	- 1,145,520	1,909,201
10016487	Intergrated Resource Mgmt		722,599	- 180,650	541,949
10016487	Intergrated Resource Mgmt		140,506	- 34,527	105,979
Asset class	**00048320**	**GP Computer S/W**	**3,917,826**	**- 1,360,697**	**2,557,129**
10014076	Telephone Communications Equipment		10,131	- 1,520	8,611
10014076	Telephone Communications Equipment		2,470	- 247	2,223
Asset class	**00048810**	**GP Telephone Equip**	**12,601**	**- 1,767**	**10,834**
Grand Total			**$ 5,668,517**	**-$ 2,256,001**	**$ 3,412,516**

26.4.3 For these assets, what are the expected gross plant, accumulated depreciation, and net book value at the expected retirement date resulting from this project?

Response:

Balances as at June 30, 2008

		Estimated Balances as at June 30, 2008		
Asset	Asset description	Acquisition Value	Accumulated Depreciation	Book value
10016486	Integrated Resource Management- Hardware	$ 975,844	-$ 975,844	$ -
10016486	Integrated Resource Management- Hardware	774,143	- 774,143	-
10016486	Integrated Resource Management- Hardware	705	- 705	-
Asset class 48310	**GP Computer H/W Expected Life**	**1,750,691**	**- 1,750,691**	**-**
10016487	Intergrated Resource Mgmt	3,054,721	- 2,863,801	190,920
10016487	Intergrated Resource Mgmt	722,599	- 587,112	135,487
10016487	Intergrated Resource Mgmt	140,506	- 113,561	26,945
Asset class 48320	**GP Computer S/W Expected Life**	**3,917,826**	**- 3,564,474**	**353,352**
10014076	Telephone Communications Equipment	10,131	- 4,306	5,825
10014076	Telephone Communications Equipment	2,470	- 926	1,544
Asset class 48810	**GP Telephone Equip Expected Life**	**12,601**	**- 5,232**	**7,369**
Grand Total		**$ 5,668,517**	**-$ 5,315,165**	**$ 353,352**

26.4.4 Please provide journal entries for the retirement of these assets.

Response:

Please find below the journal entries for the retirement of the assets referenced in Question 26.4. Accounting practice for General Plant is to retire the asset costs when net book value equals zero to ensure that no over or under recovery of original cost occurs.

Asset class 48310 GP Computer H/W Expected Life 5 years Depn Rate 20%

End of 2005

Debit	Accumulated Depn	$	975,843.74	
Credit	Cost of Asset		-$	975,843.74

To retire Integrated Resource Management Hardware

End of 2006

Debit	Accumulated Depn	$	774,142.62	
Credit	Cost of Asset		-$	774,142.62

To retire Integrated Resource Management Hardware

End of 2007

Debit	Accumulated Depn	$	704.95	
Credit	Cost of Asset		-$	704.95

To retire Integrated Resource Management Hardware

Asset class 48320 GP Computer S/W Expected Life 8 years Depn Rate 12.5%

End of 2008

Debit	Accumulated Depn	$	3,054,720.83	
Credit	Cost of Asset		-$	3,054,720.83

To retire Integrated Resource Management Software

End of 2009

Debit	Accumulated Depn	$	722,599.15	
Credit	Cost of Asset		-$	722,599.15

To retire Integrated Resource Management Software

2009/2010

Debit	Accumulated Depn	$	140,505.99	
Credit	Cost of Asset		-$	140,505.99

To retire Integrated Resource Management Software

Asset class 48810 GP Telephone Equip Expected Life 20 years Depn Rate 5%

End of 2020

Debit	Accumulated Depn	$	10,130.91	
Credit	Cost of Asset		-$	10,130.91

To retire GP Telephone Equipment

End of 2021

Debit	Accumulated Depn	$	2,469.61	
Credit	Cost of Asset		-$	2,469.61

To retire GP Telephone Equipment

26.5 For TGVI, the Commission, via Order No. G-113-04, approved $8 million capital additions during 2004-2005 related to the Utilities Strategy Project to harmonize information technology platforms between TGI and TGVI. Five major areas are Back-Office, Order Fulfillment and Operate and Maintain Distribution, Meter Management and Mobile Systems, AM/FM/Drafting Systems and Infrastructure. Please identify the assets associated with the Utilities Strategies Project that are to be retired as a result of the current project, state the gross capital additions, accumulated depreciation, the net book value at the expected retirement date.

Response:

There are no specific assets from the Utilities Strategy project that will be retired. There was some TGI labour effort in adding the TGVI field workers to the existing system but nothing was acquired that will not be utilized as part of the new solution.

26.6 If there are any revisions to the financial schedules please file the full update.

Response:

Revised Financial schedules are as follows:

Table 1 on page 6 and Table 2.4.2 on page 28:

	2007	2008	Total
Internal Labour	**$337,329**	**$379,848**	**$717,176**
Consulting	**$1,219,679**	**$1,718,476**	**$2,938,155**
Hardware	**$150,000**	**$162,000**	**$312,000**
Software	**$568,436**	**$23,112**	**$591,548**
Expenses	**$144,136**	**$291,650**	**$435,786**
Contingency	**$78,974**	**$315,896**	**$394,869**
sub-Total	**$2,498,554**	**$2,890,981**	**$5,389,535**
2006 Spend			$256,000
Total (no AFUDC)			**$5,645,535**
AFUDC			$317,570
Total			**$5,963,105**

Table 2.4.3 on page 29 of the application:

TGI REVENUE REQUIREMENT in thousands of $	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Operating & maintenance	-	-	-	(436.1)	(436.1)	(436.1)	(436.1)
Depreciation & amortization	-	-	574.9	478.9	466.9	453.3	439.7
Interest	-	-	166.0	125.5	101.2	77.1	53.6
Income tax	-	(29.7)	278.6	253.7	240.1	232.5	222.3
ROE	-	-	115.1	87.0	70.1	53.4	37.2
Incremental Revenue Requirement	-	(30)	1,135	509	442	380	317

TGVI REVENUE REQUIREMENT in thousands of $	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Operating & maintenance	-	-	-	(48.5)	(48.5)	(48.5)	(48.5)
Depreciation & amortization	-	-	63.9	53.2	51.9	50.4	48.9
Interest	-	-	13.1	9.9	8.0	6.1	4.2
Income tax	-	(3.3)	32.4	29.3	27.5	26.5	25.1
ROE	-	-	15.8	12.0	9.6	7.4	5.1
Incremental Revenue Requirement	-	(3)	125	56	49	42	35

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TGI REVENUE REQUIREMENT

in thousands of $	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Operating & maintenance	-	-	-	(436.1)	(436.1)	(436.1)	(436.1)	(436.1)	(436.1)	(436.1)	(436.1)
Depreciation & amortization	-	-	574.9	478.9	466.9	453.3	439.7	426.1	412.5	398.9	(214.6)
Interest	-	-	166.0	125.5	101.2	77.1	53.6	30.7	8.4	(13.6)	(22.4)
Income tax	-	(29.7)	278.6	253.7	240.1	232.5	222.3	210.9	198.8	185.6	(91.2)
ROE	-	-	115.1	87.0	70.1	53.4	37.2	21.3	5.8	(9.4)	(15.5)
Incremental Revenue Requirement	-	(30)	1,135	509	442	380	317	253	189	125	(780)

TGVI REVENUE REQUIREMENT

in thousands of $	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Operating & maintenance	-	-	-	(48.5)	(48.5)	(48.5)	(48.5)	(48.5)	(48.5)	(48.5)	(48.5)
Depreciation & amortization	-	-	63.9	53.2	51.9	50.4	48.9	47.3	45.8	44.3	(23.8)
Interest	-	-	13.1	9.9	8.0	6.1	4.2	2.4	0.7	(1.1)	(1.8)
Income tax	-	(3.3)	32.4	29.3	27.5	26.5	25.1	23.7	22.2	20.5	(10.3)
ROE	-	-	15.8	12.0	9.6	7.4	5.1	2.9	0.8	(1.3)	(2.1)
Incremental Revenue Requirement	-	(3)	125	56	49	42	35	28	21	14	(87)

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TGI CONTRIBUTION & GRANTS in thousands $		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening		-	-	(768.0)	(1,536.1)	(1,549.4)	(1,575.1)	(1,600.9)	(1,626.6)	(1,652.4)	(1,678.1)	(1,716.7)
Additions		-	(768.0)	(768.0)	(13.3)	(25.8)	(25.8)	(25.8)	(25.8)	(25.8)	(38.6)	(25.8)
Retirements												
Ending		-	(768.0)	(1,536.1)	(1,549.4)	(1,575.1)	(1,600.9)	(1,626.6)	(1,652.4)	(1,678.1)	(1,716.7)	(1,742.5)

TGI CONTRIBUTION & GRANTS in thousands $												
TGI ACCUMULATED AMORTIZATION		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening		-	-	-	96.0	288.0	481.7	678.6	878.7	1,082.0	1,288.5	1,498.3
Depreciation	12.5%	-	-	96.0	192.0	193.7	196.9	200.1	203.3	206.5	209.8	214.6
Retirements												
Ending		-	-	96.0	288.0	481.7	678.6	878.7	1,082.0	1,288.5	1,498.3	1,712.9
TGI NET CONTRIBUTION & GRANTS		-	(768.0)	(1,440.1)	(1,261.3)	(1,093.4)	(922.3)	(747.9)	(570.4)	(389.6)	(218.4)	(29.6)

TGVI CONTRIBUTION & GRANTS in thousands $		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening		-	-	(85.3)	(170.7)	(172.2)	(175.0)	(177.9)	(180.7)	(183.6)	(186.5)	(190.7)
Additions	Class 1	-	(85.3)	(85.3)	(1.5)	(2.9)	(2.9)	(2.9)	(2.9)	(2.9)	(4.3)	(2.9)
Retirements												
Ending		-	(85.3)	(170.7)	(172.2)	(175.0)	(177.9)	(180.7)	(183.6)	(186.5)	(190.7)	(193.6)

TGVI CONTRIBUTION & GRANTS in thousands $												
TGVI ACCUMULATED AMORTIZATION		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening		-	-	-	10.7	32.0	53.5	75.4	97.6	120.2	143.2	166.5
Depreciation	12.5%	-	-	10.7	21.3	21.5	21.9	22.2	22.6	22.9	23.3	23.8
Retirements												
Ending		-	-	10.7	32.0	53.5	75.4	97.6	120.2	143.2	166.5	190.3
TGVI NET CONTRIBUTION & GRANTS		-	(85.3)	(160.0)	(140.1)	(121.5)	(102.5)	(83.1)	(63.4)	(43.3)	(24.3)	(3.3)

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TGI BALANCE SHEET IMPACT in thousands $		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Working capital		-	-	-	-	-	-	-	-	-	-	-
Plant		-	-	5,367.4	5,284.3	5,201.2	5,118.2	5,035.1	4,952.0	4,868.9	4,785.9	4,702.8
Accumulated Depreciation		-	-	(670.9)	(1,341.8)	(2,002.4)	(2,652.5)	(3,292.3)	(3,921.7)	(4,540.7)	(5,149.3)	(5,149.3)
Contributions and grants		-	(768.0)	(1,440.1)	(1,261.3)	(1,093.4)	(922.3)	(747.9)	(570.4)	(389.6)	(218.4)	(29.6)
Deferred charges		-	-	-	-	-	-	-	-	-	-	-
Future income taxes		-	-	-	-	-	-	-	-	-	-	-
Utility rate base		-	(768.0)	3,256.4	2,681.1	2,105.4	1,543.3	994.8	460.0	(61.3)	(581.9)	(476.1)
Work in Progress		2,530.0	5,367.4	-	-	-	-	-	-	-	-	-
Total investments		2,530.0	4,599.3	3,256.4	2,681.1	2,105.4	1,543.3	994.8	460.0	(61.3)	(581.9)	(476.1)
Debt	65%	1,644.5	2,989.6	2,116.7	1,742.7	1,368.5	1,003.2	646.6	299.0	(39.9)	(378.2)	(309.5)
Equity		885.5	1,609.8	1,139.7	938.4	736.9	540.2	348.2	161.0	(21.5)	(203.7)	(166.6)
		2,530.0	4,599.3	3,256.4	2,681.1	2,105.4	1,543.3	994.8	460.0	(61.3)	(581.9)	(476.1)
Rate base (mid-year)				3,927.9	2,968.8	2,393.3	1,824.4	1,269.1	727.4	199.3	(321.6)	(529.0)

TGVI BALANCE SHEET IMPACT in thousands $		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Working capital		-	-	-	-	-	-	-	-	-	-	-
Plant		-	-	596.4	587.1	577.9	568.7	559.5	550.2	541.0	531.8	522.5
Accumulated Depreciation		-	-	(74.5)	(149.1)	(222.5)	(294.7)	(365.8)	(435.7)	(504.5)	(572.1)	(572.1)
Contributions and grants		-	(85.3)	(160.0)	(140.1)	(121.5)	(102.5)	(83.1)	(63.4)	(43.3)	(24.3)	(3.3)
Deferred charges		-	-	-	-	-	-	-	-	-	-	-
Future income taxes		-	-	-	-	-	-	-	-	-	-	-
Utility rate base		-	(85.3)	361.8	297.9	233.9	171.5	110.5	51.1	(6.8)	(64.7)	(52.9)
Work in Progress		281.1	596.4	-	-	-	-	-	-	-	-	-
Total investments		281.1	511.0	361.8	297.9	233.9	171.5	110.5	51.1	(6.8)	(64.7)	(52.9)
Debt	60%	168.7	306.6	217.1	178.7	140.4	102.9	66.3	30.7	(4.1)	(38.8)	(31.7)
Equity		112.4	204.4	144.7	119.2	93.6	68.6	44.2	20.4	(2.7)	(25.9)	(21.2)
		281.1	511.0	361.8	297.9	233.9	171.5	110.5	51.1	(6.8)	(64.7)	(52.9)
Rate base (mid-year)				436.4	329.9	265.9	202.7	141.0	80.8	22.1	(35.7)	(58.8)

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TGI CCA	in thousands $		**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Opening	Class 12			-	2,400	-	(42)	(42)	(42)	(42)	(42)	(42)	-
Additions			-	4,800	-	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
CCA	Rate	100.0%	-	(2,400)	(2,400)	42	83	83	83	83	83	125	83
Ending			-	2,400	-	(42)	(42)	(42)	(42)	(42)	(42)	-	-
Opening	Class 45			-	218	120	66	36	20	11	6	3	-
Additions			-	281	-	-	-	-	-	-	-	-	-
CCA	Rate	45.0%	-	(63)	(98)	(54)	(30)	(16)	(9)	(5)	(3)	(3)	-
Ending			-	218	120	66	36	20	11	6	3	-	-
Total	in thousands $												
Opening			-	-	2,618	120	24	(5)	(22)	(31)	(36)	(38)	-
Additions			-	5,081	-	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
CCA			-	(63)	(98)	(54)	(30)	(16)	(9)	(5)	(3)	(3)	-
Ending			-	5,018	2,520	(17)	(88)	(105)	(114)	(119)	(121)	(125)	(83)
TGI ACCUMULATED DEPRECIATION			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opening	Software		-	-	-	(636)	(1,272)	(1,897)	(2,512)	(3,117)	(3,711)	(4,295)	(4,869)
Depreciation	12.5%		-	-	(636)	(636)	(625)	(615)	(605)	(594)	(584)	(574)	-
Retirements			-	-	-	-	-	-	-	-	-	-	-
Ending			-	-	(636)	(1,272)	(1,897)	(2,512)	(3,117)	(3,711)	(4,295)	(4,869)	(4,869)
Opening	Hardware		-	-	-	(35)	(70)	(105)	(140)	(176)	(211)	(246)	(281)
Depreciation	12.5%		-	-	(35)	(35)	(35)	(35)	(35)	(35)	(35)	(35)	-
Retirements			-	-	-	-	-	-	-	-	-	-	-
Ending			-	-	(35)	(70)	(105)	(140)	(176)	(211)	(246)	(281)	(281)
Total													
Opening			-	-	-	(671)	(1,342)	(2,002)	(2,653)	(3,292)	(3,922)	(4,541)	(5,149)
Depreciation			-	-	(671)	(671)	(661)	(650)	(640)	(629)	(619)	(609)	-
Retirement costs			-	-	-	-	-	-	-	-	-	-	-
Retirements			-	-	-	-	-	-	-	-	-	-	-
Ending			-	-	(671)	(1,342)	(2,002)	(2,653)	(3,292)	(3,922)	(4,541)	(5,149)	(5,149)

TGVI	**CCA**	in thousands $		**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
	Opening	Class 12			-	267	-	(5)	(5)	(5)	(5)	(5)	(5)	-
	Additions			-	533	-	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
	CCA	Rate	100.0%	-	(267)	(267)	5	9	9	9	9	9	14	9
	Ending			-	267	-	(5)	(5)	(5)	(5)	(5)	(5)	-	-
	Opening	Class 45			-	24	13	7	4	2	1	1	0	-
	Additions			-	31	-	-	-	-	-	-	-	-	-
	CCA	Rate	45.0%	-	(7)	(11)	(6)	(3)	(2)	(1)	(1)	(0)	(0)	-
	Ending			-	24	13	7	4	2	1	1	0	-	-
Total		in thousands $												
	Opening			-	-	291	13	3	(1)	(2)	(3)	(4)	(4)	-
	Additions			-	565	-	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
	CCA			-	(7)	(11)	(6)	(3)	(2)	(1)	(1)	(0)	(0)	-
	Ending			-	558	280	(2)	(10)	(12)	(13)	(13)	(13)	(14)	(9)
TGVI	**ACCUMULATED DEPRECIATION**			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Opening	Software		-	-	-	(71)	(141)	(211)	(279)	(346)	(412)	(477)	(541)
	Depreciation	12.5%		-	-	(71)	(71)	(69)	(68)	(67)	(66)	(65)	(64)	
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(71)	(141)	(211)	(279)	(346)	(412)	(477)	(541)	(541)
	Opening	Hardware		-	-	-	(4)	(8)	(12)	(16)	(20)	(23)	(27)	(31)
	Depreciation	12.5%		-	-	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(4)	(8)	(12)	(16)	(20)	(23)	(27)	(31)	(31)
	Total													
	Opening			-	-	-	(75)	(149)	(222)	(295)	(366)	(436)	(505)	(572)
	Depreciation			-	-	(75)	(75)	(73)	(72)	(71)	(70)	(69)	(68)	-
	Retirement costs			-	-	-	-	-	-	-	-	-	-	-
	Retirements			-	-	-	-	-	-	-	-	-	-	-
	Ending			-	-	(75)	(149)	(222)	(295)	(366)	(436)	(505)	(572)	(572)

Attachment 8.1

Z662S1-05

Supplement No. 1 to CAN/CSA-Z662-03, Oil and Gas Pipeline Systems

September 2005

Annex M (normative)
Sour service pipelines

Note: *This Annex is mandatory part of this Standard.*

M.1 Introduction
This Annex specifies requirements for the design, materials, construction, operation, and maintenance of sour service pipelines. These requirements are additional to the requirements of Clauses 4 to 10.

M.2 Specific definition
"Sour service" for the purpose of this Annex shall be as defined in Clause 5.4.1.

M.3 Design

M.3.1 General
All of the parameters used in the design of the pipeline, e.g., stress calculations, soil support calculations, anchoring or expansion requirements and calculations, riser design, plot plans, bore details, crossing details, piping transitions, material specifications, welding procedures, and backfill procedures, shall be considered design information. Drawings, documentation, and procedures for design information shall be approved by the company and shall be kept in the pipeline design file for the life of the pipeline.

M.3.2 Contractors
All of the design information that needs to be understood and followed by the contractor shall be provided by the company and indicated on the construction drawings and in the construction documents to ensure that the contractor is aware of such information.

M.3.3 Internal maintenance cleaning devices and inspection devices
Pipelines shall be designed to accommodate internal maintenance cleaning devices and inspection devices. In order to satisfy this requirement, the following items shall be considered in the design:
(a) maintaining a consistent pipeline internal diameter between the pig barrels;
(b) provision of a capability for maintenance pigging;
(c) provision of a capability for in-line inspection tools;
(d) location and sizing of pig barrels;
(e) use of round-port, full-bore block valves;
(f) size of bend radii; and
(g) use of pigging guide bars.

M.3.4 Stress design
The design shall minimize secondary stresses. Tie-in welds shall be avoided at pipe-to-riser welds, pipe-to-component welds, and riser-to-component welds.

M.3.5 Anchors and restraints
Where below-ground anchors are to be used, they shall meet the requirements of Clause 4.6.2.3, and both sides of any anchored circumferential weld shall be anchored equally and properly supported.

M.4 Construction

M.4.1

Deviations from the design information on construction drawings or documents (see Clause M.3.1) shall not be made without the prior approval of the company. A record of such approval shall be retained in the pipeline design file.

Note: *Photographic records of construction should be used.*

M.4.2

All inspection and construction records related to the design information specified in Clauses M.3.1 and M.3.2 shall be retained by the company for the life of the pipeline.

M.4.3

An inspection plan that describes the inspection, testing, and documentation requirements necessary for the contractor to confirm proper construction in accordance with the design information specified in Clause M.3.2 shall be developed by the company and provided to the contractor. The contractor shall use the inspection plan to document compliance with the design information specified in Clause M.3.2.

M.5 Joining

M.5.1 Increase in carbon equivalent

M.5.1.1

The maximum carbon equivalent of the base material used in procedure qualification shall be specified in the welding procedure specification.

M.5.1.2

When steel piping materials with a carbon equivalent greater than 0.45% are being welded, an increase in carbon equivalent of more than 0.02 percentage points from that of the material used for the procedure qualification shall be considered to be an essential change and shall necessitate requalification of the welding procedure specification or establishment and qualification of a new welding procedure specification.

M.5.2 Butt welds

Butt welds between items of unequal thickness shall

(a) conform to Item a) of Figure 7.2, provided that dimension b_i does not exceed 1.6 mm;
(b) conform to Item e) or f) of Figure 7.2; or
(c) be made using a machined transition piece that meets the following requirements:
    (i) a minimum 25 mm length from each butt weld end shall match the bore of the adjacent item for each end;
    (ii) the dimensions for the transition portion shall conform to the applicable details in Figure 7.2; and
    (iii) the thickness and strength of the transition piece shall be selected to meet the design requirements for the pipeline.

M.5.3 Additional testing of welded joints

In addition to meeting the hardness testing requirements specified in Clause 7.7.11, the hardness of the deposited weld metal and heat-affected zones at any location shall not exceed 250 HV when measured using Vickers methods (ASTM E 92 or ASTM E 384) based on indenter loads not exceeding 10 kg, or 70 HR15N when measured using the Rockwell Superficial method (ASTM E 18).

M.5.4 Nickel content
The nickel content of deposited weld metal shall not exceed 1.00%.

M.5.5 Alignment
Alignment of tie-in welds and component welds shall be achieved using standard lineup clamps or an equivalent. Alignment shall not be achieved by excessive use of other forces or equipment.

M.5.6 Preheat
The weld procedure specification shall specify the minimum preheat temperature, which shall not be less than the preheat temperature used for procedure qualification. If preheat was not used for procedure qualification, the pipe temperature before the start of the welding procedure qualification test shall be specified as the preheat temperature in the weld procedure specification. During production welding, the pipe temperature shall not be lower than the preheat temperature specified in the welding procedure specification.

Note: *A common minimum preheat temperature used in the industry is* 40 °C. *It is possible that this preheat temperature will not be sufficient to control hardness of the weldment in all cases. Specific cases can require higher preheat temperatures and more comprehensive analysis that takes into consideration such variables as carbon equivalent, material thickness, heat input, and preheat temperature.*

M.5.7 Incomplete penetration
Indications of incomplete penetration of the root bead shall be unacceptable regardless of length.

M.5.8 Incomplete fusion
Indications of incomplete fusion at the root of the joint shall be unacceptable regardless of length.

M.5.9 Backwelding
Backwelding applied to the inside surface to correct internal misalignment or root bead defects shall be treated as a weld repair and shall be in accordance with the weld repair requirements of Clause 7.12.3.

Note: *Backwelding is generally not recommended as a weld root repair method in sour service. Careful control of the welding procedure and application is essential because backwelding can result in high hardness adjacent to the inside surface and microstructures that are susceptible to sulphide stress corrosion cracking.*

M.6 Corrosion and corrosion control
Note: *CAPP 2003-0023 provides information on mitigation of internal corrosion in sour service gas gathering pipelines.*

M.6.1
Upon completion, stimulation, or servicing of any sour service gas well that introduces new conditions or fluids that could be detrimental to the pipeline, the fluids shall be separated for disposal or a program designed to mitigate corrosion associated with the conditions or fluids shall be implemented. These supplemental measures shall remain in place until an analysis or assessment determines that they can be terminated.

M.6.2
Before admission of sour fluids to the pipeline, the operating company shall institute and maintain a program to mitigate internal corrosion and shall monitor the effectiveness of its internal corrosion control program.

M.6.3
New sour service gas pipelines, and sour service gas pipelines that are being restored to service after repair or a period of non-use, shall be batch-inhibited before line start-up.
Note: *In-line inspection tools can damage protective scales and inhibitor films and thereby provide initiation sites for corrosion damage. To help mitigate this damage, consideration should be given to batch-inhibiting the pipeline immediately after the running of an in-line inspection.*

M.6.4
When pigs are used for maintenance cleaning or batch corrosion inhibitor applications, their design and sizing shall be appropriate for the work being conducted.
Note: *Considerations should include the style of pig, diameter, length, material of construction, hardness, wear, oversizing requirements, and manufacturer's recommendations.*

M.7 Operation and maintenance

M.7.1
In addition to meeting the requirements of Clause 10.2.1.2, operating and maintenance procedures shall be based on the limits specified in the design information specified in Clause M.3.1.

M.7.2
In addition to meeting the requirements of Clause 10.3.2, all records related to pipeline design, construction, modification, operations, and maintenance shall be maintained for the life of the pipeline.

M.7.3
Internal corrosion defects shall be repaired by pipe replacement. Use of the other permanent repair methods for internal corrosion defects specified in Table 10.1 shall not be permitted.

M.7.4
Before welding is performed on a pipeline that has been in sour service, consideration shall be given to the possibility of prior hydrogen charging and the need for removal of such hydrogen using a bake-out process as part of the welding procedure specification.

M.7.5
A change management process shall be in place to address all types of change, including mechanical, process, operating, and personnel changes that could affect the integrity, shutdown systems, control systems, and safeguarding of the pipeline.
Note: *A change management process provides an opportunity for the key operating, maintenance, technical, and management groups to assess the impact of the potential change and address any additional measures that need to be implemented and documented as part of the change.*

M.7.6
In addition to meeting the requirements of Clause 10.11.3, the operating company shall conduct an engineering assessment where there is a possibility of a change in the service fluid composition, e.g., a significant increase in chloride content of any produced water, or in operating conditions, e.g., pressure or temperature, that could be detrimental to the integrity of the pipeline. The engineering assessment shall consider the design information described in Clause M.3.1 to determine whether the pipeline is suitable for the new service fluid composition or new operating conditions.

M.7.7
The operating company shall develop, document, and implement a pipeline integrity management program that is in accordance with Annex N.

Annex N (informative)
Guidelines for pipeline integrity management programs

Note: *This Annex is not a mandatory part of this Standard except for sour service pipelines (see Annex M). This informative (non-mandatory) Annex has been written in normative (mandatory) language to facilitate adoption for other types of pipelines where users of this Standard or regulatory authorities wish to adopt it formally as additional requirements to this Standard.*

N.1 Introduction

N.1.1
This Annex provides guidelines for developing, documenting, and implementing a pipeline integrity management program to provide safe, environmentally responsible, and reliable service.

N.1.2
The major steps in a pipeline integrity management program are shown in Figure N.1, which contains references to the relevant clauses in this Annex.

N.2 Definitions
The following definitions apply in this Annex:

External interference incident — mechanical damage to a pipe, component, or coating without release of service fluid.

Failure incident — an unplanned release of service fluid due to failure of a pipe or component.

Hazard — a condition that might cause a failure or external interference incident.

N.3 Documentation and information methods

N.3.1
Pipeline integrity management programs shall be documented.

N.3.2
A pipeline integrity management program should include methods for collecting, integrating, and analyzing information related to
(a) design and construction;
(b) condition monitoring, maintenance, and repair;
(c) operating conditions;
(d) failure incidents;
(e) external interference incidents;
(f) damage and deterioration, e.g., corrosion or manufacturing imperfections;
(g) environmental protection; and
(h) safety.

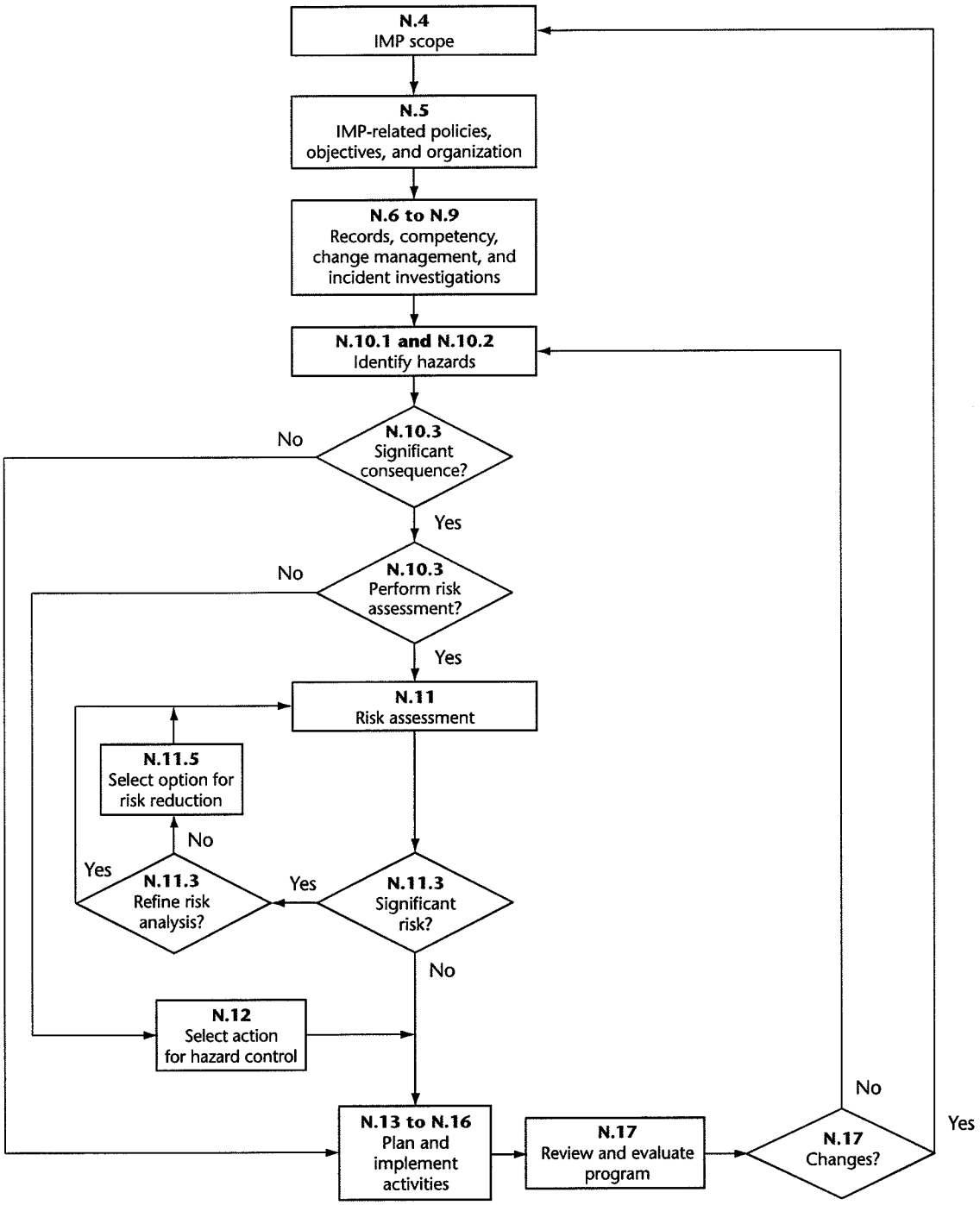


Figure N.1
Pipeline integrity management program process
(See Clause N.1.2.)

N.4 Pipeline integrity management program scope

Operating companies shall develop descriptions of the pipelines included in the pipeline integrity management program. Consideration shall be given to including the items specified in Clause B.5.2.2.

N.5 Corporate policies, objectives, and organization

N.5.1

Operating companies shall include statements covering integrity-related corporate policies, objectives, and performance indicators.

N.5.2

Operating companies shall document the types of consequences they consider to be significant and the rationale for determining their significance.

N.5.3

Operating companies shall identify and document the personnel responsible for the various elements of the pipeline integrity management program, as identified in this Annex, including the following:

(a) pipeline integrity management program development and improvement;
(b) records management;
(c) pipeline integrity management program planning and reporting;
(d) implementation of plans;
(e) integrity performance indicators; and
(f) integrity program audits, reviews, and evaluations.

N.6 Pipeline integrity management program records

N.6.1

Operating companies shall prepare and manage records related to pipeline design, construction, operation, and maintenance that are needed for performing the activities included in their pipeline integrity management program. Items to be considered for inclusion in such records shall include

(a) the location of the pipeline with respect to crossings and nearby land developments;
(b) class locations;
(c) the design of the pipeline, including limits on pressure, temperature, loading, and other operating conditions;
(d) the standards and specifications for the pipe, components, bolting, and coating materials;
(e) material test reports;
(f) joining and inspection records;
(g) coating and inspection records;
(h) terrain, soil type, backfill material, and depth of cover;
(i) pressure testing;
(j) cathodic protection system design and performance; and
(k) the methods used and the results obtained for the activities included in the pipeline integrity management program.

N.6.2

Operating companies shall document the methods used for managing pipeline integrity management program records. Items to be considered for documentation shall include

(a) the responsibilities and procedures for the creation, updating, retention, and deletion of records;
(b) retrieval of records related to a particular pipeline location or segment;

(c) evidence of past activities, events, changes, analyses, and decisions; and
(d) an index describing the types, forms, and locations of records.

N.7 Competency and training

N.7.1
Operating companies shall develop and implement competency and training requirements for company personnel, contractors, and consultants to give them the appropriate knowledge and skills for performing the elements of the pipeline integrity program for which they are responsible.

N.7.2
Operating companies shall consider documenting the methods used to evaluate the knowledge and skills of their personnel, contractors, and consultants.

N.7.3
When evaluation of knowledge and skills indicates that development is required, training and supervised experience shall be arranged. Such training and experience might include participation in
(a) formal training courses provided by educational institutions or industry organizations;
(b) workshops and conferences related to pipeline integrity;
(c) the work of technical committees of industry and standards development organizations;
(d) research and development projects related to pipeline integrity; and
(e) supervised work experience.

N.8 Change management

N.8.1
Operating companies shall develop and implement a change management process for changes that affect the integrity of their pipelines or their ability to manage pipeline integrity. Such changes can include
(a) those that are initiated and controlled by the operating company, such as changes in
    (i) the ownership of a pipeline;
    (ii) the organization and personnel of the operating company;
    (iii) piping and control systems;
    (iv) pipeline operating status;
    (v) operating conditions;
    (vi) service fluid characteristics;
    (vii) methods, practices, and procedures related to pipeline integrity management; and
    (viii) records related to pipeline integrity management; and
(b) those that are not initiated and controlled by the operating company, such as changes in
    (i) standards and regulations related to pipeline integrity management; and
    (ii) pipeline rights-of-way, adjacent land use, and development.

N.8.2
Operating companies shall address, as applicable, the following items in procedures for change management:
(a) monitoring to identify anticipated and actual changes that affect pipeline integrity;
(b) responsibilities for identifying, approving, and implementing changes;
(c) reasons for changes;
(d) analysis of the implications and effects of the changes;
(e) communication of changes to affected parties; and
(f) timing of changes.

N.9 Failure and external interference incident investigations

Operating companies shall establish procedures for investigating and reporting failure and external interference incidents (see Clause 10.2.3). Such procedures should include

(a) the recording of incident information as specified in Clause H.5.2; and

(b) an analysis to determine what changes are needed to improve the effectiveness of the pipeline integrity management program.

N.10 Hazard identification and control

N.10.1

Operating companies shall identify hazards that can lead to a failure or external interference incident.

Note: *Clause B.5.2.3 provides guidance on hazard identification.*

N.10.2

The methods and data used for hazard identification shall be documented and take into consideration the primary causes and sub-causes identified in Clause H.5.5 and any additional failure or external interference incident causes that are relevant.

N.10.3

Where hazards that might lead to a failure or external interference incident with significant consequences are identified, the operating company shall

(a) assess the risks associated with such hazards in accordance with Clause N.11; or

(b) implement measures for monitoring conditions that could lead to failure or external interference incidents and eliminate or mitigate such conditions, taking into consideration the options specified in Clause N.12.

N.11 Risk assessment

N.11.1 General

Annex B provides risk analysis and risk evaluation guidelines for

(a) estimating the frequency and consequences of incidents;

(b) evaluating the significance of the estimated risk; and

(c) identifying, evaluating, and implementing options for risk reduction.

N.11.2 Risk analysis approach

When selecting an appropriate approach for performing risk analysis (see Clause B.5.2), operating companies shall consider

(a) the features that are unique to the design, construction, and operation of the pipelines;

(b) the availability of procedures, models, and information needed to perform the analysis; and

(c) how the results of the risk assessment will be used.

N.11.3 Risk evaluation

When it is determined that the estimated risk level is significant (see Clause B.5.3.2), the following response shall be required:

(a) the undertaking of a more refined level of risk analysis (see Clause N.11.4) in an effort to reduce the uncertainty or errors that might have led to an overestimate of the risk level; or

(b) a consideration of options (see Clause N.11.5) that might be available to reduce the estimated risk level.

N.11.4 Risk analysis refinement

The options to be considered for refinement of the risk analysis should include the following:

(a) selection of a more rigorous approach for the analyses and estimates;
(b) additional observations and analysis of the operating conditions;
(c) inspections to provide more accurate and detailed information about the presence, location, and severity of identified hazards or imperfections; and
(d) an analysis using more detailed information about
    (i) the size, characteristics, and location of potential releases; and
    (ii) the location, characteristics, and susceptibility to adverse effects of people, property, and the environment.

N.11.5 Risk reduction evaluation

The risk analysis and risk evaluation shall be repeated to establish that the options selected reduce the estimated risk to a level that is considered to be not significant. The options considered for reducing the estimated level of risk shall include the items specified in Clause N.12.

N.12 Options for hazard control and risk reduction

N.12.1 Operating errors

The options that can be used to reduce the frequency of failure incidents associated with improper operation or control system malfunction include the following, as applicable:

(a) personnel training;
(b) improved pipeline control and monitoring methods;
(c) modified operating and maintenance practices; and
(d) improvements or modifications to piping and equipment.

N.12.2 External interference

The options that can be used to reduce the frequency of failure incidents and external interference incidents include the following, as applicable:

(a) participation in one-call utility location organizations;
(b) improved public awareness of and education about the pipeline;
(c) additional vegetation control, markers, and signs to improve right-of-way visibility;
(d) increased frequency of right-of-way inspections and patrols;
(e) improved procedures for pipeline location and excavation;
(f) installation of structures or materials, e.g., concrete slabs, steel plates, or casings, to protect the pipeline from external interference;
(g) increased depth of cover; and
(h) increased pipe wall thickness.

N.12.3 Metal loss, cracking, and material, manufacturing, and construction defects

The options that can be used to reduce the frequency of failure incidents associated with metal loss, cracking, and material, manufacturing, and construction defects include the following, as applicable:

(a) temporary or permanent reductions in the established operating pressure;
(b) close-interval surveys;
(c) coating assessment surveys;
(d) improved performance of cathodic protection systems;
(e) repair or rehabilitation of external coatings;
(f) improved internal corrosion mitigation and monitoring methods (see Clauses 9.4.2 and 9.4.3);
(g) installation of liners;
(h) in-line inspection programs;

(i) pressure testing as specified in Clause 10.11.5; and
(j) pipe repair and pipe replacement programs.

N.12.4 Natural hazards

The options that can be used to reduce the frequency of failure incidents associated with natural hazards include the following, as applicable:
(a) inspection and evaluation of areas subject to washout erosion, freeze-thaw, settlement due to construction or undermining, earthquake, or slope movement;
(b) increased frequency of right-of-way inspections and patrols;
(c) programs to monitor pipe or soil movement, including, if applicable, inspections using in-line geometry tools, survey techniques, and slope inclinometers;
(d) installation of structures or materials to protect the pipeline from external loads;
(e) excavation and reburial to relieve loads on the pipeline; and
(f) relocation of the pipeline.

N.12.5 Consequence reduction

The options that can be used to reduce the consequences associated with failure incidents include the following, as applicable:
(a) improved methods for early detection of a product release;
(b) improved methods for control and shutdown of compressor or pump stations;
(c) improved methods to limit the size of a product release, e.g., reduced spacing of block valves or isolating valves, and the use of remotely operated valves;
(d) improved methods for recovery and cleanup of liquid releases;
(e) improved emergency response procedures; and
(f) improved public awareness programs.

N.13 Pipeline integrity management program planning

N.13.1

Operating companies shall establish plans and schedules for activities related to pipeline integrity management.

N.13.2

Pipeline integrity management program planning shall take the following into consideration:
(a) known conditions, damage, or imperfections, e.g., corrosion or manufacturing imperfections, that might lead to failure incidents;
(b) the potential growth of any damage or imperfections;
(c) the options selected to control identified hazards (see Clause N.10);
(d) the options selected to reduce the estimated risk level (see Clauses N.11.5 and N.12 and Annex B);
(e) inspections, testing, patrols, and monitoring (see Clause N.14);
(f) inspections and analyses to refine the estimates of risk (see Clause N.13.4);
(g) recommendations from previous integrity reviews and activities;
(h) the failure and external interference incident history of the operating company; and
(i) the failure and external interference incident experience of the pipeline industry.

N.13.3

Consideration shall be given to documenting the methods used to prioritize and schedule activities related to pipeline integrity management.

N.13.4
Pipeline integrity management program plans should include steps for reviewing completed integrity activities in order to
(a) verify that the relevant methods and procedures for such activities were properly performed;
(b) verify that changes in planned activities were reviewed and approved;
(c) determine whether the intended objectives were achieved;
(d) identify incomplete work and unresolved issues;
(e) develop recommendations and plans for future work; and
(f) verify that the relevant records were created or revised.

N.13.5
Pipeline integrity management program plans shall include steps for consulting with and informing appropriate personnel about integrity issues and programs.

N.14 Inspections, testing, patrols, and monitoring

N.14.1 General
Operating companies shall document the methods and procedures used to conduct inspections, testing, patrols, and monitoring in accordance with Clauses 9 and 10. Particular attention shall be paid to
(a) cathodic protection systems (see Clause 9.2.10.2);
(b) corrosion monitoring systems and devices (see Clause 9.4.3);
(c) leak detection methods and devices (see Clauses 10.2.6 and 10.2.7);
(d) shutdown devices and systems (see Clause 10.6.1.2);
(e) pressure-control, pressure-limiting, and pressure-relieving systems (see Clause 10.6.5);
(f) pipeline valves (see Clause 10.6.6);
(g) pipeline patrolling (see Clause 10.5.1); and
(h) inspection of exposed piping for corrosion (see Clause 9.3.2) and other types of imperfections.

N.14.2 Timing and frequency of inspections, testing, patrols, and monitoring
When the timing or frequency of inspection, testing, patrols, or monitoring is not specified in this Standard, the methods used to determine the timing or frequency shall be documented and based on
(a) consideration of the types of conditions or imperfections that are intended to be detected by each inspection, test, patrol, or monitoring activity;
(b) experience related to the rate or timing of changes in the imperfections or conditions; and
(c) the effect of such changes on the estimated risk of failure incidents.

N.14.3
When an inspection is performed using indirect methods, e.g., in-line inspection or close-interval surveys, operating companies shall consider whether supplemental inspections using more direct methods are needed.

N.14.4
Consideration shall be given to using in-line inspection equipment to detect
(a) internal and external corrosion imperfections (see Annex D);
(b) dents;
(c) cracks; and
(d) excessive pipe movement.

N.14.5
Operating companies shall document the methods used to detect corrosive agents in the products transported and, where applicable, the methods used to detect and evaluate imperfections caused by internal corrosion (see Clause 9.4).

N.14.6
Close-interval and coating-assessment surveys should be considered to assist in investigating the performance of the cathodic protection system and to provide additional information to address corrosion concerns.

N.14.7
Records of inspections, testing, patrols, and monitoring shall include
(a) the dates when performed;
(b) the methods and equipment used;
(c) the results and observations;
(d) an evaluation of the acceptability of the results and observations;
(e) recommendations; and
(f) implementation of recommendations.

N.15 Evaluation of inspection, testing, patrol, and monitoring results

N.15.1 General
When inspection, testing, patrol, and monitoring results indicate the presence of conditions or imperfections that might lead to a failure incident with significant consequences, or to an external interference incident, operating companies shall perform an engineering assessment as specified in Clause 10.11.2.1 or take corrective action as specified in Clause 10.11.2.3.

N.15.2 Evaluation of indications of imperfections

N.15.2.1
Except as allowed by Clause N.15.2.2, piping with indications of imperfections shall be subject to detailed visual inspection, mechanical measurement, non-destructive inspection (if needed), and evaluation as specified in Clause 10.8.

N.15.2.2
An engineering assessment may be performed to establish that defects are not associated with indications of imperfections. The engineering assessment shall take the following into consideration:
(a) knowledge and experience of the performance capabilities and limitations of the inspection method;
(b) the types of imperfection that might correspond to the reported indications;
(c) the accuracy of reported dimensions and characteristics needed for evaluating such imperfections;
(d) the likelihood of unreported defects, e.g., cracking, being associated with an imperfection indication;
(e) the piping design and material properties; and
(f) service conditions.

Notes:
(1) *The principles described in Clauses D.6 to D.10 for assessing indications of corrosion imperfections detected by in-line inspection should be considered for evaluating other types of imperfection indications detected by in-line inspection.*
(2) *DNV-RP-F101 describes evaluation methods that include uncertainties in the values of reported depth and length measurements for corroded pipe.*

N.15.3 Natural hazard evaluations

When inspections and patrols indicate soil settlement, slope movement, or washout that could cause excessive longitudinal stress or deflection of the pipe (see Clause 4.6), operating companies shall consider implementing a monitoring and evaluation program that includes criteria for corrective action to prevent failure incidents. The use of increased line patrols, in-line geometry tools, and slope inclinometers should be considered for such programs.

N.16 Mitigation and repair

N.16.1

Operating companies should document the types of corrective actions that will be considered for anticipated conditions or imperfections that could cause a failure incident with significant consequences.

N.16.2

Operating companies shall document procedures for mitigation and repair.

N.17 Pipeline integrity management program review and evaluation

N.17.1

Pipeline integrity management programs shall be reviewed and evaluated periodically to determine whether they are in accordance with the provisions of this Standard and shall be revised as necessary. The methods for and responsibilities related to review and evaluation and the results of reviews and evaluations shall be documented. The items to be considered in such reviews and evaluations shall include

(a) the timing of such reviews and evaluations;
(b) the effects of changes in the operating company, the pipeline, or external factors;
(c) the findings, status, and trends of corrective actions identified during internal and external audits;
(d) the status and trends of integrity performance indicators related to the frequency and consequences of external interference incidents and failure incidents and the completion of integrity-related work;
(e) the status and trends of integrity-related issues and recommendations identified during previous reviews and evaluations, operation, maintenance, or integrity-related work;
(f) the root causes of recent failure incidents; and
(g) the successes and problems experienced in detecting and preventing potential failure incidents.

N.17.2

Operating companies shall consider auditing their pipeline integrity management programs. The items addressed in the methods for performing such audits should include

(a) audit scope and objectives;
(b) audit frequency and timing;
(c) responsibilities for managing and performing the audit;
(d) auditor independence;
(e) auditor competency; and
(f) audit procedures.

Attachment 8.2

N. 1 Introduction

N. 2 Company Information

N. 3 Documentation and Information Methods.

N. 4 Pipeline Integrity Management Program Scope

N. 5 Corporate Policies, Objectives, and Organization

N. 6 Pipeline Integrity Management Program Records.

N. 7 Competency and Training.

N. 8 Change Management.

N. 9 Failure and External Interference Incident Investigations

Pipeline Integrity Management Program Development Questionnaire Phase 1

N. 1 INTRODUCTION

The Pipeline Integrity Management Program Development Questionnaire is meant to provide the Oil and Gas Commission (OGC) with a mechanism for assessing industry progress in developing pipeline integrity management programs. The questionnaire format follows Annex N in *CSA Z662: Oil and Gas Pipeline Systems* and *CSA Z662S-05: Supplement No. 1* to *CAN/CSA Z662S1–03: Oil and Gas Pipeline Systems—Annex N Guidelines for Pipeline Integrity Management Programs (Annex N).* Except for N. 2, all other numbering corresponds with the applicable clause within Annex N

This Phase 1 Questionnaire is intended to continue the OGC's commitment to engage industry in discussion with respect to the development and implementation of pipeline integrity management. This Phase 1 Questionnaire is related to the requirement to develop an integrity management program that covers off Annex N Clauses N. 1 to N. 9 as stated in OGC Information Letters 06-12 and 07-05.

The key objectives of this development questionnaire are to:

- Assess at what stage of developing a documented pipeline integrity management program companies are in,
- Determine if companies are identifying and addressing the necessary elements of pipeline integrity management program required in relation to their specific pipeline system(s),
- Determine if companies are developing integrity management plans and procedures in accordance with Annex N, and
- Provide information on which to base OGC verification and audits of the development and implementation of the pipeline integrity management program.

When completing the questionnaire you may attach additional comments related to specific sections at the end if necessary.

Requirements that have not been met, in whole or in part, attach a schedule that indicates the date the requirements will be completed.

NOTE: At this time the OGC is assessing for completeness of Annex N, Clauses N. 1 to N. 9 - it is not, at this time, verifying the quality of each element. The initial review conducted by the OGC does not imply long-term acceptability of the company's integrity management program or related processes.

Where the term "documentation or documented" appears within this questionnaire it means that the element, process, procedure or requirement has been established, recorded, filed and maintained, and has been or is in the process of being implemented.

N.2 Company INFORMATION

Company name	**Terasen Gas Inc**
Name of person completing form	**Susan Uzupis**
Position in company	**Quality and Compliance Manager**
Position in pipeline integrity management program (e.g., manager, technical specialist)	**Manager within Transmission Operations responsible for IMP implementation.**
Contact information (address, telephone, fax, e-mail)	**16705 Fraser Highway** **Surrey, BC V4N 0E8** **604-592-7868 fax: 604-592-7420** **susan.uzupis@terasengas.com**

N. 3 DOCUMENTATION AND INFORMATION METHODS

This section assesses if the methodologies selected by the companies for collecting and integrating information are effective.

QUESTION	RESPONSE
a) What personnel are responsible for developing, implementing and maintaining the integrity management documentation system?	The Quality and Compliance Manager is responsible for documenting the technology and information landscape and for gathering requirements and developing the technology plans to most effectively manage integrity information.
b) Describe the structure of the company documentation system that will be used to demonstrate compliance with CSA Z662 Annex N.	Terasen Gas' (TG) Integrity Management Plan (IMP) describes the records methodology, our implementation plan will include tasks to ensure systems and procedures are in place for control, storage, retrieval, retention and disposition of records.
c) Does your integrity management program include programs that address the following: • **Environmental protection; and** • **Safety?**	No.
d) If the answer to 'C' above is no, please explain if and/or how these program aspects will be addressed?	These are managed by TG's Director, Environment, Health and Safety as per TG's Environmental and Safety Standards, Guidelines and Practices.
e) When and how will the above program aspects be integrated with your integrity management program?	Not planned at this time.
f) Does your documentation system contain an asset changes (transfers, deactivation, disposal etc.) section?	Yes.

N. 4 PIPELINE INTEGRITY MANAGEMENT PROGRAM SCOPE

This section assesses if the company is accurately documenting its pipeline systems, including a general description, material characteristics, present condition and adjacent land use.

QUESTION	RESPONSE
a.) How will your company describe the assets included in the pipeline system?	A simple list of all assets governed by the OGC is included in the IMP. Other more detailed information is available in the various technology systems as per the technology and information landscape.

b.) How will your company describe the condition of the pipeline systems?	Areas of concern will be documented and prioritized according to risk assessment. Inputs the risk assessment will include CP records, coating condition reports, material records, internal inspection data (where available), natural hazard information and leak history of specific pipeline segments.
c). How will your company integrate adjacent land use into the pipeline system integrity management program?	TG's GIS and land data system performs this duty.
d.) How will your company integrate any other unique or unusual operating or maintenance conditions into the assets description?	If there are any, records will be created and indexed with TG's records information management system (RIM) and will also be integrated into TG's GIS system.

N. 5 CORPORATE POLICIES, OBJECTIVES, AND ORGANIZATION

This section assesses if the company has documented corporate policies and objectives that demonstrates its commitment to the development and implementation of pipeline integrity management programs, within its organization. For integrity management programs to function effectively senior company management must communicate to the organization the importance of meeting company integrity management requirements.

QUESTION	RESPONSE
a.) What personnel are responsible for developing integrity related corporate policies, objectives and performance indicators?	The responsibility for this lies with the Transmission and Distribution Asset managers.
b.) How are the company policies, objectives, and performance indicators communicated to personnel and other stakeholders? **How often?**	• Internally, this is accomplished through annual planning and review, along with ongoing operations planning meetings. • During employee orientation when new employee joins the company or when internal transfers occur • Yearly during individual performance planning, standards, guidelines and measures are reviewed for their tasks. • Contractors are apprised of these whenever a contract is activated or annually for longer-term contracts. • Status of key Performance indicators are communicated to the British Columbia Utilities Commission on a quarterly basis.
c.) What methodology is being used to determine the types of consequences the company considers significant and the rationale for determining their significance? Include personnel responsible and where the above is documented.	Described in TG's IMP. The annual Enterprise Risk Management review also address these.
d.) Where are the following elements and responsibilities of the integrity management programs defined and documented? (include any other you may have)	Described in TG's IMP.

(i) pipeline integrity management program development and improvement;	
(ii) Records management;	Described in TG's IMP.
(iii) pipeline integrity management program planning and reporting;	Described in TG's IMP. Funding is determined as part of the annual review of budget needs. Reporting is performed by the Asset Mgrs to the Executive on an annual basis.
(iv) implementation of plans;	Described in TG's IMP.
(v) integrity performance indicators; and	OGC reportable incidents has been a performance measure for the past 10 years. Others are to be developed as part of the IMP implementation.
(vi) Integrity program audits, reviews, and evaluations.	Described in TG's IMP.
e.) How are the above responsibilities communicated to personnel?	Formal communication plan to be developed as part of the IMP communication plan.

N.6 PIPELINE INTEGRITY MANAGEMENT PROGRAM RECORDS

Integrity Management Program records must be established and maintained to ensure the effective development, implementation, control and operation of the integrity management program, and to provide evidence of compliance with regulatory, CSA Z662 and Annex N requirements. This section will assess if a company has a methodology for managing the records that are necessary to perform the activities included in their pipeline integrity management programs. Records should cover the lifecycle of the assets including design, construction, operation, maintenance and abandonment.

QUESTION	RESPONSE
a.) What personnel are responsible for developing procedures for the creation, updating, retention and deletion of integrity management and pipeline design, construction, operation and maintenance records?	See response to N3.a
b.) What methodology is used to determine what items will be included in the integrity management program records?	See response to N3.b
c.) What items are included in the company's integrity management program records?	See response to N3.b
d.) How does the company ensure contractor or 3rd party operator records are collected and integrated into existing documentation?	Will be part of contract and responsibility of contract manager to ensure delivery.

e.) What items are described in the integrity management records index?	All documents and records required for code and internal standards compliance.
f.) Where is the integrity management records index filed?	Will be filed in Terasen Gas's Records Information Management (RIM) system
g.) What methodology is used to communicate to company personal the location of integrity management records and the process for accessing the records?	Communication methodology will be rolled out in conjunction with IMP implementation

N.7 COMPETENCY AND TRAINING

This section will be used to assess the adequacy of competency and training requirements for company personnel, contractors, and consultants performing activities that may affect the pipeline integrity management program. Appropriate competency requirements should be based on education, training, skills and experience. Appropriate training requirements should give those involved the knowledge and skills for performing the activities of the pipeline integrity management program for which they may affect.

QUESTION	RESPONSE
a.) What company personnel are responsible for developing competency requirements?	Defined in sections 5.2 and 6 of IMP
b.) What company personnel are responsible for developing and implementing training requirements and training frequency?	The managers mentioned above, in conjunction with the Mgr, Training are responsible for developing and implementing training requirements and training frequency.
c.) What policies and procedures does a company have for identifying competency and training requirements for **i) Company Personnel,**	The Company is currently developing a more stringent quality assurance framework for implementing and documenting competency and training requirements for all of its employees, contractors and consultants. The purpose of developing and implementing a quality framework is to ensure all fieldwork and related fieldwork data is compliant with codes and corporate standards. Detailed planning and implementation is being developed as part of the IMP implementation plan.
ii) Contractors, and	See above
iii) Consultants?	See above
d.) What methodology is used to evaluate the knowledge and skills of employees, contractors and consultants?	To assist in the development of training and competency requirements for the above, the Company is reviewing the DACUM approach (Developing a Curriculum) which is a curriculum development process that has been found to be effective, quick and valid. It is also an approach to occupational analysis in terms of duties, tasks, knowledge, skills, traits and attitudes. This approach will vary to meet the requirements of specialized areas (e.g. LNG and Gas Control)

e.) Where are competency and training evaluations, training and records requirements filed?	These records are kept by Human Resources and the Training Department.
f.) What methodology is used to measure the effectiveness of the competency and training requirements?	Details here are work in progress, effectiveness assessment methodology will vary based on activity.
g.) What process does the company have to measure the extent to which company personnel, contractors and consultants are aware of the relevance and importance of their pipeline integrity management activities and how they contribute to achieving company pipeline integrity management goals and objectives?	Awareness of company personnel, contractors and consultants regarding relevance and importance of their pipeline integrity management activities will be measured through internal audits and assessments. Effectiveness of the IMP communication plan will be measured through these audits and assessments, which will be performed on a periodic basis and formally documented.

N.8 CHANGE MANAGEMENT

This section will assess if a company has developed and implemented a change management process that adequately identifies and evaluates changes that affect the integrity management program. The process should include activities initiated and controlled by the company, and activities that are initiated and controlled external to the company.

QUESTION	RESPONSE
a.) What company personnel are responsible for developing the change management process?	Change Management philosophy has been described in the IMP. This is a work in progress by Quality and Compliance manager to develop process including forms, evaluation criteria, change mgmt and communication needs. Will be developed into company standard.
b.) What company personnel are responsible for implementing the change management process?	The Transmission and Distribution Asset managers are accountable for implementation and effective operation of the change management process. Implementation will be facilitated by the Quality and Compliance manager. All personnel will be responsible for following the process.
c.) What methodology will be used to identify and manage anticipated and actual changes that affect pipeline integrity management?	The methodology is a work in progress: Standard and best practice change management techniques are being assessed for implementation. The methodology will be kept simple to avoid undue overhead and to ensure ease of use by all personnel.
d.) What does the change management process consider?	Any and all changes that could impact integrity, with particular attention to changes impacting more than one business unit and/or external parties. Examples are shown in the IMP
e.) Describe the process for reviewing, validating or verifying, approving and implementing change.	This is work in progress: see response to a) above

f.) What company personnel are responsible for analyzing and evaluating the reason and effect of change on the integrity management program?	Work in progress: see response to a) above
g.) How are changes communicated to company personnel, contractors and consultants?	Work in progress: see response to a) above

N.9 FAILURE AND EXTERNAL INTERFERENCE INCIDENT INVESTIGATIONS

This section will assess if a company has established procedures for investigating, reporting, and evaluating failures, external interference incidents and where necessary, repairs. Failure and external interference incident investigations must be documented, and the results:

- used in the company's continuous improvement process, and
- used to assist in the development and improvement of procedures for use during pipeline emergencies.

Failure means an unplanned release of service fluid due to failure of pipe or component

External Interference Incidents means mechanical damage to pipe, component or coating without release of service fluid.

QUESTION	RESPONSE
a.) What company personnel are responsible for establishing procedures to investigate, report and analyze failures and external interference incidents?	The Director, Environment, Health and Safety and staff are responsible for the Corporate Standards for investigating integrity, safety and environmental incidents.
b.) What methodology is used to integrate the results of incident investigations and failure analysis with previous incidents and failures?	Data integration of previous investigations and failure analysis is work in progress, to be part of an overall integrity data integration approach currently being developed and implemented by our System Integrity group. At present, our Corporate Standards OHS 01-02: Reporting and Investigating Incidents & Occupational Diseases and OPM 09-11: Reporting Gas System Incidents to Regulatory Authorities provide methodology. OCG requirements for incident investigation on reportable incidents are a key input into determining data-gathering requirements for failure analyses and incident reporting.
c.) What company personnel are responsible for analyzing the results of incident and failure investigations?	Each business unit is responsible (Transmission, Distribution) for analyzing the results of incident and failure investigations. Technical resources are obtained through our Operations Engineering group as necessary. Transmission and Distribution business units follow the Terasen Corporate Standards for investigating integrity, safety and environmental incidents, including near misses, damage and failure incidents.

d.) What methodology, based on incident and failure investigation, is being used to evaluate the need for change to improve the effectiveness of the company pipeline integrity management program?	TapRooT®Root Cause Analysis is performed where appropriate
e.) How are the results of incident and failure investigations communicated within the company?	The manager in charge of an incident is responsible for ensuring that the notification and reporting requirements are met.
f.) Where are incident and failure investigation and analysis filed?	Filed in TG's Asset files and will be indexed using the records information management (RIM) system once implementation is completed.

Attachment 9.1

Field Mobile Strategy Project

3.1 Distribution Workforce Strategy

June 2006 – Final Version

Document Purpose / Revision History

Document Purpose

- This document outlines Distribution's strategy with regard to the types of field work it performs and the types of workforce it utilizes to carry out that work. This document was developed as part of the Field Mobile Strategy Project to ensure that any future process, technology and organizational solutions are aligned with Distribution's overall strategy with regard to work and its workforce.
- This document was developed by a team composed of Brent MacPherson, Doug Juby, Graham Henderson, Mark Fabbro, John Turner, and Hugh Smith.

Revision History

Version	Date	Author	Comment
0.1	June 8, 2006	Hugh Smith	Initial draft for review
0.2	June 8, 2006	Brent MacPherson	Edited
0.3	June 12,2006	Brent MacPherson	Sent for review

Contents

Executive Summary / Key Points

- No current plans to exit any types of work other than direct customer “fee for service” work (i.e. no major changes on the horizon)
- Will increase amount of work performed for 3rd Party organizations via Terasen Energy Services (TES) – e.g. Sun Peaks
  - Work for 3rd parties must be fully integrated with Terasen processes to avoid duplication of effort and inefficiencies
- Amount of Meter Exchange activity may decrease substantially due to changing meter technology, but not within the next 5 years
- Field staffing approach will continue to be based on “operational footprint” to define base internal requirements
  - Goal is to maximize work performed by the base set of resources to minimize costs and maintain core skill sets
  - Assign additional workload to contract resources to manage demand fluctuations and minimize cost
  - No definitive model for which workforce can perform which work types
    - Sliding scale based on preferences, but governed by need to minimize costs
- Distribution will continue to contract routine installation work
  - Work with small contingent of contractors with 4 to 5 year contracts
  - Unit price based contracts
  - Distribution will not seek to optimize or directly manage contractor crews

Background Information

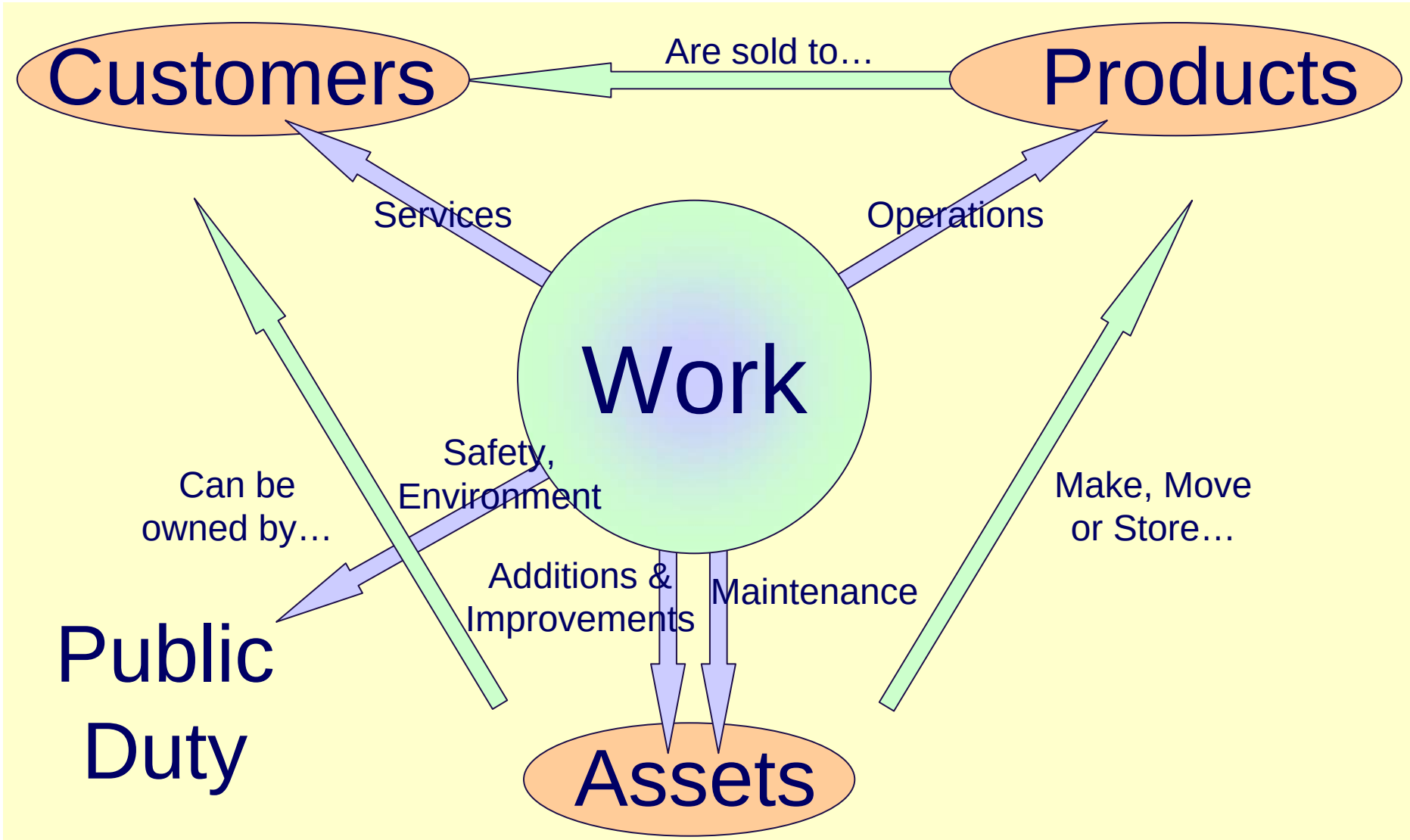
Distribution's Operating Context

- As its core business, Distribution manages Terasen Gas Utility's "distribution" assets - from the inlet of regulating stations to the outlet of gas meters at customer's premises. To support the management of these assets, Distribution organizes a field workforce comprised of a combination of internal employees and external contractors. Distribution also administers a series of work processes that are required to support the management of both the assets and the field workforce.
- Because of the distributed nature of Terasen's asset base, and the potentially dangerous nature of natural gas, Distribution also supports a substantial Public Duty in terms of responding to gas emergencies and ensuring the public safety.
- Distribution also performs specific types of work for other Terasen Gas departments, notably Meter Exchange field work for the Measurement Technologies group and leak survey services for the Transmission group.
- Distribution also performs contracted services for 3rd party organizations – either via direct contract as for some Emergency First Response services, or through Terasen Energy Services (TES). These services typically include routine maintenance and emergency response activities, but may also include construction services.
- Terasen Gas out-sources support of its meter-to-cash business process to Accenture Business Services for Utilities (ABSU), and through this arrangement, Distribution provides meter investigation and customer lock-off services as required by the meter-to-cash process.

Work Management Strategy

- Work can be categorized based on four fundamental dimensions of any business: **Assets** are used to make / move / store **Product**, which is sold to **Customers** – to whom services can be directly provided – all of which is governed by the need to fulfill the **Public Duty** by ensuring the public, employees, and environment are kept safe.
  - Asset based work involves construction and maintenance of the company's asset base.
  - Product based work (generally referred to as "operations") are the tasks performed to make, move, store, or distribute the product.
  - Customer based work is service provided directly to a customer, generally to service the product after it has been purchased (either to support a warranty or for a fee).
  - Public Duty work involves ensuring the public, the company's employees, and the environment are kept safe through maintaining emergency preparedness and response procedures.

Work Management Strategy



Overall Work Strategy – Asset Based Work

- Asset Based Work (including the following work types)
  - Customer Growth: Growth of Asset base as driven by customer additions (i.e. Order Fulfillment work)
  - Upgrades: Asset base improvements and capacity driven growth
  - Agency driven asset alterations (cost recoverable)
  - Preventive and corrective maintenance: Ongoing inspections and repairs to ensure the health of the asset base
  - Meter Exchanges: Meter sample and recall work as directed by Measurement Technologies to meet Measurement Canada requirements
- For Terasen owned assets:
  - Will continue to be **core** work performed by Distribution
- For 3rd Party owned assets:
  - Will continue to be done via relationship with Terasen Energy Services (e.g. Sun Peaks, Star Gas etc).
  - Work for 3rd parties is expected to grow
  - Processes must be integrated with work for Terasen assets
    - No duplication of effort with TES
    - Not managed as workarounds (not efficient)
  - Specific work performed depends on individual contracts
    - Provision of Meter Exchange work requires special consideration due to existing process integration with Energy CIS for Terasen meters.

Asset Based Work – Specific strategies

- Customer Growth Work
  - 5 year Horizon: Continue to grow this form of work for the next four years commensurate with achieving the goal of 1,000,000 customers by 2010.
  - Longer Term Strategy: This type of work will continue to fluctuate as it is directly tied to the growth within the province. These fluctuations need to be accounted for in resource planning.
- Upgrades
  - 5 year Horizon : Work is expected to remain stable based on the annual budgeting cycle for Category B capital.
  - Longer Term Strategy: Expected to remain stable. While overall asset base health should improve over time requiring less investment, this will be off-set by growth of the asset base.
- Agency driven asset alterations
  - Work is expected to continue to fluctuate based on economic activity within the province, with overall slight growth due to the growth of the asset base in both the near and longer terms.
- Preventive and corrective maintenance
  - 5 year Horizon : Expected to remain stable as reductions in activity off-set by asset base growth.
  - Longer Term Strategy: Slowly reduce the amount of activity through improved risk management techniques and through improvement to the overall asset base quality (i.e. designing out of repetitive failures).
- Meter Exchanges
  - The volume of work performed is driven by Measurement Technologies, who are pursuing strategies to reduce the amount of work by investing in new metering technologies and improved risk management techniques.
  - 3-5 year Horizon : Expected to be variable dependent on meter recall “opportunities”, reductions in activity due to improved forecasting to be off-set by growth and timing of MT’s meter fleet replacement strategy.
  - Longer Term Strategy: Potentially dramatic reduction in activity due to migration to new “Sonix” meter technology requiring no meter exchange (15 to 20 year battery replacement cycle)

Overall Work Strategy – Public Duty Based Work

- Public Duty Based work (including the following work types)
  - First response for gas odour calls
  - Repairs due to system damage
  - Line locates
  - For Terasen owned Public Duty:
    - Will continue to be **core** work performed by Distribution
    - "Downstream" gas odour calls: While gas leaks and CO calls downstream of the meter are not technically part of Terasen's Public Duty, they will continue to be treated as if they are due to the general public perception.
    - Line Locating: Terasen will have a consistent line locating policy implemented by the end of 2006, whereby physical locates will only be performed where the paper record is not sufficient for some reason (representing roughly 4% to 7% of calls). This number should slowly decrease over time due to improvement in as-built records.
  - For 3rd Party owned Public Duty:
    - Will continue to be done via relationship with Terasen Energy Services (e.g. Sun Peaks, Star Gas etc) or via direct contract (e.g. UBC).
    - Work for 3rd parties is expected to **grow**
    - Processes must be integrated with work for Terasen assets
      - No duplication of effort with TES
      - Not managed as workarounds (not efficient)
    - Specific work performed depends on individual contracts

Overall Work Strategy – Product Based Work

- Product Based work (including the following work types)
  - On demand / special meter reads
  - Customer Account field work (lock-offs, unlocks & relights, meter investigations)
  - For Terasen owned Product:
    - Given that the meter-to-cash process has been outsourced to Accenture Business Services for Utilities (ABSU), this work is essentially provided as a direct service to ABSU, although Distribution is not specifically contracted to provide them.
    - Distribution will continue to ensure these services are provided due to their close association with company cash flow. Where it is deemed to be cost effective, these services may be outsourced to a contractor (e.g. lock-offs in Lower Mainland currently done by contractor).
  - For 3rd Party owned Product Duty:
    - Despite current plans to fully "unbundle" the gas commodity from the gas delivery, gas billing will be performed via the current outsourced meter-to-cash process (including the fact that Terasen will continue to own any bad debt incurred).
    - As a result, while the product may be owned by a 3rd party, this has no material impact on how the work is performed or the strategy related to its performance.

Overall Work Strategy – Customer Based Work

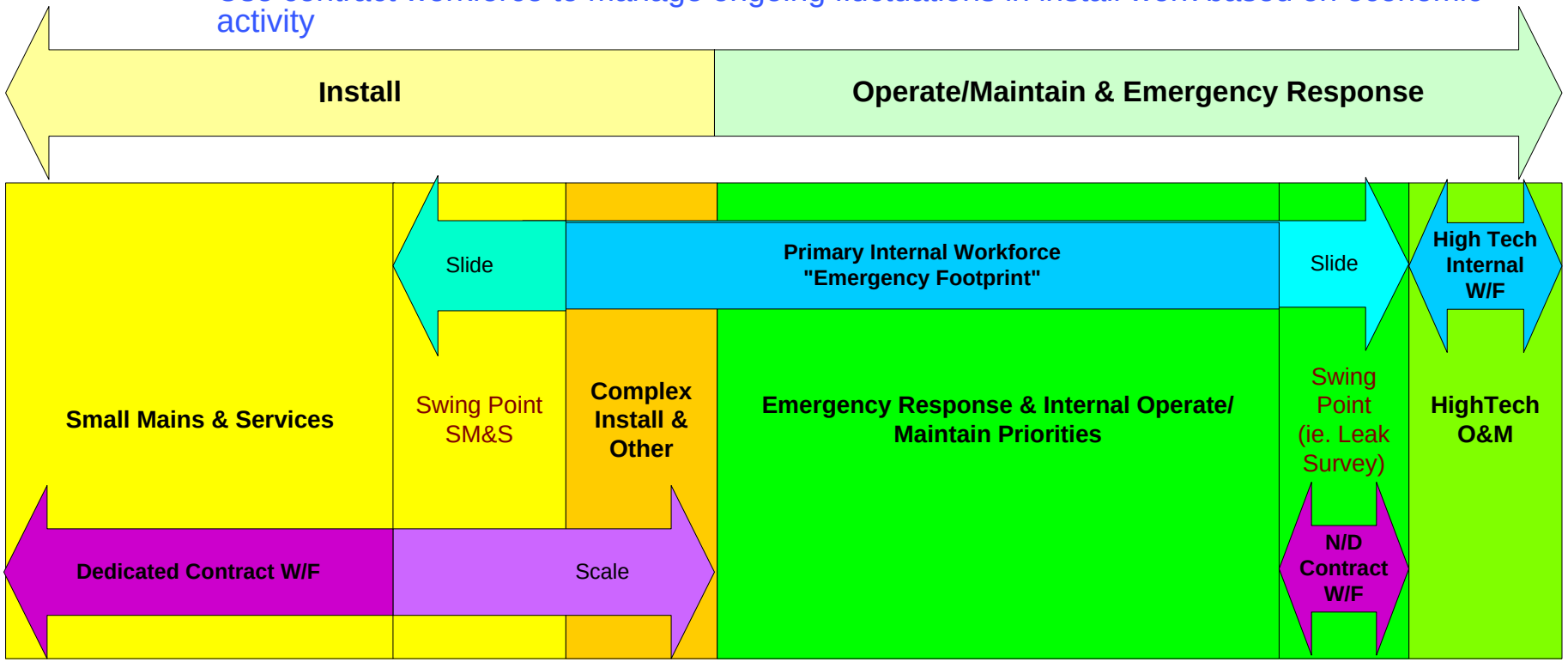
- Customer Based work
  - (including the following work types)
    - Fee for service work
  - While at one time, direct customer burner tip work formed a portion of Distribution's work, the strategy has been to retreat from any work downstream of the meter.
  - Fee for service work will also be exited in the immediate future (if it has not been fully exited already).

Workforce Strategy

- Will continue to manage a mixture of internal and contracted resources, with no plans to move any work to a fully outsourced 3rd party model
- Internal staffing levels based on maintaining "core" gas related skills and requirements to respond to emergencies and maintain system integrity (i.e. the "operations footprint" model)
  - There are no plans to move to outsourcing or contracted resources for emergency response work (there are rare situations where a contracted resource may be used for vacation coverage in remote areas).
- Resources managed on the basis of skills rather than job descriptions
  - Not all people with same job description have the skills to perform the same work.
  - While the overall strategy is to move to a more generally skilled work force rather than specialists, this does not imply that all resources will be trained or need to be skilled for all work types.
  - Geographic work forecasts will be used to determine upcoming skill set requirements, which will determine training plans.

Internal/External Value proposition

- Cannot absolutely delineate what work types will be performed by contractor versus employees.
- Will continue to use sliding scale based on focusing employees on core gas skill work and shorter duration work to be available for emergency response
  - Use contract workforce to manage ongoing fluctuations in install work based on economic activity



Internal/External Workforce Alignment
Considerations

- Are the skill sets required in this area of the business important to have in-house? (critical delivery activity i.e. public safety, system integrity, etc.)
- Are there non-core activities that enhance economies of scale (for the internal workforce) if kept in-house?
- Does the external market have access to economies of scale not accessible in-house?
- Does an external provider have the ability to manage peaks that the company does not?
- Does the company have a competitive advantage in delivering this work?
- Is there a value proposition to increasing or decreasing the level of external resources?
- Is there a value proposition to delivering internally or externally?

Core/Non-core

- Core and Non-core work does not map directly to Internal and External delivery:
  - Install
    - Non-core work with Internal option
  - Operate & Maintain
    - Core work with External option
  - Customer Care
    - Core and out-sourced

Contractor Strategy

- Distribution will continue to move to more of a partnership model with its contract work force:
  - Fewer contractor companies
  - 4 to 5 year contracts
- Contracts will continue to be unit price based with no guarantees on the volume of work (except in specific cases such as LP replacement projects).
- Distribution does not intend to optimize the contractor crews, that responsibility is left to the contractor
  - Current contracts are designed to provide incentive for the contractors to optimize themselves
- Contractors must provide accurate weekly and monthly manpower forecasts so work can be booked and scheduled correctly to meet customer commitments, and must provide daily status updates on work
- Will move towards allowing direct access to ClickSchedule for contractors so they can see and manage their work load more effectively
- May move to using more mobile technology for field data capture if leads to value in eliminating back-office closing functions

Geographic Consideration

- The workforce strategy does not vary geographically, however, practical differences between regions will impact application:
  - In rural areas it is more likely that all work types will have to be done by internal resources
    - This situation could also occur in urban areas if work volumes drop significantly (e.g. 1997)

Other Considerations

- NGV station maintenance and operations as potential new work
- Quality assurance as a new type of work
  - Of contractor installed plant
  - Not yet in product model
  - General worker, via dispatch
- May retreat from Vertical sub downstream piping (vertical header) and meter hanging – again no definite plans
  - Hydronic metering (new technology)
- Consider meter exchange as potential future swing point (to HVAC companies). Needs conceptual design as technology may impede ability to outsource.

Appendix A

Background Information

Definitions

- Product – Moves through the value chain, increasing in value
  - Most closely associated with cash flow
  - Has characteristics, including quality
- Customer – Pays to own, rent, use (etc.) products
- Asset – A physical item that is used in the process to make, move, store (etc.) products

The Strategic Elements of Work 1

➢Ownership of Asset work depends on –

- Who owns the Asset?
  - We own the asset
  - Customer owns the asset
  - A 3rd Party owns the asset
- Who does the work?
  - We do the work
  - Service Provider under contract to us does the work
  - A 3rd Party does the work

➢Ownership of Customer work depends on –

- Who owns the Customer?
  - We own the customer
  - A 3rd Party owns the customer
- Who does the work?
  - We do the work
  - Contractor does the work
  - A 3rd Party does the work

➢Ownership of Product work depends on –

- Who owns the Product?
  - We own the Product
  - A 3rd Party owns the Product
- Who does the work?
  - We do the work
  - Contractor does the work
  - A 3rd Party does the work

➢Ownership of Public Duty work depends on –

- Who holds the Public Duty
- Who does the work

Asset Work Ownership Matrix

	Terasen Owns Asset	Customer Owns Asset	3rd Party Owns Asset
Terasen performs work	Continues to be core to business	UBC Emergency response	Plan to grow work through TES (Sun Peaks)
Contractor performs work	See workforce approach. Consider dedicated contractor for demos	As above	As Above
3rd Party performs work	Can see on the horizon for customer growth. Driven by market Not an all or nothing model. Perhaps specific products such as vertical subs		

Customer Work Ownership Matrix

	Terasen Owns Customer	Customer Owns Customer	3rd Party Owns Customer
Terasen performs work	Retreat fully		N/A
Contractor performs work	N/A		N/A
3rd Party performs work	N/A		

Product Work Ownership Matrix

	Terasen Owns Product	Customer Owns Product	3rd Party Owns Product
Terasen performs work	Direct link to cash flow (i.e. bad debt). Perform or find someone who will. Contract lock-offs in lower mainland.		Exists now due to unbundling, but does not impact processes due to meter ownership and use of ABSU for billing.
Contractor performs work			
3rd Party performs work	Lower Mainland lock-offs (ABSU direct to dedicated contractor)		

Public Duty Work Ownership Matrix

	Terasen Owns Public Duty	Customer Owns Public Duty	3rd Party Owns Public Duty
Terasen performs work	Core business	UBC under contract.	Via TES.
Contractor performs work	Very limited (only vacation coverage in remote areas)		
3rd Party performs work	Hazardous spills for liquid propane (Whistler). Specialized skills.		

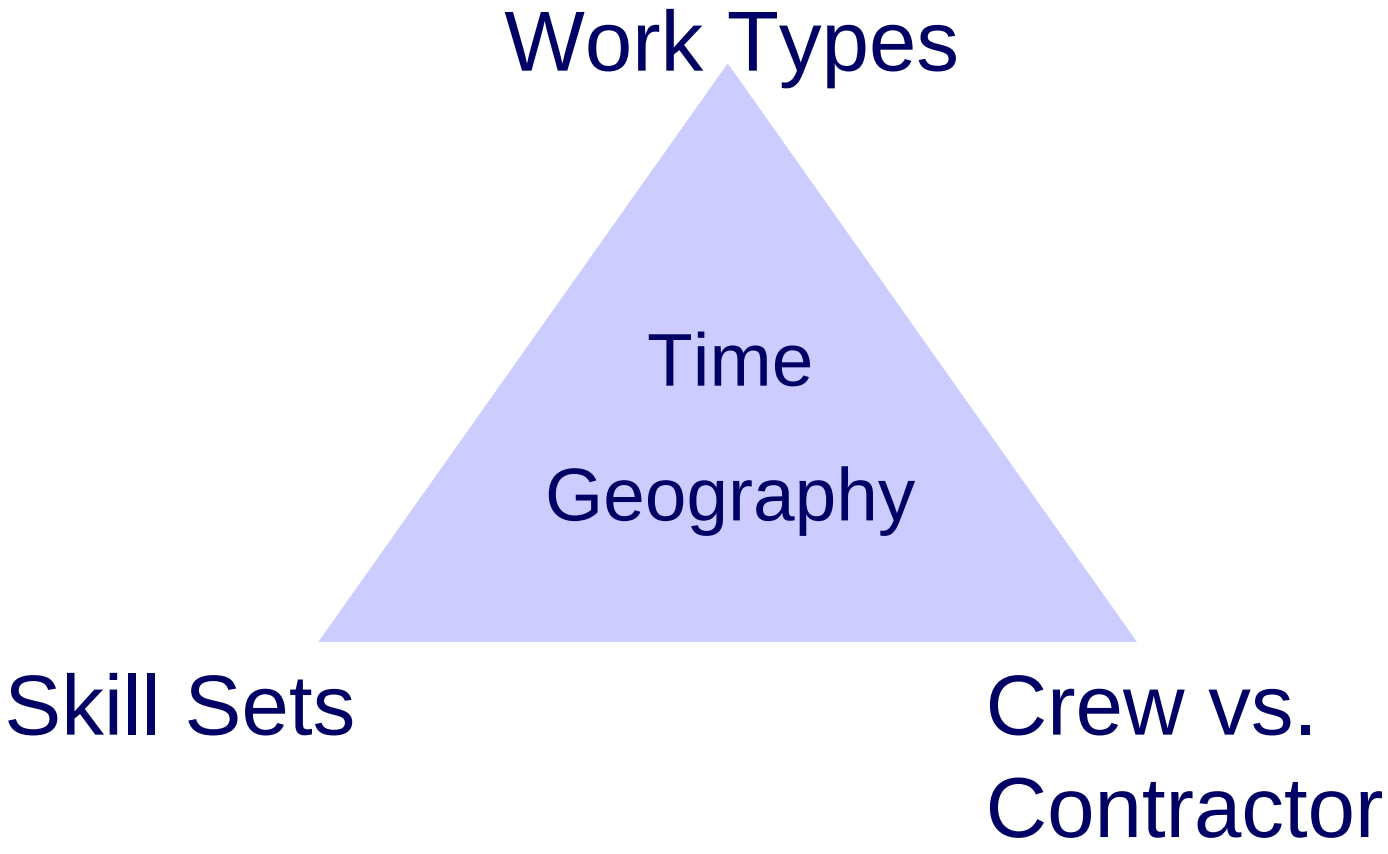
Appendix B

Workshop Notes

Background Information

- A Workforce Strategy is a key initial piece to developing a Field Mobile Strategy (which is key to replacing Mobile UP)
  - Once technology is implemented it becomes much harder to change things – we need to get it right
  - Need to ensure cost of implementing technology is well spent and helps achieve the overall Workforce Strategy
- From the perspective of the “Mobile UP Replacement Project”, developing a Workforce Strategy is just risk mitigation
  - Looking for crux decisions that would impact the nature or the extent of the solution we implement
  - Do not need every detail worked out and signed off for the project to proceed, we will simply treat key items as assumptions / risks to be managed
  - How Distribution chooses to use the Workforce Strategy for other purposes is a separate decision

Elements for Discussion



Work Types

- Categorize the types of work that Terasen will perform in the field
  - Use current product model as a base
- Are there any work types Terasen will retreat from or new types of work they will take on?
- Consider the implications of changing meter technology that may impact the need to perform physical meter exchanges
  - Where can we gain more information on this?

Skill Sets

- What skill groupings will Terasen have?
- Will the company move to generic field workers, specialized field workers, or some combination?
- How do the skill sets map to work types?
- How do the skill sets map to contractors versus internal crews?

Contractor vs. Crew

- Can work type be mapped to contractor versus crew?
- How flexible vs. definitive do we need to be in developing work rules?
- What relationship will Terasen have with its contractors?
  - Partnership
  - Competitive marketplace?
- How will contractors be rewarded?
  - Pure unit price or guaranteed base load
  - Impact on ability to forecast and time horizon

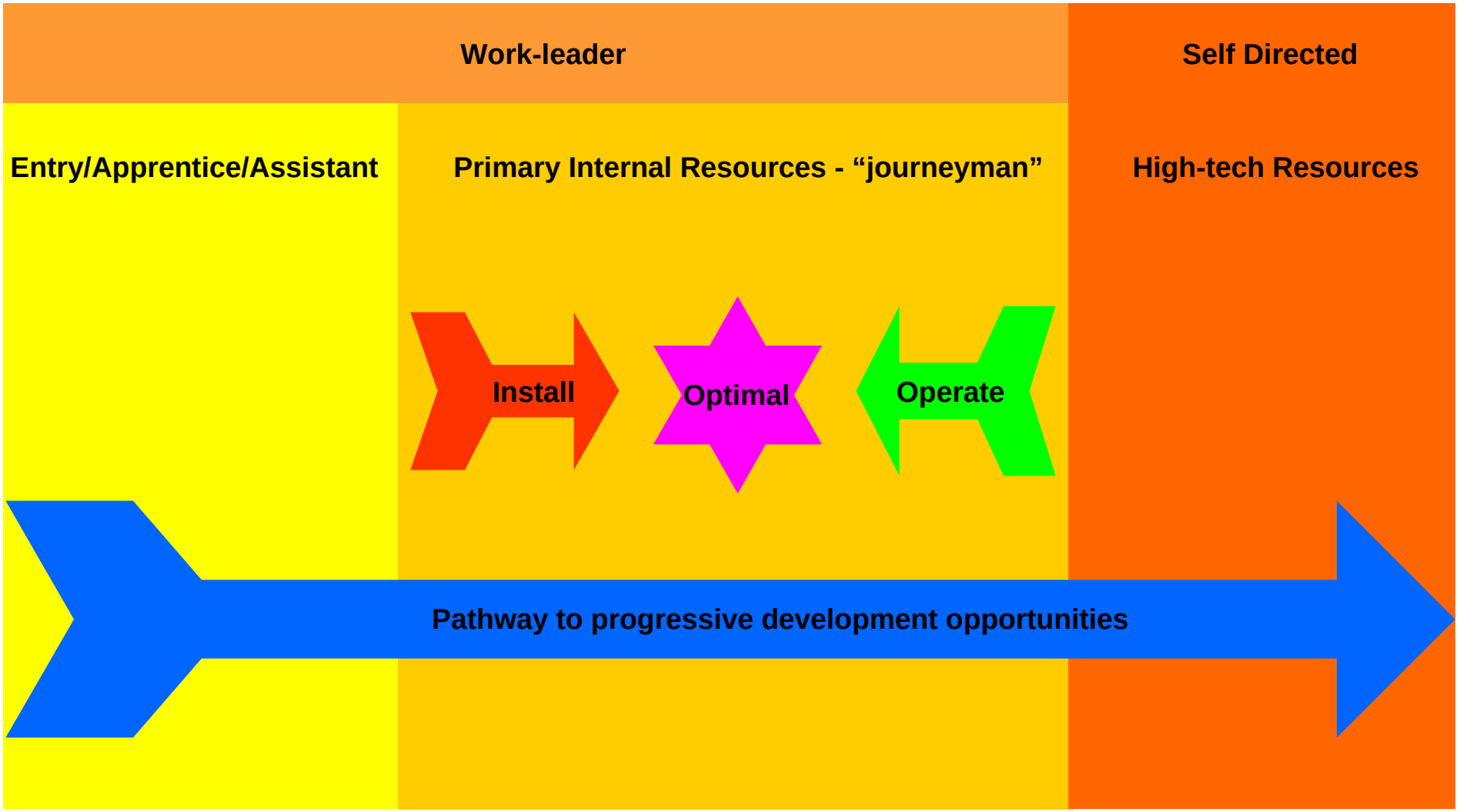
Time and Geography

- Each of the elements discussed thus far need to considered in terms of:
  - Geography –
    - Is strategy consistent province wide or are there regional groupings?
    - Lower Mainland vs Interior vs CRD vs North Island
  - Time –
    - What is the expected timeline for achieving components of the strategy?
    - How long will transitional states live

Suggested Approach

- Gather background data:
  - Hopefully, considerable thinking in this area is already complete and can be leveraged:
    - Gather skill set models
    - Gather work type models
    - Gather plans re: management of contractors
- Execute workshop:
  - Agree on purpose of Workforce Strategy and use within Distribution
  - Examine elements as outlined in this document
  - Consider geographic elements
  - Consider time elements
- Post workshop:
  - Document and review output
  - Plan follow-on workshops / reviews
  - Plan approval process

Job Description/Resource Alignment



Directional Alignment – prudent/practical

- Geographic issue/impacts
- One-size does not fit all
- Focus on stability and value
- Growth is sustainable and meets business requirements

Business Unit Input Common Themes

- Resource flexibility to cope with varying business needs and cyclical events
- Succession planning
- Employee retention and recruitment in higher technical classifications
- Supervisory support to employees
- Enable a logical career path from entry-level positions to journeyman level positions and potentially to higher technical or specialized classifications

Purpose of This Document:

This document summarizes the results of the Work Type Analysis workshops, and describes all of the field work performed by Terasen Gas' Distribution workforce. As such, it provides a comprehensive overview of the business requirements that must be supported by the envisioned process and technology solutions. The contents are a summarized view of the information captured during the workshops, more complete detail is available in the individual analysis workshop documents.

The analysis covers the following 10 types of work highlighted below:

1. Asset Based Work
   - 1.1. Maintenance
     - 1.1.1. Corrective Maintenance
     - 1.1.2. Preventive Maintenance
   - 1.2. Operations
     - 1.2.1. Leak Survey and Inspections
     - 1.2.2. General Operations Work
   - 1.3. Hazards Remediation
   - 1.4. Meter Exchange
   - 1.5. Upgrade / Improvement Work
   - 1.6. Customer Driven Construction
2. Customer Based Work (note: since Terasen has fully retreated from this work type, it is not included in the analysis. Customer Line Locates is included in 4.0 Public Duty Work)
3. Product Work
4. Public Duty Work

The analysis is divided into the following 11 sections:

1. **Nature of the Work** – provides an overview of the work types, the current budget and activity level, where the work is performed and how it is identified.
2. **Strategic Considerations** – covers the linkage between the work and the company's goals, and plans to expand or exit the work type.

3. **Forecasting Considerations** – covers how well, and by what mechanisms, the volume of work can be controlled and predicted.
4. **Planning Considerations** – covers the degree to which the work requires planning prior to execution.
5. **Resource Assignment Considerations** – covers who can perform the work and how it is determined who is assigned to a piece of work.
6. **Scheduling Considerations** – covers the elements that impact how the work is scheduled such as constraints, lead times, need for appointments, etc.
7. **Execution Considerations** – covers the items required for the work to be physically executed in the field.
8. **Follow-up / Data Capture Considerations** – covers the requirements for gathering information during the work to support downstream processes.
9. **Related Processes** – examines closely related and supporting processes that may impact the process design.
10. **Financial / Performance Reporting Considerations** – covers how the work is measured, budgeted and controlled.
11. **Process Enablers / Opportunities** – captures areas where there are current issues / potential opportunities with the existing processes that may provide business benefit through the process design effort and technology implementation.

Analysis Details:

1. Nature of the Work				
	1.1 Description of the Work Type	Annual Budget	Capital / O&M	Activities
1.1.1 Corrective Maintenance	Repair or replacement of assets that have failed, and are not currently meeting their intended function.	$2.8 million	O&M	14,350
1.1.2 Preventive Maintenance	Work done on assets that have not yet failed where the task is effective in preventing a future failure, or work done to discover hidden failures that are not apparent through routine operation.	$2.0 million	O&M	8,775
1.2.1 Leak Survey and Inspections	Routine inspections to look for leaks or other failures / hazards, primarily on pipe assets.	$2.1 million	O&M	Measured in meters of pipe
1.2.2 General Operations Work	Routine operating tasks to change charts in stations, clear vegetation, replace signage, check repairs etc.	$1.3 million	O&M	600
1.3 Hazards Remediation	Work done to inspect or correct a hazardous condition, where an installation at a customer's premise is determined not to comply with Terasen Gas standards. Note: This work is actually considered to be either Corrective Maintenance or Asset Upgrade work (the asset is operating out of compliance with company or industry standards and hence represents a risk to public or worker safety, and a determination is made whether the work constitutes a "repair" or an "improvement".	$1.5 million	90% Capital 10% O&M	Unknown
1.4 Meter Exchange	Routine exchange of meters installed in the field for compliance sampling and recall to ensure meters conform to Measurement Canada requirements.	$2.6 million	O&M	33,305
1.5 Upgrade / Improvement Work	Work initiated by the company that is done to upgrade or improve the capacity or quality of the asset base.	$15.4 million	Capital	N/A
1.6 Customer Driven Construction	Work done for customers to add, alter, or remove mains, services, and meters.	$33.4 million	Capital	20,000
3.0 Product Work	Work done to support the meter to cash process (meter reads, lock-offs, meter investigates etc.). Work that relates to billing.	$2.9 million	O&M	77,000
4.0 Public Duty Work (emergency response)	Work done to ensure the safety of the public by being first responders to potentially unsafe situations: hit lines, gas calls, fires and explosions, etc. Includes physical line locates.	$7.3 million	O&M	117,000

	1.2 What **Asset Types** are covered by this work type?	1.3 **Where** is the work done?	1.4 Is the work **Billable**?
1.1.1 Corrective Maintenance	Meter Sets – Industrial/Commercial Meter Sets – Residential Meter Devices (Portable Instrumentation, Communications, Electronic / Control Equipment, and AMR) Propane Equipment (Storage, Transfer, Regulation, and Vaporization) Pipe - Mains Pipe - Services Regulator Stations Valves – Main Valves – Service Bridge/River Crossings Odourant Facilities Line Heaters	At a Premise At a Premise At a Premise At a Facility At a Main At a Premise At a Facility At a Main At a Premise Special functional location At a Facility At a Facility	Not billable for Terasen Assets
1.1.2 Preventive Maintenance	Meter Sets – Industrial/Commercial Meter Devices (Portable Instrumentation, Communications, Electronic / Control Equipment, and AMR) Propane Equipment (Storage, Transfer, Regulation, and Vaporization) Regulator Stations Bridge/River Crossings Odourant Facilities Line Heaters	At a Premise At a Premise At a Facility At a Facility Special functional location At a Facility At a Facility	Not billable for Terasen Assets
1.2.1 Leak Survey and Inspections	Pipe (mains and services) Meter sets Valves (Main valves and service valves) Rights-of-way ROW	A geographic area (bounded in AMFM, which maps to a specific functional location in SAP)	Not billable for Terasen Assets

	Corrosion, pipe crossings		
1.2.2 General Operations Work	Pipe - Mains Pipe - Services Regulator Stations	At a Main At a Premise At a Facility	Not billable for Terasen Assets
1.3 Hazards Remediation	Meter Sets Pipe - Services	90% at a Premise	Sometimes. Five year rule – if hazard incurred by customer within past 5 years (and we can prove it) we will bill the customer. Proof is hard to get.
1.4 Meter Exchange	Industrial and Residential meters.	At a Premise	Not billable for Terasen Assets
1.5 Upgrade / Improvement Work	Mains (service headers as well, although rare) Regulator Stations Meter sets Telemetry / communication systems Valves Cathodic protection Propane equipment. Odourant systems IP / TP services (farm taps)	Mostly facilities and mains. Some at premises for meter set upgrades.	Sometimes billable (receivable) if customer initiated. This is the grey area (e.g. RAV line – customer instigated main alteration).
1.6 Customer Driven Construction	Mains (IP, DP) Services Meter sets Farm taps (slightly different)	Mains (new and existing) Premise (new and existing) Farm tap is a facility	Usually billable (based on tariff and pricing rules – not actual costs).
3.0 Product Work	Natural Gas, Propane	Work is usually done at a premise. Meters for line heater fuel are both a premise and a facility.	Sometimes e.g. Unlock / relight can be billable (billed through Energy as a standard charge based on PTJ type)
4.0 Public Duty Work (emergency response)	Gas odour calls, CO calls. Emergency line locates. Fires and explosions. Hit lines. Exposed and stressed lines. Protection of assets – floods, forest fires, security.	Can be done anywhere on system – from transfer point to burner tip (and beyond).	3rd party damage is recoverable (guidelines in place for when we bill or not).
	1.5 How is the **work identified** (internal vs. customer call)? Is it always identified the same way?		

1.1.1 Corrective Maintenance	Meter set – can be identified by a customer, call to call centre (investigate, then repair if required). Meter readers identify – log on terminal and becomes PTJ to dispatch (investigate order). Leak survey, or field techs, managers – either raised as PTJ or notification (residential vs industrial). AMR – identified by measurement analyst, raise notification and order. Leaks on mains and services identified by leak survey, public, field crews. Station repairs identified by techs when doing preventive / investigation work. Gas control also. Valve repairs through valve survey or through trying to use for emergency. Corrosion problems identified by Corrosion Techs or found by construction crews while exposing lines.
1.1.2 Preventive Maintenance	Automatically created via maintenance plans stored in SAP which contain task details and scheduling rules.
1.2.1 Leak Survey and Inspections	Normally via a maintenance plan. A portion are based on request (pre-paving). Usually requested by an internal manager, can be a municipality to an IC1. Request made to Survey group who raises the job.
1.2.2 General Operations Work	Usually by a technician noticing that signage or facility clean-up is required. Tasks such as chart changes not dispatched as orders, just used for cost collection.
1.3 Hazards Remediation	1 Customer calls IC (or calls ABSU and transferred to IC), 5% 2 Leak Survey, 80% 3 Non-survey during other work (e.g. meter exchange), 10% 4 3rd party inspectors (MC, BCSA, OGC) – the email flurry process, holding up occupancy permit. 4% Meter readers identify no access – emailed to IRM who raise notification (that just sit there, no process). 1%
1.4 Meter Exchange	By Measurement Technologies – generate a list (using notifications in SAP) to identify meter exchanges required for the following year. List is generated in November.
1.5 Upgrade / Improvement Work	Mostly internal via ops managers, system planning, asset management, etc. Raise ZE notification to request capital. Customer request for an alteration, raised as a notification.
1.6 Customer Driven Construction	Usually via a customer request. Can be via a sales process - install a main to support future customer demand. Abandonments can be internally generated, escalated lock-off process. All customer driven comes through Café.
3.0 Product Work	External customer calls call centre. Internally via “non-registering” reports – ABSU generates from Energy and raises PTJ. IRM also directly raises meter investigate orders.
4.0 Public Duty Work (emergency response)	Usually a customer call goes to ABSU. Fire department / police dept call direct to “fire” line to dispatch. Can be identified internally (gas control or tech / manager in the field) and direct to dispatch.

2. Strategic Considerations				
	2.1 Does this work type create or destroy value?	2.2 What is the link between the work type and cash flow?	2.3 What is the link between this work type and any department / company goals or strategies?	2.4 Is the strategy to exit, enter, maximize, or minimize this work type? What is the approach and timeframe?
1.1.1 Corrective Maintenance	Cost.	Indirect. If assets are not functioning correctly, cash flow may be impacted.	Core to business.	Minimize. Eliminate common / frequent repairs where changes in maintenance practice or upgrades of the assets are considered effective. Knowledge of asset characteristics and failure history are critical to this analysis.
1.1.2 Preventive Maintenance	Cost.	Indirect.	Core to business.	Neutral. While the general strategy is to minimize this type of work through long term initiatives to design out failures and the need to perform maintenance, given that this work type is generally preferable to corrective maintenance there is also logic for increasing this type of work.
1.2.1 Leak Survey and Inspections	Cost.	None (risk only).	Core business. Regulatory requirement.	Minimize. Use risk approach to perform less, improve asset quality over time to reduce lifecycle operating cost. Long time frame to reduce.
1.2.2 General Operations Work	Cost.	Indirect.	Core to business.	Minimize.
1.3 Hazards Remediation	Cost, billable is some cost recovery only.	None (risk only).	Core to business.	Minimize this type of work after completing the remediation identified from the 5-year leak survey cycle to be completed the end of 2007.
1.4 Meter Exchange	Cost.	Indirect. Ensures accuracy of meters and hence billings.	Core business. Regulatory requirement.	Minimize through investment in better risk management / forecasting software (near term), and through changes in metering technology (longer term). Goal of Measurement Technologies is to move to new technology “smart” meters that do not require physically exchanging to ensure accuracy.
1.5 Upgrade / Improvement Work	Both. Supports customer growth,	Indirect. Increases rate base.	Core to business.	Maximize – given current rate base model.

	but also cost. Adds to value of asset base.			
1.6 Customer Driven Construction	Creates.	Directly relates to growth, increases rate base.	1,000,000 customers by 2010	Grow as per 2010 target in general. - targeting specific segments (vertical subs / multi-family)
3.0 Product Work	Creates revenue, but also a cost.	Direct link (meter readings and dealing with bad debt).	Goal to reduce bad debt (scorecard item).	Minimize non-value added items (meter reads/ investigates) Maximize lock-offs as tied to bad debt reduction.
4.0 Public Duty Work (emergency response)	Cost, although majority is recoverable.	Indirect (prevent loss of gas)	Core to business.	Minimize. Public education / better records keeping, maintenance programs and construction practices etc.

	2.5 Who owns the assets?	2.6 Plans to expand work for 3rd parties?
1.1.1 Corrective Maintenance	Mostly Terasen, but some work performed for 3rd parties via relationship with Terasen Energy Services (TES)	Plan is expand work performed for 3rd parties via Terasen Energy Services (TES) relationship.
1.1.2 Preventive Maintenance	Mostly Terasen, but some work performed for 3rd parties via relationship with Terasen Energy Services (TES)	Plan is expand work performed for 3rd parties via Terasen Energy Services (TES) relationship.
1.2.1 Leak Survey and Inspections	Mostly Terasen, but some work performed for 3rd parties via relationship with Terasen Energy Services (TES) Work for Transmission.	Plan is expand work performed for 3rd parties via Terasen Energy Services (TES) relationship. Want to transfer TP leak survey to Transmission CWMM maintenance Access database.
1.2.2 General Operations Work	Terasen.	No.
1.3 Hazards Remediation	Mostly Terasen, but some work performed for 3rd parties via relationship with Terasen Energy Services (TES)	Plan is expand work performed for 3rd parties via Terasen Energy Services (TES) relationship.
1.4 Meter Exchange	Mostly Terasen, but some work performed for 3rd parties via relationship with Terasen Energy Services (TES)	Plan is expand work performed for 3rd parties via Terasen Energy Services (TES) relationship.
1.5 Upgrade / Improvement Work	Mostly Terasen, but some work performed for 3rd parties via relationship with Terasen Energy Services (TES)	Plan is expand work performed for 3rd parties via Terasen Energy Services (TES) relationship.
1.6 Customer Driven Construction	Mostly Terasen, but some work performed for 3rd parties via relationship with Terasen Energy Services (TES)	Plan is expand work performed for 3rd parties via Terasen Energy Services (TES) relationship.

3.0 Product Work	Combination of Terasen and gas marketers (currently for Commercial, with residential unbundling expands).	
4.0 Public Duty Work (emergency response)	Terasen. Agreements for TES (Sun Peaks etc) Direct contract with UBC. Support agreements with other utilities.	Plan is expand work performed for 3rd parties via Terasen Energy Services (TES) relationship.

3. Forecasting Considerations				
	3.1 Is it possible to control how much of this work is done? What is the mechanism?	3.2 How well can this work be forecasted? What is the mechanism?	3.3 How long does it take to get this work from initial identification into a worker's hands? Why?	3.4 What "constrains" our ability to do more of this work (number of field resources, number of planners etc)
1.1.1 Corrective Maintenance	Very limited. Long term strategy is to reduce this work by improving maintenance practices and asset characteristics, but no real control of how much is required. Some low priority work is discretionary, but would typically be capitalized as part of an upgrade.	Poor. Historical activity levels provides a general indication.	Some work flows directly to field (field initiated, cat 1 leaks). Timing considerations around taking stations off-line (i.e. shutdown work). Maintenance Analysts control process of when to do a repair, and relative priority of work.	Maintenance analyst time to review, prioritize, approve work, including raising of work order. Planners for more complex work. Field crews with correct skills (e.g. valve repairs).
1.1.2 Preventive Maintenance	Very limited. Over the long term, strategy is to reduce this work by improving maintenance practices and asset characteristics, but no real control of how much is required. Much of this work type is driven by code requirements. Previous analysis has been performed to determine most effective task type using risk-based maintenance approach.	Excellent. Maintenance plans can be used to generate forecasts of work required within a given time period.	Very little. Work is essentially "pre-planned" so can be dispatched almost immediately upon creation.	Number of skilled field resources.
1.2.1 Leak Survey and Inspections	Very limited, unless changes to standards.	Very well, driven from maintenance plans.	One to two days. Done as a campaign in the fall to prepare packages. Prep lasts into following year.	Field resources, resources to prep packages and close jobs returned from field. Field equipment – trucks

				with survey equipment (FI unit).
1.2.2 General Operations Work	Limited. Can do less if policies changed, but introduces more risk.	Quite well, based on historical information.	Short time.	Budget.
1.3 Hazards Remediation	Yes. Maintenance Analysts review work backlog and matches to budget. Changes in standard may eliminate need to respond to certain hazards.	Very well. Develop a budget and plan for how much to do in a given year. Forecasted based on prior year leak survey hazards identified.	3 - 5 years for routine hazards (68,000 sitting in the bucket). Emergencies identified bypass routine process and are dealt with immediately. Other work driven (meter exchange) hazards are escalated to the Install Centre and are scheduled for remediation within the year.	Field resources in the Lower Mainland not trained on hazard identification and reporting. Mismatches between field resources and work availability. Install Centre resources for complex hazard planning, scheduling, customer contact. Order initiation for simple hazard remediation orders – converting notification to work order (scanning form 2300 and digital linking). (Ops Closing). Current technology for processing the volume of orders (SAP is more efficient than CAFÉ).
1.4 Meter Exchange	In the near term, no (volume driven by current policies). Longer term, can reduce through better risk management techniques and changing metering technology.	Very well. Can determine exactly how much is required. New forecasting capability being piloted by Measurement Technology to model alternate scenarios.	Spread work load out over the year which delays dispatching.	N/A
1.5 Upgrade / Improvement Work	Yes. Easy. Tied to annual budget	Should be very well. Annual budget and planning process.	3 to 6 months typically. Lower priority work can sit much longer. Analysis and planning	Analyzing, planning and field resources.

			required. Often larger jobs requiring external permitting. Could improve with better mains repair / replace identification process.	
1.6 Customer Driven Construction	Indirect control via marketing and sales campaigns.	Quite well based on historical information and economic indicators. Annual attachments forecast / target. System planning growth forecasts.	Varies depending on complexity and location. Abandonment – 1 week if urgent and inside Property Line. 3 to 4 week generally – FUDs and delivery of job package. Can be limited by crew availability. Can be months for a large job.	Number of planners. Number of field resources. Municipalities a bottleneck to get permits. Support personnel in all areas.
3.0 Product Work	Yes. Changing life-cycle for bad debt management. Could decide not to do some work types (e.g. final reads). Could reduce amount of meter investigates we do (a lot of this is re-work).	Very well based on historical activities. Weather driven.	Almost real time.	Field resources.
4.0 Public Duty Work (emergency response)	Very limited through public education to reduce number of instances. Through risk based policy decisions can eliminate some types of work (e.g. used to go to all fires, but do not any more, only go when they really feel they need us).	Pretty well based on construction activity (building permits). Historical activity with allowance for growth. More gas odour calls in the winter, hit lines in the summer.	Almost immediate.	Number of field resources (emergency footprint model, but can run out in extreme circumstances).

4. Planning Considerations		
	4.1 Does this work require "planning" i.e. the involvement of a skilled resource between initiation and scheduling? Describe.	4.2 Does this work require ordering of materials, special tools, or sub-contracted resources?
1.1.1 Corrective Maintenance	IC2's do some planning for major station work. SOT's generally do their own planning. Decision point as to when "planning" is required, particularly where engineering oversight is required. Hand-off from Maintenance Analyst to a planning resource.	Occasionally requires ordering materials (most material is treated as muster stock). Some work types sent to sub-contractor (arranged by IC2) – e.g. fence and meter cage repairs.
1.1.2 Preventive Maintenance	No.	No.
1.2.1 Leak Survey and Inspections	OSR3 to assemble survey packages (generic job description but specific task).	Sub-contracted resources. Materials (valves). Technician usually gets from stores himself.
1.2.2 General Operations Work	No.	No.
1.3 Hazards Remediation	Yes, all complex customer related hazards including OVER, Complex VENT, STPI, EXSR, CAGE, CAGR, Complex POST/SNOW… See Failure Code Mapping Table	Yes – OPCO regs, valves, Cages, NSRGs, Houseline reconnect, Cage repairs & POST in M&S Contract. Volume of orders is an issue – would like to plan OPCO regs on components tab, but creates too much work for processing in Materials Management.
1.4 Meter Exchange	No.	Current issue with supply of meters and tracking correct quantities in musters (overlaps with install process which also consumes meters from musters).
1.5 Upgrade / Improvement Work	Yes. IC2 or a Project Manager depending on level of coordination involved. May also involve engineering.	Yes.
1.6 Customer Driven Construction	Sometimes, depends on complexity. About 1/3 require planning (IC1).	For complex jobs, yes.
3.0 Product Work	Generally no. Complex meter ID investigate. Ie: crossed meter investigation, stopped meters	No.

4.0 Public Duty Work (emergency response)	No.	Yes. Pipe, excavators, support resources. Arranged by dispatch (passed on to stores for materials). In some areas arranged directly by crews in field.

5. Resource Assignment Considerations				
	5.1 Is this work always / sometimes / never performed by internal workers?	5.2 Is this work always / sometimes / never performed by contracted workers (we "manage" the work?	5.3 Is this work always / sometimes / never performed by 3rd party workers (we do not manage the work)?	5.4 What determines who can do this work? Is the work done by a crew or an individual?
1.1.1 Corrective Maintenance	Almost always – highly skilled asset specific work.	Facility repairs, almost never. Specialist work (bridge crossing repairs). Potential to increase for other special work (fence repairs, meter cage repairs). Pipe repairs may be internal or contract.	Never	Asset type (station, meter set, pipe). Pipe work is crew, facility work one or two techs.
1.1.2 Preventive Maintenance	Always. Highest skilled workers for stations and large meter set maintenance.	Never.	Never	Skill set. Work is generally done by single technician, but larger station jobs may require two technicians.
1.2.1 Leak Survey and Inspections	Sometimes.	Sometimes. Currently do not have a mobile.	Never	Skill sets (specific training required), and equipment. Usually an individual, but some specifics require two people (line patrol).
1.2.2 General Operations Work	Almost always.	Contractors used for some routine jobs (e.g. vegetation clearing).	Never	Skill set.
1.3 Hazards Remediation	Sometimes.	Houseline reconnects subcontracted out by M&S Contractor (if meter needs to be moved) Crossings hazards (i.e. CORR, HANG, COAT, BANK) often handled by PMO due to the scope & skills of remediation required.	Never	Crew for underground. Tech for above ground – determined by skill set.

1.4 Meter Exchange	Always.	Never.	Never	Skill set. Work is performed by a technician.
1.5 Upgrade / Improvement Work	Sometimes. Internal for core skill set.	Mains generally go to contractor. Specialized skills contracted (i.e. directional drilling)	Never.	Skill set.
1.6 Customer Driven Construction	Sometimes. Try to assign work to Terasen crew such that they can be pulled off easily for emergency response.	Sometimes.	Never.	Crew skills. Whether can be done by an individual or not. Equipment (considered part of crew skills). Ability to arc weld for example. Varies by geography (in lower mainland crew calls out welder, in interior assign to crew with arc welder). Tied to job description rules.
3.0 Product Work	Always.	Will sometimes contract out relights (rare). Major outage scenario only where our internal resources cannot get done in reasonable time.	ABSU direct to contractor for lock-offs in lower mainland.	Skill set.
4.0 Public Duty Work (emergency response)	Almost always internal for first response. If we cannot respond quickly enough, may make a decision to call fire department to shut off gas for us – generally for an odour call (does not count for SQI reporting).	Contractor sometime used for vacation backfill for first response in remote communities.	No.	Starts with a skill set. First response generally done by tech. Crew generally needed if underground repair, but moving to tech being able to do for small PE repairs (Techs in interior already do).

	5.5 Does the work sometimes require a helper? How is this arranged?	5.6 What determines which individual will do a specific job?	5.7 What is the strategy regarding who should perform this work?
1.1.1 Corrective Maintenance	Yes. E.g. large meter exchange, heater repair. Call IRM to arrange.	Geography and availability.	Primarily done by internal resources, required skills and capacity based on forecasted workload.

1.1.2 Preventive Maintenance	Yes. E.g. heater tear-down inspection. Call IRM to arrange.	Geography and availability.	Continue to be performed by internal workers (keep as core skill set in company).
1.2.1 Leak Survey and Inspections	Yes. Usually an individual, but some specifics require two people (line patrol). Planned ahead of time, but organized by the techs themselves. Downtown "blitz" organized by IRM (including support help – pressure washers etc).	Geography. Outside lower mainland only one resource per area.	Used to minimize idle time amongst internal workers. Used to keep skill set (leak finding, valve work) amongst internal workforce.
1.2.2 General Operations Work	Yes. Complex planned jobs can require additional skill / help. Sometimes planned for, sometimes arranged in field via call to IRM. IC includes extra Operation on Service Order required or work is assigned to multi resource Contractor.	Availability.	
1.3 Hazards Remediation		Geography and availability.	Assignment of company resources to asset upgrade activities first.
1.4 Meter Exchange	Rarely. Through IRM.	Proximity and availability	Potential for contracting out residential exchanges if cost effective. Could be problematic given degree of system integration in current process (i.e. need to provide contractors with mobile devices). Also, may not make sense given plans to minimize this work via new meter technologies.
1.5 Upgrade / Improvement Work	Yes. Identified by planner, coordinated by IRM.	Geography and availability.	No plans to change. Generally keep with in house crews. Mains work goes to contractor.
1.6 Customer Driven Construction	Yes (for non-crew work). Tech calls IRM to arrange.	Geography and capacity (minimize travel time and idle tile). For larger jobs / projects may have specific crew preference, but generally try to treat them as the same if they have the skills.	Generally the approach is to move more to contractor as long as not impacting idle time. Geographically driven in some areas – not enough work to keep a contractor.

3.0 Product Work	Yes. For safety at times or complex meter identification. IRM coordinates.	Geography primarily. Optimize to minimize travel.	Stays as-is.
4.0 Public Duty Work (emergency response)	Yes. Through IRM.	Proximity and ability to pull off current work. Moved away from “base crew” / construction crew model. Crews pretty much all equipped the same now.	Keep in house (maintain skill set to be able to respond to emergencies).

6. Scheduling Considerations				
	6.1 What time constraints are placed on the work – done in a day / week / month?	6.2 Does the work involve a customer appointment? How is this booked? How is it confirmed prior to execution?	6.3 Generally, how urgent is the work?	6.4 Does the work involve more than one task / site visit / coordination with another group?
1.1.1 Corrective Maintenance	Leak response has specific standards. Other work types based on general priority and being "opportunistic" – do repair next time we are doing an operational check.	If gas shutoff is required (and work is not urgent), then a customer appointment should be made. Either done by CAS group, or tech will try to make customer contact themselves.	Full range from "right now" to never.	For complex / planned work.
1.1.2 Preventive Maintenance	Should be done within a month.	Meter maintenance where a customer shut down is required or is everything on bypass now? Most, but not all meter sets have bypasses.	Not urgent. Can be moved to optimize schedule since no failure has occurred. Can become urgent if work is continually delayed, however.	Rarely.
1.2.1 Leak Survey and Inspections	Must be done in a year, try to have done in a month or quarter. Techs hold onto jobs for a long time (8 hour "duration" but may hold for weeks and do in stages). Pipeline patrols – given a quarterly order, but go once a week to check.	No. Tech may phone for no access.		8 hour duration spread out over several weeks. May be completed by different individuals.
1.2.2 General Operations Work		No, mostly performed at a facility.	Not urgent.	Rarely.
1.3 Hazards Remediation	Generally lower priority for scheduling. Time of year can be important if customer shut down is required. To be done within the year for budget.	Yes, CAS group not yet set to do this on an ongoing basis (resource issue); Hazards letter and Install On-Call OSRs; IRM dispatch hazards	Not urgent.	Only for complex hazards at Industrial meter sets or crossings. Planned by IC2.

		group to tech for direct scheduling or cold-calls. Confirmation via tech/crew/contractor cell phone contact.		
1.4 Meter Exchange	Overall, must be done within the year. Break down into smaller components (by meter reading route) to help manage by month.	Yes. Currently letters are issued from an MS Access application and customers call in to the Customer Appointment Setting group who book appointment. Potential to move this function to the ABSU call centre.	Not urgent.	No.
1.5 Upgrade / Improvement Work	Generally very wide open. Get it done in the year.	Occasionally, e.g. LP service renewal, IP/TP services, meter set upgrades. Same as OF process – agree to window with customer, crew phones to confirm date.	Generally low. Long time frame for planning and scheduling. Can become urgent if not done within required time frame (i.e. before cold).	Yes, quite often. IC2 plans and coordinates. IRM coordinates some tasks.
1.6 Customer Driven Construction	Typically scheduled for a "week of". "Day of" used sometimes (rarely) when coordination with a gas fitter required – e.g. large meter work or where customer needs to be shut down for a period.	Usually a "week of" appointment is agreed to. Booked using ClickSchedule and customer agreement. Confirmation letter sent in follow-up. Pre-req calls two weeks ahead to confirm. Crew calls week to day ahead to confirm. For meter work, IC1 phones customer to confirm appointment.	Generally not urgent. Work to standard service levels (3 to 4 week delivery). 5-8% are rushes (rush no heat).	Depends. About 50% of complex jobs (50% of 33.3%) require more than one field task.
3.0 Product Work	Most activities have business rules – typically 3 days or less from when PTJ received.	Mostly. Sometimes booked by call centre ("be there all day"). Does not currently work well due to lack of	Driven by business rules. See 6.1.	Typically no.

		appointment booking tool. Sometimes tech will phone (if note on job), but not a requirement.		
4.0 Public Duty Work (emergency response)	Done immediately.	Generally no. For requested investigates will arrange time.	Urgent.	Yes, if an escalated event. Co-ordinated as events unfold (sending another crew with special tools).
	6.5 Are materials or specialized equipment required to perform this work?	6.6 Is coordination with logistics (flaggers, gravel etc) required for this work.	6.7 Are there pre-requisites that must be arranged before a job can be executed? How are these scheduled?	6.8 How big are the jobs of this work type – hours, days, weeks, months?
1.1.1 Corrective Maintenance	Sometimes, for complex jobs.	Sometimes. Valve repair, main repair.	Sometimes. Main repairs (excavation required)	Wide range. From less than an hour to days. Larger than that typically managed as a capital upgrade. Leak monitoring as a current issue – one long order that is really short weekly "check" tasks.
1.1.2 Preventive Maintenance	No.	No.	No.	Typically hours up to a day. Large station jobs can take one or two weeks, but low volume.
1.2.1 Leak Survey and Inspections	Techs arrange equipment. Important in assignment.	Techs arrange through IRM. Save up jobs that require flaggers and do all at once. E.g. surveys at the airport.	No.	Depends on survey. Hours to months. 8 hours spread out over several weeks.
1.2.2 General Operations Work	No	No	No	Hours to days.
1.3 Hazards Remediation	Sometimes, for complex jobs. i.e. crane, hoist, scissor jacks, and directional drill.	Sometimes, for complex jobs. Flaggers for work in street.	Prereqs arranged for Complex hazards by Install Centre.	Usually less than 1 day. Crossings hazards may be several days due to scope –

				contracted out by PMO.
1.4 Meter Exchange	Supply of correct meters.	No.	No.	Hours.
1.5 Upgrade / Improvement Work	Yes.	Yes.	Yes. Uses the same process as OF (but IC2's do more of their own coordination). IC plans and pre-req coordinates. Some interior IC's arrange there own.	Range from hours to months.
1.6 Customer Driven Construction	Sometimes, for complex jobs. Crane truck in lower mainland.	Yes, for a percentage. Depending on the area this is either arranged by the crew or IRM	Yes, identified by planning, arranged by pre-req. IC's arrange for some pre-reqs directly for their jobs.	Range from hours to months. Jobs can be non-continuous.
3.0 Product Work	No.	No.	No.	Less than 1 hour.
4.0 Public Duty Work (emergency response)	Sometimes. Co-ordinated through dispatch or arranged by crew.	Sometimes.	No, given urgency. Emergency requests for sewer locations to support response. "Post" requisites for environmental issues – work in a sensitive area but no time to permit ahead of time.	Typically hours. Monitoring can go on for months (downgraded leak where cannot complete repair). Large outages can continue for days to complete relights. Floods and fires can last days as well.

	6.9 How much warning is provided prior to when the job is required? Is the strategy to shorten / lengthen this timeframe?	6.10 How likely is the job to require rescheduling? What causes rescheduling to occur?	6.11 Is this work often a component of a larger piece of work (i.e. project)?
1.1.1 Corrective Maintenance	For urgent work, no warning. For other work, make a specific prioritization decision.	Depends on the job type. Much of this work is not really scheduled now – sits on a work list (stations and meter sets).	Generally not. Opportunistically will group repairs into a larger upgrade.
1.1.2 Preventive Maintenance	As much as necessary. Maintenance plans can be used to forecast activities	Not likely. Largely dedicated workforce who are not used for emergency	No.

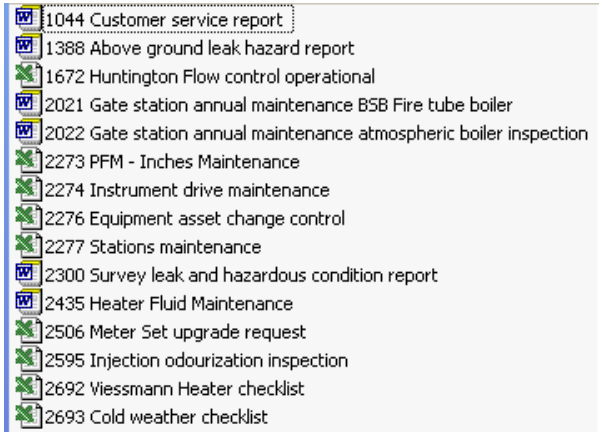
	out into the future. Actual works orders are created a month ahead of due date by the system.	response and generally manage their own schedules.	
1.2.1 Leak Survey and Inspections	Campaign of creating packages late in year for following year. Orders created in SAP 90 days ahead. For special surveys, like to have as much warning as possible.	Re-assigned at times. Techs generally hold onto package until they can get it done. May manually generate order to meet resource availability.	Pre-paving survey for large job (arranged by IC2). Engineering may have a project where a survey is required (one offs). Transmission ROW clearing project (manipulate leak survey schedule).
1.2.2 General Operations Work		Bumped by higher priority work.	No
1.3 Hazards Remediation	Lengthen. The Install Centre generally is not able to forecast the amount of hazards work to do.	Yes. Crews or SSTs/Utechs unavailable or geographically mismatched. Lack of good forecast and manpower plan. Customer preference often changes scheduling especially for commercial / business.	No. Exception is MRO and LP Replacement Projects. LPR uses direct planning and dedicated resources rather than standard process. Capital hazards program (single WBS that orders are linked to)
1.4 Meter Exchange	Jobs created en masse in November for following year.	Generally not likely except when customer not available or “no access”. Techs also get called off for emergency response.	No.
1.5 Upgrade / Improvement Work	Should be plenty of warning. Strategy is to lengthen –ideally 3 to 6 months.	Once schedule confirmed and work ready to go to the field, work is not rescheduled very often (due to level of planning and coordination). Prior to this however, dates change often and challenges arise with finding resources given the size of the jobs.	Yes. Often is a project.
1.6 Customer Driven Construction	Varies widely. Stick to service levels. Would like to lengthen, but customers would like to shorten.	A lot of re-dating of jobs occurs through the planning process. Continual process to keep dates “fresh”. Generally driven by customer readiness / changing dates. About 25% of jobs in the field require rescheduling – 2/3 due to Terasen issues (emergency response, crews not	Can be. Not very common. Most are one off items.

		available – unplanned absence – materials not available, shifting work to contractor in field), 1/3 due to customer site not ready. High incidence of rescheduling for complex meter work due to site not ready (first guys on site).	
3.0 Product Work	Short. Try to improve service levels (see business rules).	Not too likely. Sometimes the customer is not home when we are on site. Currently raised as a separate job to go back.	Meter ID's could be (prefer to raise one order for whole project).
4.0 Public Duty Work (emergency response)	None for emergency work.	Not.	No.

7. Execution Considerations				
	7.1 Are there physical documents required to perform the work?	7.2 What data is required while on site (required or just useful)? Where does it come from?	7.3 Are there specific safety procedures that must be followed to perform the work? How are these executed?	7.4 What data validation is required in the field for accurate data capture?
1.1.1 Corrective Maintenance	Generally no. FUDS for excavation work.	Meter Sets – equipment information, what is at the site. Recent history (very useful, but not required). Other identified work. Customer contact information is useful. Last meter reading. Delivery pressure. Combination of SAP and Energy information. Location, special instructions, premise warnings, hostile customer call. Stations – equipment info, recent history (really required). History on valves and pipe would be useful – help with repair / replace decision.	Written work procedure (developed by project manager, approved by operations manager) required occasionally. Standard procedures – confined space entry.	Meter number, meter readings, meter pressures. Equipment nameplate information and numbers for station work.
1.1.2 Preventive Maintenance	No.	Functional location, equipment, and bill-of-material information. Equipment characteristics. Recent work performed and outstanding work to be performed / items to be repaired. Recent maintenance history (previous readings). Data comes from orders and notifications in SAP.	No.	Functional location, equipment, and material numbers. Activity and failure codes.
1.2.1 Leak Survey and Inspections	Yes. Survey package (AMFM drawing and SAP order).	Phone numbers of customers provided in package (added at notes for problem customers) – useful. Non-standard services provided in package, but access to DCRS for	No.	Used for cleaning up field data – report back problems with what shows in AMFM. Incomplete field reporting is a current issue.

		finding services and stub services may be useful.		
1.2.2 General Operations Work			No	
1.3 Hazards Remediation	Yes, Job package including Shop Papers, service sketch, permits, etc.	Work Instructions, Guidelines, Standards are useful. "Canned" instructions in failure mapping table for OSR to paste into crew notes. Comes from Pipeline and Job Package. Customer information provided for premise work (look-up in Energy and add to order).	No – standard procedures.	Training on Form 2300 and Hazards Reporting using proper Failure Codes and digital images of hazard. Meter number, delivery pressure, image of repaired item (ideal state). Good sketch.
1.4 Meter Exchange	No.	Customer information (contact, warning notes). Meter information. Latest actual reading. Recent work performed and pending work / hazards at the site (useful).	No.	Meter number, meter reading.
1.5 Upgrade / Improvement Work	Yes. Often drawings, t-docs and engineering drawings, permits, FUDs.	Wireless access to AM/FM and DCRS would be useful. Access to standards would be useful.	May need a written procedure describing how to perform a specific job.	
1.6 Customer Driven Construction	Job package sent to crews: permits, t-doc, plate maps, construction drawings, environmental documents. Physical sign-off required for as-built information. Potential to make electronic.	Length required of service. Size a main attaching to. Pressure. Material. FUD's.	Standard set of procedures.	Meter number (serial and manufacturer's) and initial read. Non-standard services (GPS idea). Additional charges / additional work effort. Changes from as designed. Address validation. Pipe Coating Report form. Environmental monitoring

				forms. Timesheets. Potential for connected load / connected appliances (not currently done).
3.0 Product Work	Rarely. On a multi-meter ID they have a form. Tech has pad and sends in. Complex meter ID (SHO) may have drawing.	Address, meter location, meter ID, Need to have safety items – bad customer, big dog, etc. Current Energy notes truncates (issue). Consumption history would be useful. Work history would be very useful.	No.	Meter number, manufacturer serial number. Readings. PFM and pressure.
4.0 Public Duty Work (emergency response)	Generally no. In rare cases may need foreign utility (arranged by dispatch). Ideally be able to have plate map / records information, shut-off lists.	Meter set / location information would be helpful. Customer information (contact, special requirements). Emergency plans as reference would be useful. Access to knowledge base and standards. Ideally be able to have plate map / records information, shut-off lists.	Yes. May need other people for confined space, gas envelope entry. Company standard procedures for protective equipment, fall protection, etc.	

8. Follow-up / Data Capture Considerations		
	8.1 What activities follow downstream of the completion of the work in the field?	8.2 What data is required to be captured from the field? What is the data used for? How is it processed?
1.1.1 Corrective Maintenance	Details of completed repair work entered into SAP. Leak repairs are plotted in AMFM. Issue with level of detail coming from the field not being sufficient to close job (or not accurate enough). Multiple forms for recording information. Equipment changes (excluding meters). E.g. regulator changes. Temporary repairs – currently done on same work order instead of raising new.	Keep asset and customer records up to date. Keep asset history accurate. Used for ongoing maintenance / asset improvement decisions. Energy is mostly automated. SAP data is largely manual forms.
1.1.2 Preventive Maintenance	Recording of maintenance history and identification of hazards / failures for later repair.	Data captured in various maintenance forms to record inspection results and request follow-on work. Currently captured via word and excel templates, emailed to specific email account, semi-automated entry (via CATT) into R3 as notifications. 
1.2.1 Leak Survey and Inspections	Entry of plant units. Recording of hazards / failures for future repair.	Raise notifications for the hazards. Field codes what type of hazard. Including any emergent problems directly reported to IRM.

		Manually entered in SAP. Feeds repair processes. Plot below ground leaks plotted in AMFM. Below ground cat 3 leaks create notification via interface – but rest of process may not be working.
1.2.2 General Operations Work		
1.3 Hazards Remediation	Sometimes billing. T-doc closing, scanning into DCRS etc. Updates to SAP for industrial meter set information (e.g. new cage installed). Update valve attributes in AMFM. Closing raises Notifications, links images, TECOs Orders.	Form 2300 correctly completed for identification with digital image. Pipe Condition Report (new UPIR) must be completed & logged whenever main or service is exposed.
1.4 Meter Exchange	Install of new meter in billing system and continuing meter-to-cash process. Return of meter to meter shop for testing.	Meter number and meter reading used to feed meter-to-cash process. Currently fed automatically from mobile device to billing system.
1.5 Upgrade / Improvement Work	Closing – TECO based on t-doc return from field. Plant units in SAP. Update as-builts in AMFM. Project managers don't use t-docs – do engineering documentation follow-up (issue with plant units). ABSU for change of meter set on an upgrade. Billing on actuals through SAP and Terasen AR.	Plant units. Pipe size, depth, pressure test info. Goes into GIS. Timesheets.
1.6 Customer Driven Construction	Closing: GIS updates, plant units, billing adjustments. ABSU – attaches charges and meter to premise (billing), creates customer. Paving repairs? Follow-on field tasks (meter set commissioning). Payment process for contractor.	Pressure and material drives maintenance schedules. Meter info used in meter to cash process. Set up of leak survey information – type of premise (special use buildings).
3.0 Product Work	Energy closing (majority auto-close unless data errors). Office review" process – manually set by tech for review in office (Kathy Payne)	Meter number, manufacturer serial number. Readings. PFM and pressure.
4.0 Public Duty Work (emergency response)	May end up in court. Closing updating records information and customer information. Completions and drafting recording as-built records. Billing for third party damage.	See 8.1

	Orders raised for follow-on work (tech either verbally tells dispatch, or indicates office review in closing information). Reporting for Oil and Gas commission, Red Tags for Safety Authority (see OPM 0911) Potential need for investigations. Pipe coating report. Asset accounting (new plant added or abandoned). Corporate communications may be required. REMS (Kinder thing) – investigation reporting. ERL – Emergency response line – email broadcast system for on call people, Execs, EH&S, etc. Updating of SQI measurement	

9. Related Processes			
	9.1 Supporting Processes: What processes are key to supporting this process (e.g. supply chain, time entry, capital approval etc)?	9.2 Interconnected Processes: What processes (upstream / downstream) connect to this process or overlap with this process? (E.g. leak survey into hazards, or Industrial Meter Exchange and Preventive Mtce).	9.3 How distinct is this work type? Does it always follow the same process, or is it possible to switch to another process part way through (e.g. bundling or corrective mtce into a single capital project).
1.1.1 Corrective Maintenance	Maintenance analysis, repair prioritization, repair / replace / upgrade processes (analysis of work to group with upgrades). Time entry. Work approval / order creation process (currently a gap as to who does order creation). Planning process.	Preventive mtce into corrective maintenance. Leak survey and other field work into corrective maintenance. Corrective work can become recoverable (e.g. leak on a main that turns out to have been 3rd party damage).	Repairs are typically O&M, but can "become" capital (based on length of pipe replaced and valve replaced etc.) Rules for capitalizing work need to be clearer, and decision made later in the process.
1.1.2 Preventive Maintenance	Maintenance analysis of historical information.	Meter maintenance overlaps heavily with meter exchange process due to desire to perform both tasks at the same time. Also overlaps with corrective maintenance and hazards remediation due to potential to complete repair work while performing preventive maintenance.	Distinct for main preventive process. Current issue with techs performing repairs when on-site – are repairs part of preventive maintenance, when is a new order required, when is an upgrade required?
1.2.1 Leak Survey and Inspections		Directly flows into hazards. Overlap with TransAm survey process. Emergent leak repair may be initiated from a survey (tech stays at site)	Very distinct.
1.2.2 General Operations Work			
1.3 Hazards Remediation	Supply chain for supply & forecasting of regional stock. Annual capital approval process required	All Surveys (Leak, Pipeline/Crossings, Valve, Corrosion, Odorant) domestic meter exchange (cannot do	Endeavour to follow standard process and bundle into Capital Hazards or Evergreening budgets.

	for most hazards upgrades.	because of hazard – no access) Industrial meter exchange few identified through PM (Ind meter sets & stations)	Crossing hazards often not clear until detailed assessment prepared. Getting to the field and finding problem is not what was planned for. Large variations due to the wide nature of hazards.
1.4 Meter Exchange	Supply chain for delivery of meters.	Overlaps with preventive maintenance process for industrial meter sets (maintenance done at same time as meter exchange).	Very distinct.
1.5 Upgrade / Improvement Work	Capital approvals, budgeting, supply chain, risk analysis, repair / replace analysis, asset (station) analysis. System / capacity planning. Contracting (supply chain) process. Engineering (drafting).	Order fulfillment process overlaps largely in execution. Maintenance processes that identify capital requirements. Leak survey process for identifying items. Hit line may identify the need for an upgrade.	Ability to group maintenance items into a project (e.g. while performing a station upgrade). "While we are there" work. Repairs that become upgrades.
1.6 Customer Driven Construction	Supply chain. Capital expenditure approval rules (main extensions over $50k, over $100k) Financial reconciliation process with ABSU – reconciling billing. Economic test refunds and tracking. Work forecasting, workforce planning.	System improvement process (high load customer that may drive an SI on top of a main extension). Sales process upstream.	Usually distinct. Scenarios where a job turns into an upgrade or replacement at our cost although initiated by the customer.
3.0 Product Work	Pretty standalone.	Discreet	Mostly completed as issued. A meter investigate (for non-registering) may lead to a meter exchange.
4.0 Public Duty Work (emergency response)	Closing and Billing. Records.	Feeds into follow-on work. Leak survey identifying urgent leaks. Claims adjusting follows. Use information to target "bad actors" for education.	Gas odour investigates not distinct – can be treated various ways once tech in field and problem understood. Hit line response / repair quite distinct. May respond as a hit line, and find it is not, but generally information up front is quite good.
	9.4 Is it clear at initiation what process the work will follow, or does it start with a general condition that can lead to branching	9.5 Are there specific decision points in the process, beyond which rework occurs if decisions are changed?	

	(e.g. hazards remediation process)?	
1.1.1 Corrective Maintenance	Starts with a general condition – something is broken or not functioning properly. Current issue with identifying "failures" versus hazards or suggested improvements. Not clear O&M versus capital at times – often requires discussion and decision.	Rework can occur after work has been sent to the field based on rules for changing a job from O&M to capital. Work order type and notification type decisions create rework.
1.1.2 Preventive Maintenance	Clear at initiation since work is pre-planned.	No.
1.2.1 Leak Survey and Inspections	Clear at initiation since work is pre-planned.	Very limited.
1.2.2 General Operations Work		
1.3 Hazards Remediation	Branching options depending on complexity & quantity of hazards. 1) Routine - Notiifcations & Orders raised programmatically; no letter, not billable 2) Complex hazards - Ops Closing raises Notifications; IC raises Service Orders & plans 3) Simple hazards i.e. POSTs - Ops Closing raises Notifications, links digital images, raises Service Orders	Approx 10% of POST hazards are returned due to a variety of reasons. Yes. Order type issue.
1.4 Meter Exchange	Clear at initiation since work is pre-planned.	No.
1.5 Upgrade / Improvement Work	Generally clear due to amount of planning performed	Challenges with the hazards process. Duplicate orders raised for SI's (not sure why).
1.6 Customer Driven Construction	Generally pretty clear. Jobs can become more complex, but still within the same process.	Planning complete is a big milestone. If things change after this point (driven by customer or approving body), it is difficult. Current issue with crews making field design decision and wanting new job package.
3.0 Product Work	Meter investigate can branch, but usually completed and follow-on identified.	Meter IDs and investigates can lead to a bunch of rework (meeting person on site).
4.0 Public Duty Work	Starts out with a general condition – don't really know what is happening in the field until skilled resource on site. May lead to	Not really.

(emergency response)	escalation, e.g. departmental emergency centre activation.	

10. Financial / Performance Reporting Considerations			
	10.2 How is performance of the work measured (unit cost, asset quality, product quality)?	10.3 Are there specific SQI's?	10.4 How is this work budgeted?
1.1.1 Corrective Maintenance	Try to do by unit cost, but really does not make sense. Trying to measure "asset health". Indicators of health, number or leaks, number of minor failures (regs etc). Number of outages due to plant failure.		Based on number of preventive activities being used to forecast number of corrective activities (stations and meter sets). Richard Leong through Randy Kieper's group. Historical information – what did we spend last year?
1.1.2 Preventive Maintenance	Unit cost. Progress tracked through percentage of orders completed.	No specific SQI's.	Forecast of work activities multiplied by unit cost.
1.2.1 Leak Survey and Inspections	Unit cost. Progress tracked through percentage of orders completed.		Forecast the activities from the Mtce Analyst, Contractor versus internal split, multiply by unit cost.
1.2.2 General Operations Work	Unit cost.		Based on historical budget.
1.3 Hazards Remediation	Unit cost, jobs completed. Should also have a measure for returned work and adequate reporting. Completion compliance.	- Leaks/Km Distribution main SQI reported to BCUC – asset base quality indicator. - MRO Scorecard for NSRG & OPCO jobs	Project Concept Documents through the Capital Steering Committee. - start with the dollar figure, then use to drive how much work will be done.
1.4 Meter Exchange	Unit cost		Forecast workload times unit cost.
1.5 Upgrade / Improvement Work	Unit cost for some work (mains). Actual versus budget cost. Project managers should be within 10% of planned cost.	Not really tracked.	Amount of Cat B capital in Distribution budgeted for the year (usually the same year over year). Credit Committee. Use that to determine what work will be done for the year.
1.6 Customer Driven	Customer complaints (anecdotal measure until Café 2 and issue tracking).	Customer sat is indirectly related. Customer complaints to the commission.	Based on work forecast.

Construction	Unit cost by asset type. Jobs completed by customer required date. Exception reports for pulled jobs, design exceptions, etc. IC's measured on through-put and quality (jobs returned for redesign).		
3.0 Product Work	Unit cost. Compliance to business rules (timeliness, particularly lock-offs).	Scorecard for bad debt.	Forecast activities based on historical information.
4.0 Public Duty Work (emergency response)	Unit cost (first responses by type). Percentage of non-recoverable costs Historical number of hits versus BC Onecall tickets.	Yes. BCUC SQI for response time to emergency, internal SQI for customer outage time.	Based on historical actual costs (plus growth factor).
	10.6 What is the capital treatment for this work?	10.7 Current SAP Order Type	10.8 Maintenance Activity Type logic. How is the MAT assigned? What are the rules for determining the MAT?
1.1.1 Corrective Maintenance	O&M	PM40 for all asset types except residential meter sets, which use standing PM75 orders for Mobile UP work.	Asset type
1.1.2 Preventive Maintenance	N/A	PM50 for all asset types.	Asset type
1.2.1 Leak Survey and Inspections	N/A	PM60 for all.	Type of survey and type of asset. Do not distinguish by gas type (NG versus propane)
1.2.2 General Operations Work	N/A	PM60 for all.	Asset type
1.3 Hazards Remediation	MAT RSE - 50 yr life	ZB ZF40, ZE ZF50, ZF PM40 (AMFM interface), M1 PM40 for O&M Other notifications being converted to ZB are M1, ZE, and ZF.	Hazard type (moving to asset type)
1.4 Meter Exchange	N/A	PM70 (PM75 for MUP standing orders for residential exchanges)	Asset type (industrial vs. residential) and activity type.

1.5 Upgrade / Improvement Work	Cat B. Standard asset classes. BCUC code of accounts.	ZF50, ZF40 for hazards remediation using capital.	Asset type.
1.6 Customer Driven Construction	Cat A. Asset type (pipe by size).	ZF10 (ZF50 issue for agency driven work)	Logic is combination of work type and asset type. Assigned by system based on variant responses.
3.0 Product Work	N/A	MC10	Type of work.
4.0 Public Duty Work (emergency response)	See above.	PM10 (line locates PM20). Cat 1 and 2 leaks are PM40. Odour calls are MC10. Question with regard to what type to use for monitoring.	Activity type. Table that maps PTJ's to MAT's.

10.9 Current MATS covered by this work type

1.1.1 Corrective Maintenance	PM40	INC	Meter Set (Ind) - Inches
	PM40	IDS	Meter Set (Ind) - Instr Drives
	PM40	PFM	Meter Set (Ind) - PFM
	PM75	080	Residential Meter Sets
	PM75	092	Relight after Maintenance
	PM40	INS	Portable Instrumentation
	PM40	SCA	Communications
	PM40	ELC	Electronic / Control Equipment
	PM40	AMR	AMR trouble calls
	PM40	PSE	Propane Storage Equipment

	PM40	PTE	Propane Transfer Equipment
	PM40	PRE	Propane Regulation Equipment
	PM40	PVE	Propane Vapourization Equip
	PM40	RDP	Mains DP - Repair/Renewal
	PM40	RIP	Mains IP - Repair/Renewal
	PM40	RLP	Mains LP - Repair/Renewal
	PM40	RTP	Mains TP - Repair/Renewal
	PM40	RSE	Services
	PM40	STN	Station - Regulator
	PM40	VMA	Main Valves DP/IP
	PM40	VLT	Main Valves TP
	PM40	VSR	Service Valves
	PM40	GRD	Mains - General Ops
	PM40	GRS	Services - General Ops
1.1.2 Preventive Maintenance			
	PM50	INC	Meter Set (Ind) - Inches
	PM50	IDS	Meter Set (Ind) - Instr Drives
	PM50	PFM	Meter Set (Ind) - PFM
	PM50	INS	Portable Instrumentation
	PM50	SCA	Communications

	PM50	ELC	Electronic / Control Equipment
	PM50	PSE	Propane Storage Equipment
	PM50	PTE	Propane Transfer Equipment
	PM50	PRE	Propane Regulation Equipment
	PM50	PVE	Propane Vapourization Equip
	PM50	STN	Station - Regulator
	PM50	SHO	Station Heater Overhauls
1.2.1 Leak Survey and Inspections	PM60	LBD	Leak Survey, Business District
	PM60	LIP	Leak Survey, IP Pipelines
	PM60	LOT	Leak Survey, Other
	PM60	LRE	Leak Survey, Residential
	PM60	LSB	Leak Survey, Special Use Building
	PM60	LTP	Leak Survey, TP
	PM60	PCR	Pipeline Inspections – Crossings
	PM60	PIP	Pipeline Inspections – IP Patrol
	PM60	ROW	ROW Operations
	PM60	VMA	Main Valves DP/IP
	PM60	VLT	Main Valves TP
	PM60	VSR	Service Valves
	PM60	OMF	Odorization, Measure and Fill
	PM60	OTS	Odorization, Test and Sample
1.2.2 General Operations Work	PM60 GRD – Mains General Ops		

	PM60 GRS – Services General Ops PM60 LLR – Leak survey, inspections / investigations PM60 STN – Stations – Regulator PM60 OPS – Propane systems PM60 DIA – Dist Integrity Assessment		
1.3 Hazards Remediation	See Failure Code Mapping Table that the OSRs use.		
1.4 Meter Exchange	PM70	REC	Meter Recall
	PM70	SAM	Meter Compliance Sample
	PM70	UNS	Unscheduled Exchange
	PM75	068	Complete Exchange
	PM75	071	Change & Leave Off
	PM75	091	Subsequent visit
	PM75	906	No Admit
1.5 Upgrade / Improvement Work	ZF50	RDP	Mains DP - Repair/Renewal
	ZF50	RLP	Mains LP - Repair/Renewal
	ZF50	RIP	Mains IP - Repair/Renewal
	ZF50	RTP	Mains TP - Repair/Renewal
	ZF50	AMA	Main DP/IP - Abandon - Company driven
	ZF50	AMT	Main TP - Abandon - Company driven
	ZF50	RSE	Services - Repair/Renewal

	ZF50	ASE	Services - Abandon - Company driven
	ZF50	RSH	Service Header - Repair/Renewal
	ZF50	ASH	Service Header - Abandon - Company driven
	ZF50	RMS	Meter Set (Res)
	ZF50	AME	Meter Set - Res - Aban - Company Driven
	ZF50	IDS	Industrial Meter Sets - Instr. Drive
	ZF50	PFM	Industrial Meter Sets - PFM
	ZF50	INC	Industrial Meter Sets - Inches
	ZF50	AMI	Meter Set - Com/Ind - Aban - Company Driven
	ZF50	SSV	Stations Regulator - Upgrade
	ZF50	SSA	Stations Abandonments
	ZF50	STN	Station - Regulator - New
	ZF50	AST	Station - Abandon - Company Driven
	ZF50	ELC	Electronic / Control Equipment
	ZF50	INS	Portable Instrumentation
	ZF50	SCA	Communications
	ZF50	RPS	Propane
	ZF50	CID	Cathodic Prot, DP/IP

	ZF50	CTP	Cathodic Prot, TP
	ZF50	CDM	Mains DP - Capacity Improvement
	ZF50	CIM	Mains IP - Capacity Improvement
	ZF50	CTL	Mains TP - Capacity Improvement
1.6 Customer Driven Construction	ZF10	MND	Mains DP - New
	ZF10	MNI	Mains IP - New
	ZF10	MAD	Mains DP - Alteration - Cust Driven
	ZF10	MAI	Mains IP - Alteration - Cust Driven
	ZF10	MAB	Mains Abandonments - Cust Driven
	ZF10	SND	Services DP - New
	ZF10	SNI	Services IP - New
	ZF10	SMM	Service Multi-Meter Install - New
	ZF10	SNS	Services Stub - New
	ZF10	SST	Services from Stub - New
	ZF10	SCD	Services DP - Conversion
	ZF10	SCI	Services IP - Conversion
	ZF10	SAA	Service Alterations
	ZF10	SAB	Service Abandonments
	ZF10	SHD	Service Header DP - New
	ZF10	SHI	Service Header IP - New

	ZF10	SHC	Service Header DP - Conversion
	ZF10	SIP	Service Header IP - Conversion
	ZF10	SLD	Service Header DP - Lateral
	ZF10	SLI	Service Header IP - Lateral
	ZF10	SHA	Service Header Alterations
	ZF10	SAC	Service Header Abandonments
	ZF10	VHM	Vertical Header - Master Job
	ZF10	VMI	Vertical Header - Meter Install
	ZF10	MRN	Meter Set (200/400) - New
	ZF10	MRV	Meter Set (200/400) - Upgrade
	ZF10	MRB	Meter Set (200/400) - Abandon
	ZF10	MCN	Meter Set (750+) - New
	ZF10	MCS	Meter Set Consolidation
	ZF10	AMD	AMR Installation
	ZF10	MCV	Meter Set (750+) - Upgrade
	ZF10	MCB	Meter Set (750+) - Abandon
3.0 Product Work	MC10	062	Re-reads

	MC10	094	Read commercial month end
	MC10	100	Re-read requested by utility
	MC10	033	Customer Billing
	MC10	029	Disconnect (Safety issue/other agency request)
	MC10	025	Remove meter - potential diversion
	MC10	034	Customer Billing - Straight Time
	MC10	035	Customer Billing - Overtime
	MC10	063	Customer Billing - Straight Time
	MC10	064	Customer Billing - Overtime
	MC10	060	Relight only after unlock - Straight Time
	MC10	061	Relight only after unlock - Overtime
	MC10	098	High Bill Investigation - Customer Billing
	MC10	095	Meter IDs - Customer Billing
	MC10	030	Meter Investigation - Customer Billing
	MC10	099	Meter Investigation - Utility generated
	MC10	HGN	Hang Notice

	MC10	I33	Lock-offs
	MC10	I34	Unlocks
	MC10	I98	High Bill Investigations
	MC10	I95	Meter Identification
	MC10	I30	Meter Investigation
4.0 Public Duty Work (emergency response)	PM10	022	Gas Odour Upstream
	PM10	023	Gas Odour Downstream
	PM10	026	Gas Odour non gas related
	PM10	027	CO Investigation
	PM10	024	Fires, Explosion, Customer Safety
	MC10	I18	Fee for Service / Premise call Industrial
	PM10	FRD	First response/standby during working hours
	PM10	111	Mobile UP time vs Timesheet reconcilliation

	PM10	FRA	First response/standby after working hours
	PM10	ITD	Idle Time - Day Shift
	PM10	ITA	Idle Time - Afternoon / Weekend Shift
	PM10	GRD	Mains
	PM10	GRS	Services
	PM10	SRF	Meters / Stations

11. Process Enablers / Opportunities			
	11.1 Workflow Design	11.2 Technology (including data model)	11.3 Motivation and Measures
1.1.1 Corrective Maintenance	- Leak monitoring process as a current gap – one order is issued, but used to check weekly. How to schedule and dispatch? - Potential to use a separate order type (Janet's "PM30") for leak repairs (above and below ground) to allow for easier searching to ensure none are missed in list edits - Scada work identification process issues – gas control notes problem (messy process due to people involved). Sometimes Transmission sometimes distribution. - Note – potential need to have techs able to raise "field" order. Need control to ensure what they are doing is worth doing (to prevent budget overruns and gold-plating). - To arrange a helper for large Mtce jobs, Tech should call IRM to arrange, but process seems not to work (arranged helper gets pulled at last minute – maintenance treated as lower priority than install work). - Lead time of special materials for complex Mtce jobs. Currently "planning" is a weakness (availability of IC2).	- Managing work in both SAP and Energy, need to standardize to one work system - AMR as a "meter device"?	
1.1.2 Preventive Maintenance	▪ Process for repairs performed on site. Need ability to do, but also need control mechanism to ensure work is approved before proceeding.	▪ Automation of data capture for maintenance history. Provide access to technicians in field of recent work performed and hazards identified.	

1.2.1 Leak Survey and Inspections	▪ Work done over a time period – 8 hour duration but spread over 2 weeks ▪ Chart changing / no work order process, just let IRM know ▪ Vegetation – Jenny Mingo in Engineering. No scheduling or dispatch ▪ audit process for leak survey quality GRD, GRS, STN – system planning work	▪ SIA data for the interior and island ▪ Contractors who perform this work not currently equipped with mobile technology (will they be?).	▪ Measurement by meter of pipe, but contractor quotes and paid by number of services. Multiply number of services by 21m/service to get plant units. Plant units do not get updated until TECO causes timing delay (may have been billed for work but packages come in much later for TECOing).
1.2.2 General Operations Work			
1.3 Hazards Remediation	▪ Consolidated notification type. Simplified order type structure. See end state vision SDD. ▪ Meter readers identify "no access" issues. No repair process. Sent to IRM, who send to closing (Kathy Horne). Not sure of process. ▪ Repair / replace decision (went out the window with OF). Should be part of capital process (according to Christine).	▪ Reverse interface from SAP to Café. Better interfacing to Energy. ▪ TransAM access database to generate non-chargeable orders ▪ Resource skill spreadsheet for assigning work (who can do what)	▪ Seems to be a problem getting this work done – considered to be a lower priority or discretionary work. 15% return rate on post orders, not being done by crews over past 3 years ▪ Install centre not wanting to process hazard jobs called in by customer (in past could not do in GasApp). Build into Café. Related to issue of who pays for the work. Perhaps investigate process.
1.4 Meter Exchange	▪ Current issues with supply of meters and real time tracking of inventory on hand in musters (can be 30 day delay for new installs to be reflected in SAP).	▪ Limited appointment booking capabilities (potential to eliminate current MS Access database). Potential for ABSU to provide appointment booking. ▪ Useful to be able to see job status in Energy (particularly for emergencies). ▪ Use of barcoding to ensure meter	

		number accurate and potential to validate meter readings entered in field (eliminate some of 1500 rechecks done per year now).	
1.5 Upgrade / Improvement Work	▪ Work for 3rd parties (Sun Peaks) process design. ▪ Adding an SI on top of a customer driven main extension o Should be split between cat a and cat b, but no process in place today o Sometimes an SI is needed for customer load and either can be absorbed in the MX test or not (if not cost goes where?) ▪ Project managers don't use t-docs – do engineering documentation follow-up (issue with plant units).	▪ Automated timesheets. ▪ Ability to forecast estimates to complete to improve capital tracking and reporting (potential to use of WBS versus order planned costs). ▪ Café for ZF50 work. ▪ GPS so people are in the right place ▪ Reporting – resource plan specifically. ▪ Multi-size main issue	▪ MAT "STN" actually includes a number of asset classes. ▪ Conforming to asset accounting rules causes challenges in managing work (ability to split costs on order to multiple assets)
1.6 Customer Driven Construction	▪ Process is very rigid. Hard to move work through more quickly. ▪ Not very good at translating sales forecasts into field resource requirements. React based on seeing service levels drop. ▪ Directly relates to growth, increases rate base (timing for closing). ▪ Also issue for pricing correctly and receivables.	▪ Multiple technologies (meter work specifically) ▪ Field needs to wait for paper (impacts service delivery). ▪ Café versus SAP for IC2 work. ▪ Impacts OSR – SAP, CAFÉ, Energy, GIS, DCRS, ClickSchedule in terms of job complexity. Also makes it hard to change process (e.g. introducing a new service product). ▪ Technology seen as big brother rather than an enabler. ▪ Current issue with multi-size mains requiring multiple work orders. ▪ Current MAD / MAI issue.	▪ Lack of clarity between meeting customer date and unit cost. ▪ Work priority between work types (customer driven versus maintenance) – capital versus O&M distorts. ▪ Idle time versus contractor / crew work (clarity of priority)
2.1 Customer	▪ Currently need to raise 2 orders (one	▪ Timing issue re: physically getting	▪ Like to see average time to perform

Line Locates	for MUP to dispatch, one in SAP for costing). Issue with agencies (e.g. highways) calling techs directly to have them come and do a locate ▪ Requests for information on Transmission plant (sign marker process) go ABSU, who forward to dispatch to assign tech to support	paper to the field (requires trip back to muster). Shouldn't be a trip to the muster. The field tech leaves the muster with the locate requests / packages arriving the day prior. The tech will / should have all the work in their hands before leaving for the day. Potential to "attach" electronic document to order being dispatched electronically, or provide field access to GIS. Useful for field asbuilts as well. ▪ Access to GIS in the field as a tool to simplify process. (Not sure if this really will be a time-saver, or a 'nice-to-have')	a locate o TGVI did have this in their Field Job Standards
3.0 Product Work	▪ Pretty clean. Relationship with ABSU improving all the time with better communication. ▪ Grow ops locked-off by City (we don't want our people doing it). Not billed. They tell us about it. ▪ Lock-offs happen in stages – lock-off, plug, remove meter, cut-off.	▪ Lack of a customer appointment setting tool for call centre. Access to Energy data in the field. ▪ Drop down boxes have too many codes – prefer smart templates. ▪ Pat Flack is talking of one order (PTJ) per meter for meter investigates ▪ List from Cal of reasons why jobs fail to auto-close in Energy. Data validation requirements.	▪ Historical "filler" work issue, but seems to be resolved. ▪ Motivation to not work overtime – avoid doing lock-offs to prevent having to go do unlock in the evening. ▪ Trying to measure techs on unit cost when they have less and less control over their schedule. Idle time is a similar issue.
4.0 Public Duty Work (emergency response)	▪ Timing for information regarding an event getting to Damage Prevention (can take a month now).	▪ Potential value of GPS enabling crews. ▪ Clunky connection between ABSU call centre and dispatch (emailed templates, raise a PTJ and phone to make sure they got it) – issue with skill set in call centre. ▪ Potential for electronic document transfer to crews – records	▪ Because of SQI, always send tech immediately, even if a hit line and may just want to send crew (does still provide value in terms of helping make safe and providing information).

		information, GIS. ▪ Having multiple systems for finding information. ▪ Streets and trips mapping (how to get to an emergency) – was loaded as stand alone app but taken away. ▪ Potential access to internet for street routing. ▪ Current issues with Click's mapping system (clunky). Limited navigation options (cannot type an address and go there).	
	11.4 Policies and Rules	11.5 Organizational / Human Resources	11.6 Facilities / Other
1.1.1 Corrective Maintenance	▪ Strategy to maintain fewer valves where we would squeeze the pipe in an emergency, rather than use the valve anyway ▪ Repairs done during an operational check o How to track? o Idea to split costs out later to preventive / corrective based on number of repairs reported o How to control which repairs get done?	▪ Current gap with "planning" of maintenance work. Impacts ability to schedule maintenance. ▪ Potential to expand use of contractors for fence and cage repairs as not a skill our techs have	▪
1.1.2 Preventive Maintenance	▪ Policy on what work is preventive versus corrective for repairs done while on site.	▪ Skill set challenges. ▪ Hazards reporting training for field techs	▪
1.2.1 Leak Survey and Inspections	▪ work on Transmission assets is currently problematic – would like them to go away ▪ Downgrading of emergent leaks o Not following policy, crews downgrading,	▪	▪ Facility challenges with special equipment / vehicles.

	manager downgrading when not on site.		
1.2.2 General Operations Work			
1.3 Hazards Remediation	▪ Cutoff policy needs to be formalized. Issue about whether to cut-off or not if we cannot get access to customer site to remediate hazard – Cal developing clear decision tree o Stan (from Suzana, from Dwain) that we will not cut customers off ▪ Which hazards will be processed in Café versus SAP? ▪ Rules for when a hazard is billable or not – Cal working on decision tree ▪ Upgrading plant at the time while we are digging it up or working on it. Timing of decision.	▪ Skill set issue for techs performing inspections to report problems correctly and sufficiently plan appropriate remediation. Contractors seem to learn quickly, more of an issue for internal techs. Learning curve. ▪ Tech skills are not always consistent (all SOT's cannot do the same work). ▪ Failure code mapping table. o IC2's do not know as well as they should	
1.4 Meter Exchange	▪ Potential to outsource letter generation and appointment booking to ABSU.		
1.5 Upgrade / Improvement Work	▪ Policy is unclear as to priority of this work versus customer growth targets (issue is more with planning and timing). ▪ Annual budgeting cycle versus two year.	▪ Have to give the work to an IC2 to do even though a lot of it is quite simple. Job description should be complexity not type of work. Possibly more classes of IC, one to focus more directly on this work type rather than being pulled into customer driven work.	▪ Billing based on pipe put in ground (used to be managed by Bob Booth) – Kelly will find out.
1.6 Customer Driven Construction	▪ Distinction between ZF10 and ZF50 receivable work (definition of customer – 3rd party agency that is billed).	▪ Knowledge retention is an issue because the environment is complex. Needs to be more simplified. ▪ Number of field designations –	▪ Space restrictions in install centre. ▪ Access to pool cars. ▪ Crane truck issue (stores have crane trucks but cannot use due to job

		legacy issues with changes to organizational structure. ▪ Balance between specialization and generalization of workforce (ease of scheduling versus cost – geographic considerations). ▪ Long lead times for training – to ramp up for increased work. ▪ Timing of refresher training to fit with seasonality of the work. ▪ Lack of training group to keep skills up with staff. ▪ Retirements of skilled resources (both office and field). ▪ Cultural issue with changing role of field managers – not sure measures and motivation have really adjusted as well. ▪ What is real work versus not real work. ▪ Planners becoming ICs (think less, process more). ▪ People feel they do not have control of their priorities – takes toll on the people.	description restrictions) ▪ Loss of control of billing information due to outsourcing to ABSU. ▪ selling plant to Kelowna so they can avoid franchise fee (happened a few years ago says Linda and Olaf). What happened? Does it matter?
2.1 Customer Line Locates	▪ Policy re: pulling tech off current job to perform non-emergency locate (temporary to help sell to the Island). Decision based on how quickly can complete current job? ▪ Policy re standby resources watching work (e.g blasting work)	▪ Not everyone is trained (despite being a fairly simple activity). TGVI - Everyone can perform this task. TGI – not everyone has the equipment.	▪ Issue re access to instrumentation. Balance against speed or response.
3.0 Product Work	▪ Very strong knowledge base.	▪ Turnover challenge in ABSU. ▪ See 11.3 – lack of desire to do call-out work for older workforce (interior).	▪ Lack of barcode. ▪ Lack of portability of mobile device.

		▪ Lock-offs done mainly by contractor in the lower mainland (do not go through us – direct from ABSU to contractor)	
4.0 Public Duty Work (emergency response)	▪ COPE dispatchers preventing IBEW field techs from providing dispatch for emergencies.	▪ Non gas skilled resources in ABSU call centre for up front data gathering. ▪ Skill set of office people to be able to support emergencies. ▪ Loss of skill in the field of senior techs.	▪ Knowing what equipment is available, where is it located, how to get it (transportation requirements). Potentially track in SAP. ▪ Current issues with radio system (project under way to upgrade). ▪ Emergency equipment stored in non-earthquake proof building. ▪ Red flashing lights on vehicles.

Process Scenario Title	3.0 Meter Disconnect, Utility generated		
Version 0.1	February 19,	Hugh Smith	Initial draft, added because of removal of hazard identification from meter disconnect scenario.
Scenario Overview:	This scenario covers a simple job raised by a dispatcher to have a technician disconnect a meter for safety reasons (product model MC10-029). While on site, the technician identifies a hazard and raises a separate notification to record it.		
Process Inputs / triggers:	Maintenance plan in SAP creates leak survey work order		
Process Outputs / results:	▪ Leak survey completed ▪ Work order has the correct MAT and settlement rule. ▪ Work order is TECO ▪ Hazard notifications raised in SAP to record identified problems		
Process variations:	▪		

Current Process Issues / Gaps (and how the new process would address)

#	Current Issue	Proposed Solution	Severity of issue
1			

Process Scenario Steps

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
1	Initiation				
1.1	Deadline monitoring program executes in SAP R3 and creates the leak survey work order.	Auto R3	Leak survey order is created against the same survey functional location as today.		As per current process. There is an option to add the list of premises to be surveyed as items in the order object list as this may help the tech in identifying locations to record hazards (see step 5.3).
2	Order Prep				

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
2.1	Leak survey paper package is assembled	Manual			As per current process.
3	Scheduling				
3.1	Program releases orders scheduled within the next time window.	Auto SAP		Need to determine time frame for releasing orders to ClickSchedule, e.g. weekly with rolling schedule for next 4 weeks.	**WBS D.3.2.4.c** New ABAP program to release orders in batches for sending to ClickSchedule. Should be same program for both meter exchange and planned maintenance work. Should be schedule during low scheduling activity period so Click can handle the influx of orders (e.g. night time on weekends).
3.2	Creation of the released order in R3 triggers the creation of the ClickSchedule task for the order operation.	Auto R3 to ClickSchedule			
3.3	Creation of the new task in ClickSchedule causes Click to schedule the job.	Auto ClickSchedule		Option to have Click remove work from the schedule that is lower priority and replace it with the newly created order?	
3.4	Click works to optimize order timing and assignment	Auto ClickSchedule			
3.5	Click changes status of order to trigger dispatching of job (i.e. as per the MGAP process in construction today)	Auto ClickSchedule		Assumption is that leak survey work will follow the same two week approval schedule that construction does today. This allows time for the paper package to be sent to the correct technician.	
4	Dispatch				

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
4.1	Status change sent from Click to SAP which triggers download of order to technicians mobile device	Auto ClickSchedule to R3 to Mobile			As per current construction process.
4.2	Confirmed receipt of order on the mobile device returns message which updates the status in R3 (and then to Click) of Dispatched (DISP).	Mobile to R3 to Click			As per current construction process.
4.3	Paper leak survey package mailed to appropriate technician	Manual			
5	Executing				
5.1	Technician goes En Route and then Arrives at the job site (setting job status accordingly).	Technician Mobile App		Option to have status update message from R3 also update the PTJ status in Energy.	As per current construction process.
5.2	Status changes of the operation trigger updates to operation status in R3 and then to ClickSchedule.	Auto Mobile App to R3 to ClickSchedule		Option to have status update message from R3 also update the PTJ status in Energy.	As per current construction process.
5.3	While on site at one of the premises the Technician identifies a hazard. Technician confirms that the hazard has not been previously logged.	Technician Mobile App		Need to determine the best method for the technician to locate the correct premise to record the hazard against: use GPS locator, use object list on order (see step 1.1), or just search function. May need method to limit number of premises downloaded to the handheld (only those within the geo-area of the syrvey job?).	**WBS D.3.2.6.b** View for the Technician of completed and outstanding work at the premise so he can determine if a problem has been previously reported.
5.4	Technician selects “Record	Technician			**WBS D.3.2.6.b**

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	Problem" function from within the located premise view and enters catalog information to record the type of problem, and saves the document.	Mobile App			Ability to record problem at any object in the technical object hierarchy (functional location, equipment, or bill-of-material item).
5.5	Attach digital photograph to hazard report.	Technician Mobile App		Potential ability to take a digital photograph and attach it to the problem record. Option to have a camera integrated with the hand-held device.	Nice to have.
5.6	Repeat steps 5.3 to 5.5 for each hazard identified.	Technician Mobile App			
5.7	Upon completion of entire survey, Technician sets the order status to FCMP.	Technician Mobile App			As per current construction process.
6	Follow-up				
6.1	Setting of Field Complete status triggers posting of final confirmation for the operation.	Auto R3		Need to determine if this step is necessary. Used in current manual closing process for R3 work.	**WBS D.3.2.3.i**
6.2	Final confirmation of the operation triggers the setting of the order status to Technically Complete TECO.	Auto R3			**WBS D.3.2.3.i** New ABAP function to automate this step. Includes posting of plant units.
6.3	Problems recorded by the Technician create notifications in R3 assigned to the correct functional location / technical object and with catalog information defining the problem.	Auto Mobile App to R3			**WBS D.3.2.2.b** **WBS D.3.2.6.b** New function to create problem notification in R3 for later processing. Consolidation of problem recording notifications.

▪

Process Scenario Title	**1.4 Meter Exchange, including Industrial Meter Maintenance**		
Version 0.1	May 30, 2006	Hugh Smith	Initial draft for review
Version 0.2	June 28, 2006	Hugh Smith	Revised after team walkthrough
Version 0.3	October 23, 2006	Hugh Smith	Revised for RFQ documentation for Mobile Solution. Steps specific to the mobile solution functionality highlighted in yellow.
Version 0.4	February 20, 2007	Hugh Smith	Updated now that Click and Mobile workshops have been completed and key scoping decisions have been made. Key change is that we do not expect to have any changes to Energy be in scope so will have to move to model of essentially replicating the current Energy / MUP interfaces with SAP.
Scenario Overview:	This scenario covers the combination of the Industrial Meter Exchange process and Industrial Meter Maintenance process where these types of work are performed together in the field, and follows these basic steps: ▪ Identification by Measurement Technologies that a meter exchange (recall or sample) is required in the following calendar year via the creation of a tracking notification (type Z3 or Z4) in SAP R/3 ▪ Matching of this requirement to the current maintenance plan for the associated meter set ▪ Creation of a tracking Process Tracking Job (PTJ) in Energy to identify the planned work at a customer premise ▪ Booking the appointment ▪ Scheduling / dispatching / and field execution of the work ▪ Updating of SAP R3 with the required maintenance history information ▪ Updating of Energy and SAP R3 with the meter install / uninstall ▪ Auto-closing of the associated work order and notifications ▪ Completion of the original tracking notification upon return of the removed meter to the meter shop		
Process Inputs / triggers:	Creation of a Meter Exchange tracking notification in SAP R/3		
Process Outputs / results:	Meter Exchange: ▪ Meter exchanged in field ▪ Removed meter returned to meter shop (tracking notification completed) ▪ Both Energy and SAP-MMS updated to reflect uninstalled / installed meters ▪ Energy updated with final and new meter readings for exchanged meters		

Process Scenario Title	1.4 Meter Exchange, including Industrial Meter Maintenance
	▪ Work order in Technically Complete (TECO) status ▪ Work order has correct Maintenance Activity Type and Settlement Rule assigned Meter Set Maintenance: ▪ Maintenance executed in the field ▪ Maintenance history entered on notification in SAP R/3
Process variations:	Residential meter exchange would follow the same process without the need for the preventive maintenance components.

Current Process Issues / Gaps (and how the new process would address)

#	Current Issue	Proposed Solution	Severity of issue
1	Process is currently limited to managing meters, as these are the only "devices" Energy is able to track. This does not allow Measurement to manage other devices such as correctors and PFM regulators.	While the new process keeps essentially the same model in place today, it would be possible to develop a separate process (entirely SAP) for non-Energy devices. This would involve a mechanism to directly convert the recall notifications for the non-Energy devices to SAP work orders for scheduling, dispatching, and field processing.	
2	Forms used by technicians who do not use Mobile UP (i.e. industrial meter exchange). Because the Technicians who perform industrial meter exchanges do not use Mobile UP, they are required to complete a separate form to manually complete the exchange process.	All meter exchange work will be processed the same way in the field, with all data being captured and processed automatically to complete the process.	Accurate, timely completion of this paperwork has been an ongoing challenge for the current process.
3	Lack of barcode / data validation for meter number and meter reading data.	Provide latest actual meter reading and "validation rules" locally to provide better confirmation that data entered is meaningful. Provide for future barcode capability to "scan" meter number rather than have technician enter.	Some 1500 field meter investigate jobs are raised per year to correct meter identification and meter reading errors. The reading of the meter being removed seems to be particularly problematic.
4	**Removed from scope:**	Develop a standard function to create / update a PTJ in	

#	Current Issue	Proposed Solution	Severity of issue
	ABSU does not currently get PTJ notice of work being done at a premise unless that work is initiated in Energy. Also, do not get status information in Energy of any work being performed in the field.	Energy anytime a work order is released for work at a customer premise. Status updates would also automatically show in Energy (particularly useful for emergencies where customer may be waiting for a technician to arrive).	
5	ABSU currently does not perform any appointment booking for utility work due to limitations with the current technology (although they were originally contracted to do so).	Use of ClickSchedule for appointment booking allows this function to be outsourced back to ABSU for which they are better equipped given the number of inbound and outbound calls generated. The solution positions the utility to outsource appointment booking.	This is seen as a significant benefit for other work types, particularly reconnects, for which the current level of customer service is very poor.
6	Ensuring correct supply of meters in the musters to support the process is a current issue due to the overlap with the new install process (using the same meters) and the delay (up to 30 days) between a meter being installed in the field and having the material movements processed in SAP. This can lead to significant disconnects between what inventory of meters is shown in SAP and what physically exists in the field.	New process would execute the material movement in SAP directly from the entry of the data in the field, rather than waiting for the updates to be made by ABSU in Energy and using this to trigger the SAP transactions. This would allow the current muster stock levels shown in SAP to be considerably more accurate.	
7	Current disconnect between exchange progress reporting due to use of different tracking objects. Measurement technologies uses the completion of the tracking notification (triggered by the physical return of the removed meter to the meter shop) to track progress, while Distribution uses the completion of job orders. This is further complicated due to the duel processes (MUP and SAP) for residential and industrial meters.	New process would have a single mechanism for reporting the progress in the field, and be able to distinguish this from the status of meters returned to the meter shop for testing.	

Process Scenario Steps

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	Work Initiation				
1.1	Raise meter exchange notifications (notification type Z3 for Meter Recalls and Z4 for Compliance Samples) for the coming year.	Measurement Technology SAP R3-MMS Annually in Q4 for following year.	Notifications raised against ISU-CCS Device which is installed in Device Location / Connection Object representing the customer premise.	Whether the consolidated functional location structure uses the existing level 4 (dispatch area) structure to install the connection objects in (as a superior functional location) or not.	Note: The process for identifying the devices for recall / sample is not in scope for this discussion. The process from Distribution's perspective is started with the creation of the tracking notification.
1.2	Execute a comparison program that would check for meters due to be exchanged for which there is also maintenance due.	Maintenance Analyst SAP R3	Maintenance plans built for the meter set equipment object, installed in the device location (functional location)		**WBS D.3.2.3.a** A new ABAP program that would use the list of recall / compliance sample notifications, the projected maintenance work from the maintenance plans, and other inputs to determine which meter maintenance should also be performed. For meters that also require maintenance, set a flag (status) on the tracking notification to indicate this. Program should automatically skip the call for the maintenance plan at the same location where an exchange is to be performed.
1.3	Interface to Energy to create Energy PTJ's to record the planned activity at each customer's premise.	Auto SAP to Energy			As per current process and existing interface. Exchange type (recall vs. sample) differentiated in Energy by using different required by dates).
1.4	Export PTJ data from Energy to create SAP orders (and	Auto Energy to SAP		Need to decide whether creating orders alone will be	**WBS D.3.2.4.a** Intent is to use the existing output files

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	notifications?)			sufficient or whether will need to create an order / notification combination for each PTJ. Need to decide whether Mercator will continue to be used or be replaced with a new middleware technology.	from Energy as today to minimize impact to ABSU. New ABAP program to take the existing Energy output and create work orders (and notifications) in SAP for each. Will need to examine the trigger / timing issues of when the PTJ data is sent from Energy to SAP. Currently triggered by required date on the Energy side, so only work that is due comes across. For scheduling and management reasons, will want PTJ's to come over as soon as possible from Energy. Date matching issue between Energy and SAP, need a method to deal with date changes in both SAP and Energy as a result of jobs coming over to SAP before they are due. Need a method to convert PTJ type code from Energy into job text and duration. Could either store in a custom table in SAP or use variant config. Using variant config would allow values to be stored for later analysis.
1.5	Execute program to "load level" work across the year based on forecast for how much work should be done when and where to smooth overall workload.	SAP			**WBS D.3.2.3.b** ABAP program that levels this work type across the year (by geography). E.g. in geo code "xyz" in January, 3 recalls and 10 samples will be done (possible at level 3 geo-code, i.e.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
					"6N6"). Program needs to take the meter exchange orders as input (and perhaps a set of rules as to how many exchanges should be done by area per time period) and use it to set initial work time windows by setting basic start and finish dates on the orders. Ideally there should also be an output report that can be tied into the resource planning spreadsheet (John Turner's).
1.6	Program releases orders scheduled within the next time window.	Auto SAP		Need to determine time frame for releasing orders to ClickSchedule, e.g. weekly with rolling schedule for next 4 weeks.	**WBS D.3.2.4.c** New ABAP program to release orders in batches for sending to ClickSchedule. Should be same program for both meter exchange and planned maintenance work. Should be schedule during low scheduling activity period so Click can handle the influx of orders (e.g. night time on weekends).
1.7	Interface to ClickSchedule sends newly released orders to Click where new tasks are created.	Auto SAP to ClickSchedule			New auto-scheduling rules in ClickSchedule based on type of work.
2	Order Prep				
2.1	Plan meter deliveries / supply chain to ensure meters available in field	Materials management			**WBS D.3.2.3.c** Custom report for meter supply planning. New ABAP program to look at coming meter work demand for next time period by muster. Will also need to include new install work, and meter type installation. Will also

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
					need to account for individually planned meters (likely include in the report, but show separately).
3	Scheduling				
3.1	ClickSchedule works to optimize the scheduled tasks	Auto ClickSchedule			
3.2	Generate and mail letters for upcoming recalls to arrange for appointments.	Customer Appointment Setting SAP R3			**WBS D.3.2.3.d** Create a new layout set for the meter exchange service order that replicates the current notification that is mailed to customers from the appointment booking Access database. Will likely want an un-numbered status on the work order to track that a letter has been sent.
3.3	Receive customer call and book appointment. OSR accesses service order in R3 and calls Click appointment booking routine.	CAS SAP R3 with call to Click		Method to ensure OSR is offered "preferred" appointment options from Click to help optimize.	Method for task in Click to be put into schedule based on appointment being booked in place of already scheduled but lower priority work.
4	Dispatch				
4.1	ClickSchedule automatically assigns the appropriate resource and "micro-schedules" within the appointment window based on optimization criteria	Auto ClickSchedule		Need to develop a conceptual model for how skill matching will take place in Click. Will we use work type characteristics (service products with chars), or just MAT? May also need to use match work center rule for PM work.	Assign resources in Click based on "check list" of skills sets that match to job types

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
4.2	Operation status updated in ClickSchedule to MGAP	Dispatcher ClickSchedule		Finalize rules for how far in advance of a job is it dispatched, and what approval process is required for dispatch.	Assume that this process will occur similarly to the way construction work is currently approved and dispatched. Final rules to be determined, but presumably the Click status is either automatically or manually set to MGAP which triggers the downloading to the mobile device.
4.3	Operation status automatically updated in SAP from interface from Click.	Auto ClickSchedule to R3			As per current construction process.
4.4	Operation status change in R3 triggers the operation to be downloaded to the assigned technician's mobile device. Confirmation of the delivery is reflected in R3 and ClickSchedule by updating the operation status to DISP.	Auto Syclo to R3 to ClickSchedule			As per current construction process.
4.5	Master Data required for job (premise / functional location data, recent work orders, recent notifications) synchronized to technician's mobile device.	Auto R3 to Mobile App		Need to determine how best to achieve this. Assumption is that the master data resides permanently within the mobile client application (with periodic delta updates from R/3).	Mechanism to ensure required master data is available to the technician to successfully process their work, including recent work history and upcoming unprocessed work.
5	Execute Work				
5.1	Technician receives operation on his mobile application and sets status to ENRT (En Route).	Field Tech Mobile App			As per current construction process.
5.2	Automated message sent to R3 to update operation status, which triggers message to	Field Tech Mobile App to R3 to			As per current construction process.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	ClickSchedule to update status	ClickSchedule			
5.3	Technician arrives on site and updates operation status to ARRV (Arrived) which triggers update to R3 and then to ClickSchedule	Field Tech Mobile App to R3 to ClickSchedule		Need to look at process for how to handle situation where tech does not proceed to the next scheduled job. The current construction design is to automatically reschedule the task to start at the current time in ClickSchedule, but to not try and resolve any conflicts this creates. This could be an issue for short duration work as this may leave an artificial opening in the techs schedule.	As per current design. Upon receiving the update that the status is now ARRV, ClickSchedule should automatically reschedule the start time of the job to the actual start time as per the status change.
5.4	Technician performs meter exchange task in field, and records the number of meter being removed and number of meter being installed.	Field Tech Mobile App	Create a meter install notification – against the premise where the device is being installed, linked to the dispatched exchange order – to record this data.	Future potential to utilize bar code capability to scan meter numbers rather than enter manually.	**WBS D.3.2.2.b** New notification type to record meter install information (should work for new installs, planned exchanges, and unplanned exchanges). May want to include some failure code or reason code information to explain unplanned exchanges. Ability to create notifications from the field to record the exchange data.
5.5	Technician completes the preventive maintenance portion of the job and records required inspection information.	Field Tech Mobile App		Need to determine whether only items attached to the same equipment or same functional location are included in viewing historical work Is it a requirement to raise	Workflow in mobile app should require Tech to complete appropriate form based on the job type as an industrial exchange. Technician needs ability to view previous notifications and orders – both historical (already complete) and

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
				multiple notifications against specific equipment or materials within the structure (e.g. the station maintenance process)?	unprocessed for the same location. Technician needs to be able to view functional location and equipment data, including Bills-of-material and characteristics. **WBS D.3.2.6.a** Creation of field notification document to record history information using catalog codes to record information. Require specific templates for different asset inspection types (PFM, Instrument Drives, Stations, Heaters, etc) to ensure key data recorded in a standard format.
5.6	Technician updates the work order operation to FCMP (field complete). SAP operation status and ClickSchedule task status updated automatically.	Field Tech Mobile App to R3 to ClickSchedule			For jobs FCMPed before their scheduled completion time in Click, Click should automatically adjust the job to show complete at the actual time (to prevent future time from being taken up by a now erroneously scheduled future job).
5.7	Physical meter returned to muster and placed in storage.	Field Tech Manual			As current.
6	Follow-up				
6.1	Plant units for meter exchange posted against work order based on FCMP status.	Auto R3		Whether data should be stored temporarily somewhere first (i.e. on a "completion" notification) and then posted later (similar to meter movement model) or whether to do in one step from the field data.	**WBS D.3.2.3.i** New automated update to post plant units (unit of measure F_JOBS) of "1" for work order. Updates order header un-numbered status to PLNT (Plant units posted).
6.2	Order operation confirmed in R3	Auto		Not sure whether this step is	**WBS D.3.2.3.i**

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
		R3		required anymore or not. Perhaps still to allow auto-TECO based on all operations being confirmed for multi-operation jobs.	New automated update to post final confirmation against operation based on FCMP status.
6.3	Meter install type notification raised in R3 from entry of data by technician in Mobile SAP.	Auto. R3	Notification raised against premise where device is being installed, and is linked to the work order.	Need to determine status model for this notification type. Does it wait for some feedback from Energy before completing or does it complete upon TECO of exchange work order?	**WBS D.3.2.2.b** New notification created via message from the mobile client.
6.4	Maintenance history notification raised in R3 from entry of data by technician in Mobile SAP.	Auto. R3	Notification raised against premise, linked to work order.		**WBS D.3.2.2.b** New notification created via message from the mobile client. Assumption is that the existing notification type that is currently used for recording this data will continue to be used.
6.5	Work order technically completed in R3	Auto R3			**WBS D.3.2.3.i** New automated update to set order status to TECO based on plant units being posted, notifications having been created, and all operations confirmed.
6.6	Notifications associated with the work order are automatically completed based on TECO of work order.	Auto R3		Do for all notifications or limit to the newly raised notifications but not the initial Z3 / Z4 tracking doc (see item 6.10)	**WBS D.3.2.3.i**
6.7	Program takes the meter install / removal data from the completed notifications and performs the	Auto R3	Uninstalled meter removed from device location and		**WBS D.3.2.3.e** New ABAP program to execute physical meter movement in SAP

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	physical meter movement in SAP MMS.		stock transferred as serialized material to plant EDS1, and a storage location determined from the functional location. Reverse transaction processed for installed meter.		MMS. Program would work for all meter movements, not just meter exchanges.
6.8	Program executes in R3 to send message to Energy to execute the meter uninstall / install based on the data recorded in the meter install notification.	Auto. R3 to Energy			**WBS D.3.2.4.a** New program to deliver meter uninstall / install data to Energy (triggered by completion of install notification?). Will need a method to not send this data to Energy for non-energy devices managed via this process (non-meter devices) or for meters being managed for 3rd parties not billed via Energy.
6.9	Meter uninstall / install performed in Energy	Auto? Energy			**WBS D.3.2.4.a** As per current process. Assumption is that the existing input from Mobile UP to Energy to trigger this function can be re-used.
6.10	Daily export from Energy to SAP runs to record meter installs and uninstalls.	Auto (nightly batch) Energy to SAP-MMS			**WBS D.3.2.4.a** Change current interface function to perform a compare to see that data matches R3, rather than current process which triggers the physical meter movement in R3.
6.11	Upon return of the removed meter to the meter shop, original tracking Z3 / Z4 notification is	Meter shop receiving, Barcode to		May want to have this notification also auto-close from the TECO of the work	As per current process.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	completed.	SAP-MMS		order, then update a separate status on the notification. Allows for consistent tracking of exchange progress.	
7	Analysis				

Process Scenario Title	1.6.1 Customer Driven Construction - simple		
Version 0.1	May 30, 2006	Hugh Smith	Initial draft for review
Version 0.2	October 23, 2006	Hugh Smith	Revised for RFQ documentation for Mobile Solution. Steps specific to the mobile solution functionality highlighted in yellow.
Version 0.3	January 31, 2007	Hugh Smith	Updated based on scope finalization discussions now that Click and Mobile workshops have been completed. Note: scenario still assumes t-doc is paper and manually entered into SIA and DCRS. If scope is expanded to include electronic t-docs, this needs to be updated.
Scenario Overview:	▪ This scenario covers the installation of a new duplex on an existing main. The scenario does not cover the details of the Café initiation and planning processes, but focuses on the creation, scheduling, dispatching, execution, and completion of the SAP service orders.		
Process Inputs / triggers:	Café project is Quote Accepted in Café and submitted to SAP for execution.		
Process Outputs / results:	▪ Work is physically completed in the field – service installed, meters hung and operating. ▪ Premises created and meters installed in Energy ready for billing. ▪ Meters installed in correct device locations in SAP-MMS. ▪ SAP service orders TECO, with correct Maintenance Activity Type and Settlement Rule.		
Process variations:	▪ If the job is cancelled after being submitted to SAP, but before dispatching to the field, would need to expand the current cancellation functionality to include canceling of any connection objects / device locations created on the initial submit. ▪ Work done by a contractor, where individual crews do not have mobile devices for recording meter install information etc. ▪ Process for dealing with errors in terms of how many premises are planned versus installed (does this ever happen?). Only plan for two meters for example, but hang three in the field.		

Current Process Issues / Gaps (and how the new process would address)

#	Current Issue	Proposed Solution	Severity of issue
1	Tracking or meter installs, particularly for multi-meter jobs.	Meter installs will be recorded in the field by the technicians, and each event will create a meter install tracking notification document in R3.	

#	Current Issue	Proposed Solution	Severity of issue
2	Timing delays with reflecting meter install in R3 due to waiting for Energy to process information first.	Meter installs reflected in R3 as a direct result of field activities with updating to Energy happening as a later step.	
3	Errors with meter number entry and initial meter reading.	Bar code mechanism for meter number reading and logic within the mobile client application to check logic of meter readings being entered.	

Process Scenario Steps

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
1	Initiation				
1.1	Project is raised and planned in Café, triggered by customer call.	IC1/OSR Café	Single project two attachments for the duplex. The duplex has two new premises attached to it. Project assigned to level 4 funcloc as per today.		As per current process.
1.2	Crew availability confirmed via call to ClickSchedule from Café.	IC1/OSR Café to Click		Method for performing skills match as part of appointment booking from Café.	**WBS D.3.2.4.d** Addition of match skills logic to the appointment booking routine from Café. The current program does not look at skills, but presumably will need to in the future. Hopefully this can be simplified to use a crew or work centre match to avoid Café needing to know the full work-type data.
1.3	Customer accepts quote, and job is set to QUAC in Café and				**WBS D.3.2.4.b** Need to add sending of premise data

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	submitted to SAP.				to SAP as part of the interface from Café so that the premise objects can be created in R3 as per 1.4a.
1.4	SAP objects created from Café interface to continue with job execution.	Auto Café to SAP			**WBS D.3.2.4.b**
1.4a	The two new premises create device locations / connection objects (functional locations) in SAP.	Auto Café to SAP	Connection object assigned to correct level 4 functional location as project is assigned to in Café.		**WBS D.3.2.4.b** New functionality in current Café to SAP submit interface to create "premise" objects in SAP (connection object and device location) based on the attachment data from Café.
1.4b	Café project creates notification / sales order combination in SAP.	Auto Café to SAP	Notification is assigned to the connection object that represents the billing premise for the project.	Need method to determine which of the two premises created in 1.4a to assign to the notification (i.e. which is the billing premise).	New function to assign notification and sales order to the newly created connection object rather than old level 4 functional location.
1.4c	New service attachment creates line item on the sales orders creating a service order.	Auto Café to SAP	Service order is assigned to the functional location representing the billing premise for the project. The other (non-billing premise) is added to the order object list.	May decide to have both premises assigned to the order via the object list to simplify design.	New interface functionality to assign service order to the functional location representing the billing premise segment and add the other premise to the order item list. Note: for a multi-meter install, this could be many functional locations. May need to modify the duration calculation table as it currently uses the level 4 functional location on the sales order as part of the duration look-up. Other option is to keep the level 4 functional location on the sales order, but probably prefer to have the

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
					billing premise assigned to the sales order (seems more logical).
1.5	Service order operations created in ClickSchedule and appointments booked.	Auto SAP to ClickSchedule			As per current process.
1.6	Café objects updated with service order / operation data.	Auto SAP to Café		May need a method to update the Café premise with the SAP connection object and/or device location numbers. Depends on how premise numbering done in the future (external numbering for connection objects driven from Café?)	As per current process.
2	Order preparation				
2.1	Prem-out report run from Café for ABSU to create / assign Energy Premise numbers.	Auto. Café.			As per current process.
2.2	Prem-in report received and imported into Café to update premises with Energy premise numbers.	Auto. Café.			As per current process.
2.3	SAP connection objects updated with Energy premise numbers.	Auto. SAP		Can either trigger update from the update in Café, or can update directly from Prem-in file. Assume SAP will use the same input file as Café rather than generating an extract from Café based on the Energy input.	**WBS D.3.2.4.a** New function to update the Energy premise number on the new SAP connection objects representing the same premises.
2.4	Pre-reqs gathered and orders set to RTGO.				As per current process.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	Note: this step is not detailed as it is not anticipated to materially change from current.				
3	Scheduling				
3.1	Resource Scheduling Manager reviews RTGO jobs and adjusts ClickSchedule auto-assignment. Operations in ClickSchedule move to WFAP status.	RSM ClickSchedule			As per current process.
3.2	Schedule review and approval for following weeks schedule. Schedule approved and operations move to MGAP status in ClickSchedule.	Area Manager ClickSchedule		Determine whether this is still an Area Manager function (probably).	As per current process.
4	Dispatch				
4.1	Change to MGAP status on operation in R3 triggers download to crew leader's mobile device.	Auto SAP to Mobile App			As per current process.
4.2	Confirmed receipt of the operation on the mobile device returns a message to R3 and then to ClickSchedule to update status to DISP.	Auto. Mobile App to SAP to ClickSchedule			As per current process.
5	Execute				
5.1	En route / Arrived status changes occur as per current process and crew physically completes the services install and meter hangs in the field.	Crew Mobile App			As per current process.
5.2	Crew records the meter installation information on the mobile device by selecting one	Crew Mobile App			Ability for crew to see the new premise information from the functional location on the order object

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	of the premises (functional location on the order object list), and triggering a meter install function.				list. New function in Mobile to install a meter (i.e. create a notification)
5.2a	Crew confirms the address for the selected premise and updates if determined to be incorrect.	Crew Mobile App			Ability to update address information on functional location assigned to order object list.
5.2b	Crew enters meter number and initial meter reading for meter being installed.	Crew Mobile App			Method for data validation of meter reading being entered.
5.3	Crew repeats steps for 5.2 for the second meter being installed.	Crew Mobile App			
5.4	Crew records completion information for the job.	Crew Mobile App		Will likely record the data on a notification in R3 and trigger follow-on processing from there, rather than try to update directly.	
5.4a	Update job characteristics for billing adjustments (usually service length).	Crew Mobile App		Possibly use work flow so that only entries that result in a pricing change need to be looked at by Closing?	**WBS D.3.2.3.i** Characteristic data is ultimately updated on the sales order line item for the configurable service product, which may result in pricing changes. Ability for crew to record whether the customer has been notified of the changes.
5.4b	Record other billing adjustment information (e.g. service line clean-up charge – pricing condition ZLCU)	Crew Mobile App			Ability to record this data.
5.4c	Record plant units			Determine if this can be combined with 5.4a. Supports logic of recording all the completion data on a	

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
				notification, then using it to update pricing and plant units as a secondary step using a single set of completion data.	
5.5	Crew finishes capturing of required completion data and sets the operation status to Field Complete (FCMP). Triggers status update to R3 and then to ClickSchedule.	Crew Mobile App to R3 to ClickSchedule		Is there value in having the operation stay on the mobile device for the remainder of the day (considering the timesheet process), or continue to remove immediately?	As per current process.
6	Follow-up				
6.1	"Meter installation" notifications created in R3 (one per meter installed), recording the meter number and initial reading.	Auto Mobile App to R3	Notifications are raised against the connection object functional locations representing the new premises. Notifications are connected to the work order via the order object list.		New notification type **WBS D.3.2.2.b** and new function to create from mobile device **WBS D.3.2.6.b**.
6.2	Creation of meter install notification triggers install of appropriate device into correct device location in R3.	Auto R3 / ISU-CCS	Meter (serialized material) transferred from muster plant to operating plant and installed in device location.		**WBS D.3.2.3.e** New ABAP program to perform this function based on creation of a meter install notification (use same program as for meter exchange).
6.3	Interface triggered from R3 to Energy to perform the meter install there as well.	Auto R3 to Energy	Energy premise number on connection object used as key field to	May trigger from the same notification document as meter install in R3 (likely), or may use the physical	**WBS D.3.2.4.a** New ABAP program to send meter install information to Energy.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
			determine where to install meter in Energy.	install in R3 as the trigger.	
6.4	Updating of characteristic entries on sales order line item (configurable service product) based on data entered on the completion notification.	Auto R3			**WBS D.3.2.3.i** New ABAP program to execute the update.
6.5	Updating of other billing condition information on the sales order line item based on the data entered on the completion notification.	Auto R3			**WBS D.3.2.3.i** New ABAP program to execute the update.
6.6	Posting of plant units to service order based on entry made on completion notification.	Auto R3			**WBS D.3.2.3.i** New ABAP program to execute the update.
6.7	Creation of final confirmation document for the order operation.	Auto R3			**WBS D.3.2.3.i** New ABAP program to execute the update.
6.8	Order is set to TECO once all operations are finally confirmed.	Auto R3			**WBS D.3.2.3.i** New ABAP program to execute the update. **WBS D.3.2.3.j** Program to check for orders that have not been TECOed although no outstanding operations.
6.9	TECO of order triggers billing report to Energy.	Auto R3 to Energy			As per current process.
6.10	Physical documents returned from the field and AM/FM closing (dot on the lot) processed.	Closing AMFM			As per current process.

Process Scenario Title	3.0 Meter Disconnect, Utility generated		
Version 0.1	June 30, 2006	Hugh Smith	Initial draft for review
Version 0.2	October 23, 2006	Hugh Smith	Revised for RFQ documentation for Mobile Solution. Steps specific to the mobile solution functionality highlighted in yellow.
Version 0.3	February 19, 2007	Hugh Smith	Updated with revised project scope to keep interactions with Energy as per today (i.e. jobs must be raised in Energy). Original model was to have work raised in SAP and passed to Energy for info. Removed raising hazard as this has been moved to the leak survey scenario.
Scenario Overview:	This scenario covers a simple job raised by a dispatcher to have a technician disconnect a meter for safety reasons (product model MC10-029). While on site, the technician identifies a hazard and raises a separate notification to record it.		
Process Inputs / triggers:	Decision within the utility to have the meter disconnected for safety reasons		
Process Outputs / results:	▪ Meter disconnected in the field. ▪ Work order has the correct MAT and settlement rule. ▪ Work order is TECO ▪ Completion information sent to Energy for processing ▪ Physical meter movement processed in both Energy and SAP ▪ The removed meter returned to the meter shop		
Process variations:	▪		

Current Process Issues / Gaps (and how the new process would address)

#	Current Issue	Proposed Solution	Severity of issue
1			

Process Scenario Steps

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
1	Initiation				
1.1	Dispatcher launches premise information / order creation application in R3.	Dispatcher R3			**WBS D.3.2.3.g** New ABAP application to provide display of information about a premise, e.g. completed work, planned work, identified hazards etc.
1.2	Dispatcher uses address information to search for the correct premise in R3.	Dispatcher R3	Connection Object / Device Location functional locations used to represent the premise in R3.		**WBS D.3.2.3.g** Able to directly enter a premise number, a meter number, or search by address to retrieve the premise.
1.3	Upon selection of the premise, lists of recent work orders, outstanding work orders, and outstanding notifications are displayed by the application.	Auto R3		Whether to include work orders where the "premise" is only included in the object list or only include orders with the "premise" on the order header?	**WBS D.3.2.3.g** Information displayed in a structured way by work category (completed work, pending work orders, pending notifications) – likely sorted by date. Need method to not confuse view by duplication notification and order data (i.e. if a notification has an order, only show the order). Need ability to open work orders and notifications from lists.
1.4	The lists provided do not contain an existing work order to perform the lock-off, so the dispatcher accesses Energy to raise a PTJ for the job.	Dispatcher Energy			**WBS D.3.2.3.g** If the work being requested was a non-Energy order type (e.g. corrective maintenance), the dispatcher would have the option to create the order directly in R3 at this point in the order creation app.
1.5	Dispatcher executes get work program in Energy to send PTJ to SAP.	Dispatcher Energy			**WBS D.3.2.4.a**
1.6	Work order created in R3 with	Auto		How is the duration for the	**WBS D.3.2.4.a**

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	correct MAT, and set to Released status.	Energy to R3		work determined? Do we use configurable service products or just code via a table in the order creation app?	Correct order type / MAT type created in R3. May need rules in interface as to when to release orders upon creation based on required date. Need a method to capture "as dispatched" versus "as completed" information, likely by storing as variant characteristic on order or on a notification.
2	Order Prep				
3	Scheduling				
3.1	Creation of the released order in R3 triggers the creation of the ClickSchedule task for the order operation.	Auto R3 to ClickSchedule			
3.2	Creation of the new task in ClickSchedule causes Click to schedule the job.	Auto ClickSchedule		Option to have Click remove work from the schedule that is lower priority and replace it with the newly created order?	
4	Dispatch				
4.1	Message automatically sent to SAP to assign resource to the operation.	Auto ClickSchedule to R3			
4.2	Assignment of resource in R3 triggers the push of the operation to the assigned resource's mobile device. Upon confirmed receipt of the operation on the device, the status is updated in R3 (and then to Click) of Dispatched (DISP).	Auto R3 to Mobile App		Need to determine whether the action of assigning a resource in Click triggers the dispatching of the operation to the mobile device, or whether a status in Click must also be set. Perhaps do through a pop-up in Click to	

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
				prompt whether to dispatch immediately once task has been assigned.	
5	Executing				
5.1	Technician goes En Route and then Arrives at the job site (setting job status accordingly).	Technician Mobile App		Option to have status update message from R3 also update the PTJ status in Energy (not in scope)	As per current process.
5.2	Status changes of the operation trigger updates to operation status in R3 and then to ClickSchedule.	Auto Mobile App to R3 to ClickSchedule		Option to have status update message from R3 also update the PTJ status in Energy (not in scope).	As per current process.
5.3	Technician performs work, confirming that the address and meter number are correct.	Technician		What happens if the address or meter number are not correct?	
5.4	Technician selects meter removal function and records final meter reading	Technician Mobile App			Custom completion form based on the fact that tech is performing a disconnect. Not allowed to complete order until meter reading is entered.
5.5	Technician sets order status to Field Complete FCMP.	Technician Mobile App			
5.6	Status change of the operation triggers update to operation status in R3 and then to ClickSchedule.	Auto Mobile App to R3 to ClickSchedule		Option to have status update message from R3 also update the PTJ status in Energy.	As per current process.
6	Follow-up				
6.1	Completion data is posted in R3, including creation of meter removal notification.	Auto Mobile App to R3		Need to determine where best to store completion data – notification or order. Order is better due to link with Energy PTJ, however, notification better suited to holding this sort of data.	**WBS D.3.2.2.b** **WBS D.3.2.6.a** Should include reason as part of meter removal notification so meter shop know why meter has arrived at the shop.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
6.2	Setting of Field Complete status triggers posting of final confirmation for the operation.	Auto R3		Need to determine if this step is necessary. Used in current manual closing process for R3 work.	
6.3	Final confirmation of the operation triggers the setting of the order status to Technically Complete TECO.	Auto R3			**WBS D.3.2.3.i** New ABAP function to automate this step. Also includes posting of plant units.
6.4	Completion of R3 order triggers sending of closing information to Energy (final meter reading)	Auto R3 to Energy		Where best to store closing data in R3 so it can be sent to Energy?	**WBS D.3.2.4.a** Assumption is that we will re-use the existing interface input format into Energy.
6.5	ABAP program executes to perform physical meter move in SAP based on data on notification.	Auto R3			**WBS D.3.2.3.g** New ABAP program
6.6	Energy PTJ closing process, including meter removal in Energy	Auto Energy			**WBS D.3.2.4.a** As per current process.
6.7	Nightly meter movement extract runs from Energy and data passed to SAP MMS	Auto Energy to R3			**WBS D.3.2.4.a** Convert current interface to perform compare on SAP side rather than executing the meter move.
6.8	Meter physically returned to the meter shop	Manual			As per current process.

Process Scenario Title	**4.0 Public Duty work (emergency response)**		
Version 0.1	June 14, 2006	Hugh Smith	Initial draft for review
Version 0.2	October 23, 2006	Hugh Smith	Revised for RFQ documentation for Mobile Solution. Steps specific to the mobile solution functionality highlighted in yellow.
Version 0.3	Feb 26, 2007	Hugh Smith	Updated to account for final scope decisions.
Scenario Overview:	This scenario covers a response to a customer initiated gas odour call for which it is not initially known whether a hit line is involved. Upon reaching the site, the dispatched technician discovers that the the situation does involve a service hit by an excavator at a premise neighbouring the site to which he was initially dispatched. A repair crew is then also dispatched to perform the repair. The repairs are completed, and the excavating company is later billed for the cost of the repair. The manual updating of the Emergency Diary notification is not detailed in this scenario as it is assumed this will continue to happen as it does today, via manual updates by the dispatcher from radio updates provided by the field technicians.		
Process Inputs / triggers:	Customer call to the ABSU call centre to report the gas odour.		
Process Outputs / results:	▪ Repairs in the field completed. ▪ Emergency diary completed in SAP. ▪ Work order has the correct MAT and settlement rule. ▪ Work order is TECO ▪ Excavating company is billed for the repair costs.		
Process variations:	▪ For situations where the gas odour call does not lead to a hit line, the process would end with the completion of the initial technician being dispatched and completing his tasks. Diary notification status would be manually set to NOHL (No Hit Line) by dispatch OSR to exclude from SQI reporting (as per current process). In this case, order should auto-close as no paper is required to be returned from the field.		

Current Process Issues / Gaps (and how the new process would address)

#	Current Issue	Proposed Solution	Severity of issue
1			
2			
3			

Process Scenario Steps

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
1	Initiation				
1.1	A customer calls the ABSU call centre to report the strong smell of gas outside their premise. The CSR raises an Gas Odour Emergency type PTJ in Energy (GASEM)	ABSU CSR Energy	PTJ is raised against the premise ID of the customer reporting the gas odour.		As per current process.
1.2	Energy PTJ sent to SAP R3 where it raises an Emergency response work order (PM10) and an emergency diary notification (ZD) (and adds initial diary task for receipt of PTJ).	Auto Energy to SAP	Both notification and order raised against the connection object functional location representing the customers premise. Work order and notification linked.	Need to decide whether to use service products for emergency response orders to track characteristics. Current PM10 order type does not, although it is configured as a service order.	**WBS D.3.2.4.a** New function in SAP to take the PTJ type and recognize the need to create both a notification and work order (possibly create notification first, then order from it to link correctly). Function to use the Premise number provided by Energy to identify the correct functional location in SAP (premise number stored in custom field on connection object functional location). **WBS D.3.2.2.a** Work order configured to release immediately upon creation. Order assigned MAT 022 (Gas Odour Upstream) automatically based on the PTJ type from Energy.
1.3	Creation / release of work order in SAP sends message to ClickSchedule to create the equivalent task there.	Auto SAP to ClickSchedule			As per current construction process.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
2	Order Prep				
3	Scheduling				
3.1	On screen pop-up in ClickSchedule to notify dispatcher that an emergency task has been received.	Auto ClickSchedule			New ClickSchedule function. Other nice-to-haves (not in scope): to have system also list technicians in proximity of emergency (ranked by time to respond), and include current status and job type if working. This would help dispatcher decide who to dispatch.
3.2	Dispatcher selects technician to respond to emergency, and assigns in ClickSchedule	Dispatcher ClickSchedule			
4	Dispatch				
4.1	Message automatically sent to SAP to assign resource to the operation.	Auto ClickSchedule to R3			
4.2	Assignment of resource in R3 triggers the push of the operation to the assigned resource's mobile device. Upon confirmed receipt of the operation on the device, the status is updated in R3 (and then to Click) of Dispatched (DISP).	Auto R3 to Mobile App		Need to determine whether the action of the dispatcher assigning a resource in Click triggers the dispatching of the operation to the mobile device, or whether they must also set a status in Click.	Mechanism to take a task away from a technician, if it is decided to send someone else (remove it from their mobile device – i.e. the "reverse push", Mobile App requirement 3.9.7).
4.3	Based on the dispatching of the operation to the assigned tech, a page message should also be automatically sent to the technician's pager number.	Auto R3		Current MUP functionality – need to determine if still required.	Auto-paging capability, built into Mobile App requirements (3.9.6).
5	Executing				
5.1	Technician receives pop-up notification on his mobile device	Auto Mobile App			New function for Mobile App to auto-generate emergency pop-up.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	that an emergency task has been received. Technician must acknowledge receipt of emergency task.				
5.2	Acknowledgement of emergency triggers message that updates operation status in R3 and then ClickSchedule.	Auto Mobile App to R3 to ClickSchedule			Timed warning for the dispatcher in Click if the technician does not acknowledge emergency within a set time period. Timing to occur in Mobile middleware which triggers message to Click if time exceeded. Mobile Requirement 3.9.3. New operation status required.
5.3	Technician sets the status of the current job he is working to Suspend (SUSP) and enters the appropriate reason code. This creates update message to update status in R3 (Click) and create confirmation document to record reason (delay) codes.	Technician Mobile App			As per current process.
5.4	Technician goes En Route and then Arrives at the job site (setting job status accordingly).	Technician Mobile App			As per current process.
5.5	Once on site, the technician determines that there is a hit line, and calls dispatch to arrange for a repair crew to be sent.	Technician Manual			
5.6	Dispatcher accesses the work order in R3 and adds a second operation for the crew to perform the repair and saves the updated work order.	Dispatcher R3		Whether to process as a second operation on the same order or whether to raise a second order. Scenario assumes the former, but need to confirm	**WBS D.3.2.1.d** Emergency order type design (two orders or one with two operations).

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
				design. Have the dispatcher also manually change the order MAT from 022 to GRS since they are accessing the order or should this be a general function built into capturing standard closing data from the field that drives the updating of MAT?	
5.7	Saving the work order triggers a message to ClickSchedule to create the second operation as a Click task.	Auto R3 to ClickSchedule			
5.8	Dispatcher determines which crew to send to perform the repair and manually assigns in Click.	Dispatcher ClickSchedule			
5.9	As per the steps above, assigning crew in Click updates operation in R3 and triggers pushing the operation to the crew's mobile device, and triggers a pager message to the crew leader.	Auto ClickSchedule to R3 to Mobile App			As above.
5.10	Crew acknowledges receipt of the emergency repair operation, suspends current task and goes en route to the emergency repair. Status updates reflected in R3 and then in ClickSchedule	Crew Mobile App			As per standard process for all work.
5.11	Original technician determines that the address on the job is incorrect (dispatched to original	Technician Mobile App		Determine whether there is value in having the technician update the	Address needs to be corrected on both the work order and notification by changing the funcloc number to the

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	customer's house, but damage at neighboring premise).			address in the field, or verbally pass the correction on to dispatch for them to update.	correct premise. Need a method to quickly identify neighboring properties' premise numbers.
5.12	Original technician gathers damager information from excavation company and verbally passes on to dispatcher, who updates in R3 on the work order.	Technician Mobile App		Determine if there is value in having tech enter this information directly in the field, or verbally pass the information to dispatcher.	Needs to be updated on both
5.13	Original technician sets the status of the initial operation to Field Complete (FCMP), and status updates are reflected in R3 and ClickSchedule.	Technician Mobile App, Auto updates to R3 and ClickSchedule			As per current process.
5.14	Crew completes repair and sets status of second operation to Field Complete (FCMP), and status updates are reflected in R3 and ClickSchedule.	Crew Mobile App, Auto updates to R3 and ClickSchedule			As per current process.
6	Follow-up				
6.1	Completion data posted in R3	Auto Mobile App to R3		Need for a separate completion notification linked to the order (as per install process)?	
6.2	System Damage Report			Option to capture System Damage Report electronically? Currently paper (form 1564) and includes sketch. Electronic "form" attached to job or create notification to	Electronic capture of SDR form added to scope of mobile requirements.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
				capture?	
6.3	Once order TECOed, resource related billing processed through R3.				As per current.

- Will there be an issue with dispatcher keeping the emergency diary notification open and getting the order changes to be updated correctly from Click and Mobile App? If so, may need to consider not linking the notification and work order directly.

Process Scenario Title	Field Work and Timesheeting		
Version 0.1	May 30, 2006	Hugh Smith	Initial draft for review
Version 0.2	October 23, 2006	Hugh Smith	Revised for RFQ documentation for Mobile Solution.
Version 0.3	Feb 26, 2007	Hugh Smith	Updated now that final scope decisions have been made.
Scenario Overview:	▪ This scenario covers a typical day from a field crew's perspective from logging into the system in the morning, tracking their work and off-route activities through the day, and processing and posting their timesheet.		
Process Inputs / triggers:	▪ Start of the field crew's work day.		
Process Outputs / results:	▪ Completion of the work day ▪ All processed orders statused correctly in R3 and ClickSchedule ▪ Time for costing and time for pay entries posted in R3 ▪ Crew logged out at the end of the day		
Process variations:			

Current Process Issues / Gaps (and how the new process would address)

#	Current Issue	Proposed Solution	Severity of issue
1	Dispatchers cannot see whether a technician is currently in coverage or not.		
2	Manual process for time entry for construction and maintenance work force (manual time for pay entry for entire workforce)		
3	Large discrepancy between data entered via timesheets versus what is directly recorded using Mobile UP.		
4	Lack of data validation for time entries with current paper process. Large effort required to "clean" data prior to entry in R3.		

Process Scenario Steps

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
1	User Log-in				
1.1	Crew leader logs into mobile application on latop.	Crew Mobile App Start of day			Must be able to login to application successfully regardless of who else has previously logged into it on the specific mobile device.
1.2	Message sent to update crew leaders status in Click as "Logged on"	Auto Mobile App to ClickSchedule			Dispatchers using Click need to be able to see the "real time" status of the technicians / crews. Need a method to send this information directly from Mobile App to Click.
1.3	Crew leader enters the names / ids of personnel working on his crew for the day, their designation (activity type for costing), and the vehicle number they are using.	Crew Mobile App		Process for dealing with dependant contractors. Would they also be covered, or do they keep a separate timesheet process?	Similar to current Mobile SAP log in process. Method to validate user ids being entered for crew members.
1.4	Message sent to ClickSchedule to update status of crew members.	Auto Mobile App to ClickSchedule			Method to compare if crew line-up matches the planned line-up in Click.
1.5	Time stamp of login time set in mobile time sheet application.	Auto Mobile App		Send to R3 as well or just store locally?	Local timesheeting application running on the mobile device that is updated with time stamps for changes in job activity.
1.6	If log-in is later than scheduled log-in time, system prompts user to select an off-route activity and approximate time to account for	Auto Mobile App		Current mobile field functionality – is this still required or can it be handled through the timesheet at the	

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	the late log-in.			end of the day?	
1.7	"Message of the day" screen is displayed for the crew.	Auto Mobile App			Similar to current functionality in both MAM and Mobile Field.
2	Off route activity				
2.1	Crew starts off-route activity "Stock truck" while they prepare the vehicle for the day's work, including current location and estimate for how long will be off-route.	Crew Mobile App		Not sure if location and estimated time function still required. Should estimated time "count down" on screen (currently does not in Mobile Field)?	Similar to current Mobile Field "Off-route" functionality.
2.2	Message sent to SAP (Click?) to status crew as being off-route and estimated duration.	Auto Mobile App to ClickSchedule		Send via R3 or direct to ClickSchedule?	Status update is required in ClickSchedule so dispatcher can see.
2.3	Time stamp set in local timesheet application to note start of off-route activity.	Auto Mobile App			
2.4	Crew completes off-route activity a selects "End Activity" on Mobile application.	Crew Mobile App			As per current Mobile Field
2.5	Message sent to Click to status crew as being available for work.	Auto Mobile App to ClickSchedule			
2.6	Time stamp set in timesheet application for end of off-route activity.	Auto Mobile App			
3	Executing Work				
3.1	The crew selects the first job from their list that they plan to work and set the status to "En Route".	Crew Mobile App			As per current MAM functionality.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
3.2	Message sent to R3 and then to Click to update status of operation in both applications.	Auto Mobile App to R3 to ClickSchedule			As per current.
3.3	Time stamp set in local timesheet application.	Auto Mobile App			
3.4	While driving, the crew leaves the area of network coverage and an update is sent to Click to highlight crew as being out of coverage.	Auto Mobile middleware to ClickSchedule		Nice-to-have scope option.	Detection of lost coverage (Intel SDK) triggers registration service in mobile middleware to "unregister" mobile device. This triggers an update to ClickSchedule to update status of crew as out of coverage.
3.5	While driving, the crew returns to network coverage, and an update is sent to Click to highlight crew as being back in coverage.	Auto Mobile middleware to ClickSchedule		Nice-to-have scope option.	Detection of resumed coverage (Intel SDK) triggers registration service in mobile middleware to "register" mobile device. This triggers an update to ClickSchedule to update status of crew as in coverage.
3.6	Crew arrives at the first job and sets the status to "Arrived" - ARRV	Crew Mobile App			As per current MAM functionality
3.7	Message sent to R3 and then to Click to update status of operation in both applications.	Auto Mobile App to R3 to ClickSchedule			
3.8	Time stamp set in local timesheet application.	Auto Mobile App			
3.9	Crew completes work and sets status to "Field Complete" and enters completion data.	Manual Mobile App		What if address information is incorrect? Procedure to set flag so job does not auto-close but is reviewed in closing?	As per current, in order to process completion, crew is required to fill out completion information. Completion information required is driven by type of work, using catalog codes on notification to standardize

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
					entries. Crew also enters plant units and confirms address information.
3.10	Message sent to R3 and then to Click to update status of operation in both applications.	Auto Mobile App to R3 to ClickSchedule			As per current.
3.11	Completion information sent to R3 and raises a notification.	Auto Mobile App to R3	Notification linked to the work order for the job via the object list.		New functionality to perform this.
3.12	Time stamp set in local timesheet application.	Auto Mobile App			
3.13	Crew selects next job to work and repeats “En Route”, “Arrived” sequence.	Crew Mobile App			As above.
3.14	Once on site, crew determines that they cannot complete the job (e.g. running line not clear), but plan to return tomorrow when it is supposed to be. Set status of job to “Suspend” – SUSP. Crew also enters delay code information to explain why job is suspended.	Crew Mobile App			As per current.
3.15	Message sent to R3 and then to Click to update status of operation in both applications.	Auto Mobile App to R3 to ClickSchedule			As per current.
3.16	Confirmation document created in R3 to record the delay code information.	Auto Mobile App to R3		Assumption is that delay information (suspended and pulled jobs) will continue to be recorded as confirmations	As per current.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
				in R3. Job completion information should be captured on notifications. Need to decide if still need to capture delay information during job completion or just for SUSP and PULL jobs.	
3.17	Steps of section 3 repeated to end of day.				
4	End of day processing				
4.1	Crew accesses daily timesheet functionality and reviews data pre-populated based on status change timestamps through the day. See timesheet mock-up.	Crew / Tech Mobile timesheet application End of day			**WBS D.3.2.6.a** Time sheet application uses time stamps from the day's activities to build a timesheet, including how much travel time and work time will be charged to each order the crew worked.
4.1a				Nice-to-have scope.	**WBS D.3.2.6.a** Ability to add or remove crew members through the day (add / remove crew member function) and have the application keep track of work times accordingly.
4.2	Crew edits timesheets entries accordingly to ensure pay portion of timesheet and costing portions of timesheet are accurate.	Crew / Tech Mobile timesheet application End of day			**WBS D.3.2.6.a** Need the ability to edit the time worked and travel time for the overall crew sheet, and then create individual timesheets for the crew members and their vehicle. Need to be able to edit the individual timesheets separately once they have been created but not yet submitted.
4.3	Crew logs off mobile device,	Crew / Tech		Process for changing a time	**WBS D.3.2.6.a**

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
	which triggers submission of timesheet.	Mobile timesheet application End of day		sheet after it has been submitted? What happens if crew does not log off correctly?	Timesheet becomes read only once it has been submitted.
4.4	Message sent to Click to status crew as being logged off.	Auto Mobile App to ClickSchedule			
5	Follow-up – Time for Costing				
5.1	Submitted time sheets post as confirmations in R3, with actual work time charging to the individual jobs and off-route activities charging to standing work orders.	Auto Mobile App to R3	Standing orders to represent off-route activities (likely new order type, MAT per off route activity type, standing order per municipality).	Need to determine how to process travel time. Currently not posted in R3 as a separate entry, but need a method to identify for reporting. Should it post as a separate entry in R3 (new activity types)?	Mapping table required to match off-route activity to standing work orders. New order type for off-route activities.
6	Follow-up – Time for Pay				
6.1	Submitted pay portion of timesheet sent as document to a pay administrator.			Note: have not yet finalized how best to process pay portion of time entries. Original concept was to generate a form from the mobile timesheet which is "sent" to a pay administrator and processed manual. Other options include developing a LAN version of the timesheet app which is then used for routing approvals and interfaces data into R3 for final posting, or	**WBS D.3.2.6.a** Business continues to keep printed paper copies of timesheets as legal record of approvals.

#	Description	Who / Where / When	Data Model	Outstanding Decisions / Options	Requirements / Notes
				using CATS as the timesheet app and posting data there and using workflow in R3 for approvals, printing etc.	
6.2	Administrator prints and has timesheet approved.				
6.3	Timesheet data keyed into SAP HR for payroll execution.				
7	Reporting				
7.1	Employee activity report				

- What do we do with the travel time at the end of the day? Charge it to the final job even though the crew has finished that final job or make it an off-route activity? What if the crew does not complete the final job but sets it to EDAY – charge to the job or to off-route?

	One Day	One Week	One Month	Three Months	One Year	Two Years +
Current State Processes	Complex procedures to enable dispatching due to multiple technologies. No validation of data entered in field. Manual identification of field hazards. No ability to move work across streams. No optimization across resource types. No GPS positioning of technician location.	Reactive work planning - short notice absences, manual processes to juggle resources and work.	No decision support tools for adjusting resource mix based on updated work plan. Numerous manual processes to track resource availability and skills.	No tool to support updating of work forecasts and manpower plans and see impacts to budget and work plan status.	No clear linkage between work forecasts and annual budgeting process.	No current process for forecasting or budgeting out two years, but will be required with new budgeting approach.
Current Customer Service / Mobile UP Process	Real-time visibility of technician and job status No ability to see if technician is in coverage or not No field visibility of work history, other field work, or premise information. Automated time tracking for costing Complex manual timesheeting requiring reconciliation with costing. Auto-closing of most work orders	No view of upcoming work. No ability to schedule or optimize. No street routing or travel time optimization. No ability to manage complex jobs with dependencies Does not support multi-meter processes.	Appointment booking for meter exchange via manual Utility based process. No appointment booking. Current device management process cannot support devices other than meters (not AMR devices, PFM regulators, etc.)			
Current Construction / Click-MAM Process	Real-time visibility of job status Manual field data capture and manual time sheets No ability to see current technician status.	Sign-off by manager of planned work schedule for the week Work for following week is visible to crew once manager has approved schedule.	Appointment booking based on availability. Schedule optimization by ClickSchedule, including street routing and travel time. Manages complex jobs with dependencies			
Current Maintenance Process	No visibility of technician or job status Technicians not utilized for emergency response. No tracking of work progress (until history returned from the field) Manual field data capture and manual time sheets		Work manually assigned based on “who can do what, where” rules.		Ability to forecast preventive maintenance work based on SAP plans.	
Future State Vision	Real-time visibility of all technicians and job statuses, including GPS and coverage status. Automated field data capture and time sheets All technicians available to support emergency response as required. Field visibility of work history and other pending work. Manual closing for paper processes (sketches) Validation of field data captured (including meter barcoding) Automated identification of hazards from the field	Appointment booking based on availability, including potential to have appointments booked by ABSU. Supports multi-meter processes. Ability to move work and optimize across all work and resource types. All work auto-scheduled based on rules. Schedulers / dispatchers respond to exceptions only Manual juggling for short term changes still required. Fewer systems to update. Sign-off by manager of planned work schedule for the week Work for following week is visible to crew once manager has approved schedule.	Tool to support updating work plans through year, updating resource requirements, and budget impacts. Schedule optimization by ClickSchedule, including street routing and travel time. Manages complex jobs with dependencies Supports management of all “devices” (not just meters) through a standard process. Ongoing pro-active planning of resource requirements in single tool, based on updated work forecast		Work forecasting tool with clear linkages to annual budgeting process.	Work forecasting tool with clear linkages to multi-year budgeting process.

Field Mobile Workforce Strategy Project:
2007 Mobile Vision
Last updated: July 2006

terasen

Attachment 12.6

REQUEST FOR PROPOSAL

Field Workforce Mobile Solution for Distribution Project

REFERENCE: PO61465SLK

Terasen Gas

November 2006

Table of Contents

Part 1
Request for Proposal

Request for Proposal

Terasen Gas Inc. ("Terasen") invites proposals ("Proposals") for the provision of a Field Workforce Mobile Solution for Distribution (the "Project").

A detailed description of the nature of the services that Terasen requires and desires in connection with the Project can be found in Part 3, Scope of Work..

Terasen requires the Project to commence and be fully implemented and operational by no later than January 1, 2008.

Proposals will be considered only from proposers ("Proposers") who have been selected by Terasen and whose financial resources, technical ability, qualifications and experience are commensurate with the services to be performed. Terasen will not be responsible for any costs incurred by any Proposer in preparing its Proposal. The criteria to be used by Terasen in evaluating the Proposals are described in the Instructions to Proposers forming part of this Request for Proposal.

Proposals will be received at the following address until 12:00 p.m. (noon), local time, on November 15, 2006 (the "Closing Time").

TERASEN GAS INC.
Attention: Hugh Smith
Business & Information Technology Services
c/o Mailroom
16705 Fraser Highway
Surrey, B.C.
V3S 2X7

Part 2

Instructions to Proposers

1. **Invitation to Bid:**

Terasen Gas Inc. ("Terasen") invites proposers ("Proposers") to submit proposals ("Proposals") for the Project described in Part 3 hereof (the "Project") in accordance with the following instructions.

2. **Process:**

The Proposal selection process will proceed in two stages. The first stage is covered by the contents of this Request for Proposal document. A second document will be issued to a short-list of Proposers with instructions on supplying a quotations for implementation services.

3. **Identification of Proposers:**

Each Proposal shall include the Proposer's:

a) Name and address
b) Telephone number
c) Facsimile number
d) Signature of authorized signatory
e) Name (printed) of authorized signatory
f) Title of authorized signatory

4. **Information/Clarification**

4.1 All requests for information or clarification shall be addressed in writing to Hugh Smith at (604) 592-7520 (Fax) or hugh.smith@terasengas.com at least five (5) business days prior to the closing time. All replies shall be confirmed in writing by Terasen and any reply other than in writing is invalid. Any instructions or information given to Proposers other than by Mr. Smith are invalid.

4.2 A reply to all questions, if any, shall be made in the form of an addendum(s) which will be forwarded to all Proposers.

4.3 No verbal agreement or conversation made or had at any time with any officer, agent or employee of Terasen, nor any oral representation by such officer, agent or employee, shall add to, detract from, affect or modify the terms of the Request for Proposal or be relied upon in any way whatsoever, unless specifically incorporated in a written addendum issued by Terasen.

5. **Notice of Intent to Bid**

Each Proposer shall submit written notice of its intention to submit a Proposal in response to this Request for Proposal on or before November 8th, 2006. The notice shall be sent to Hugh Smith at the fax number set out in Section 4.1 above.

6. Joint Proposals/Subcontractors

A Proposer may submit a Proposal wherein more than one company will be providing the Proposal, either through a joint bid or through a subcontracting arrangement.

The Proposer submitting the Proposal shall:

a) identify all companies party to the Proposal;

b) identify the solution components to be provided by each participant;

c) identify the primary Proposer's representative who shall assume all responsibilities for the Proposal and if successful the contracted services and materials; and

d) not add or substitute other companies without first obtaining written consent from Terasen.

7. Knowledge of Work

7.1 Before submitting its Proposal, Proposers shall obtain all necessary information, local or otherwise as to risks, contingencies and other circumstances which may influence or affect its Proposal.

7.2 All communications during the Request for Proposal period shall be made directly with:

Hugh Smith, Consultant
Business & Information Technology Services
Terasen Gas Inc.
16705 Fraser Hwy
Surrey, B.C. V3S 2X7

Reference:
Phone: (604) 592-7512
Facsimile: (604) 592-7520
Email: hugh.smith@terasengas.com

8. Time Line

The following table reflects the desired timing of the Field Workforce Mobile Solution for Distribution Project (the "Project") Proposal process.

Key Event	Deadline Date
RFP for solution short-list Issued	November 2, 2006
Notice of Intent to Bid	November 8, 2006
Close of Proposer Questions	November 10, 2006 – 5:00 PM
Close of RFP	November 15, 2006 – 12:00 noon
RFQ for implementation quotation issued (to short-listed Proposers only)	November 24, 2006
Close of Bids for implementation quotations	December 8, 2006 – 12:00 noon
Completion of Bidder presentations	December 15, 2006 – 12:00 noon

9. Proposal Format

All Proposals must be submitted in the following structure:

9.1 Overall Solution Fit

The Proposal must describe how the Proposal supports Terasen's Future State Vision as described in Section 2.1 of Part 3 hereof, including:

a) Whether the Proposal just provides the Mobile Middleware and Mobile Application components, or whether it also provides work order management, resource management, and scheduling functionality currently supported by SAP R/3 and ClickSchedule;

b) How the Proposer envisions Terasen using the proposed solution to meet the Future State Vision;

c) The degree to which the solution considered to be "out-of-the-box" versus how much customization is envisioned to meet Terasen's requirements.

9.2 Mobile Application Functional Fit

The Proposal must describe how the Proposer's solution supports the requirements outlined in Sections 2.2.1, 2.2.2 and 2.2.7 of Part 3 hereof.

9.3 Mobile Middleware Functional Fit

The Proposal must describe how the solution supports the requirements outlined in Section 2.2.3 of Part 3 hereof, including whether the Proposal provides connection persistence and network isolation or if it will utilize Terasen's existing NetMotion's Mobility XE product.

The Proposal must also describe the Proposer's solution's capabilities in each of the following nine general categories used for rating Multichannel Access Gateway (MAG) functionality:

a) **Device, network, and peripheral support**

b) **Synchronization and mobile database management system (DBMS)** - in particular, describe how the solution supports Terasen's requirement to use a combination of message based communications – including "Push" capability – for work order status updates and bulk synchronization for master data updates.

c) **Pre-built applications** – what pre-built applications are delivered with the solution that support Terasen's general functional requirements?

d) **Pre-built connectors** – what pre-built connectors are delivered with the solution for communicating with SAP R3, ClickSchedule, GE Smallworld, and Peace Energy?

e) **Workflow tools**

f) **Back-end integration tools**

g) **Debugging and emulation**

h) **Management and security**

i) **Instant messaging, e-mail, thin-client, and voice integration**

9.4 Technical / Network Considerations

The Proposal must describe any considerations regarding the use of the solution over a 1X wireless network as described in Section 2.2.5 of Part 3 hereof.

9.5 Compliance to Operating System and Database Standards

The Proposal must describe any deviations in the solution from Terasen's standards described in Section 2.2.6 of Part 3 hereof. Indicate any specific

concerns in supporting the use of VMware ESX virtualization infrastructure for development and test environments.

9.6 Implementation Approach and Estimated Effort

The Proposal must describe the implementation approach, including typical phases, time-frames, Proposer supplied roles, and whether the vendor provides implementation support directly or through a partner firm. This item must also include a rough estimate of the Proposer's implementation effort required and the anticipated cost. This must include either a level of confidence with the estimate (e.g. +/- 25%) or a statement of the estimate as a range. Include any key assumptions that have been made in developing the estimate and identify the factors that would cause the estimate to move to the upper or lower ends of the stated range. Since the estimate can only be based on the information in this document, it will only be used for a rough comparison of the solutions not as the basis for development of a contract for implementation services. Contract discussions, if any occur, will be based on the detailed implementation Quotations developed in the second stage of this process. However, it will be considered a negative if the estimates developed through the detailed process are significantly different from the rough numbers provided at this point.

9.7 Support Model

The Proposal must describe the support model, or models, provided by the Proposer once the solution is in production and has been stabilized, including:

a) The support services provided by the Proposer, and the location of these services;

b) The capabilities that Terasen is expected to provide in-house versus what the Proposer or a 3rd party partner would provide;

c) A description of typical administrative tasks Terasen would be expected to provide to support the routine operation of the system, and a rough estimate of how many full-time-equivalent resources would be expected to fill this role.

9.8 Licensing Cost and Structure

The Proposal must describe how the product is licensed – both for initial purchase and ongoing support - and provide an estimate of what the licensing costs will be.

9.9 Server Requirements

The Proposal must include a schematic of the anticipated server requirements to support the proposed solution, and a description of the factors would cause the solution to require additional servers.

9.10 Other Considerations

The Proposal must provide any additional information that should be considered in the potential selection of the solution or that specifically differentiates the solution from others in the market.

10. Proposer's Qualifications

The Proposer must provide a Statement of Proposer's Qualifications, Part 4 Appendix "A", with its Proposal. This must include a list of at least three references where the solution is used in a similar manner to what is being proposed. Ideally the references should be for distribution utilities with SAP R/3 and ClickSchedule as described in Terasen's Future State Vision in Part 3 hereof. The references must indicate which components of the solution each reference demonstrates: SAP R/3 as the work management system, ClickSchedule used for scheduling, implemented for a distribution utility. The Proposal must also provide a breakdown of the number implementations of the described solution have been completed or are currently in progress (itemized separately) that i) integrate with SAP R/3 work management, ii) are for distribution utilities, iii) are for both distribution utilities and integrate with SAP R/3 work management, and iv) utilize a 1X wireless network as described in Section 2.2.5 of Part 3 hereof.

11. Delivery of Proposal

Three (3) paper sets of the Proposal, and one (1) electronic copy in MS Word 2002 and MS Excel 2002, shall be submitted in an envelope addressed to:

Hugh Smith
Business & Information Technology Services
Terasen Gas Inc.
c/o Mailroom
16705 Fraser Highway
Surrey, B.C.
V3S 2X7

Reference: PO614665SLK

indicating Terasen's reference number and delivered up to but not later than 12:00 noon Pacific Time on November 15, 2006.

Proposals delivered after the closing time will not be accepted.

Faxed Proposals will be accepted prior to closing time but must be followed by a written Proposal within two (2) working days. It is the sole responsibility of the Proposer to ensure that faxes have been received by Hugh Smith.

All Proposals including spreadsheets, must be provided in electronic form, as MS Word 2002 and MS Excel 2002.

12. Request for Proposal and Proposal Proprietary and Confidential

12.1 In addition to the specific information covered by the Agreement, all information in this Request for Proposal is confidential and should not be disclosed by the Proposer except as required in the preparation of the Proposer's Proposal.

12.2 The Proposer may designate portions of its Proposal that are proprietary in nature and Terasen agrees not to disclose those portions except as required by the evaluation process.

13. Proposal Preparation Costs

Costs associated with preparing Proposals in response to this Request for Proposal are the sole responsibility of Proposers.

14. Acceptance and Rejection of Proposals

14.1 Proposals will be opened privately at the offices of Terasen. Following submission of the Proposal and within forty-eight (48) hours of being requested, Proposers shall provide such additional information as called for herein and as may be required by Terasen.

14.2 Terasen reserves the right to reject any or all Proposals, including without limitation the lowest Proposal even if the lowest Proposal conforms in all respects with the Request For Proposal, and to award Purchase Orders to one or more Proposers or to whomever Terasen, in its sole and absolute discretion, deems appropriate, notwithstanding any custom of the trade to the contrary nor anything contained in the Request For Proposal. Terasen shall not, under any circumstances owe a duty of care or duty of fairness to any Proposer or, be responsible for any costs incurred by any Proposer in the preparation of its Proposal or for any damages whatsoever arising out of or related to the rejection of any Proposal.

14.3 Should a Proposer fail to complete its Proposal in strict compliance with the requirements of the Instructions to Proposers, Terasen, in its sole and absolute discretion, may nonetheless waive such non-compliance, seek clarification from and enter into negotiations with that Proposer and award a Purchase Order to that Proposer, even if such failure in compliance would at law render the Proposal null and void. Failure to comply with any provision of the Instructions to Proposers described in mandatory terms such as "must" or "shall" shall not result in a Proposal being disqualified or rendered void unless Terasen, in its sole and absolute discretion, elects not to consider the Proposal any further, otherwise Terasen in its sole and absolute discretion may waive such non-compliance and still consider the Proposal.

14.4 Without limiting the generality of the foregoing, Terasen reserves the right, in its sole and absolute discretion, to accept or reject any Proposal which in the view of Terasen, is incomplete, obscure, or irregular, which has erasures or corrections in the documents, which contains exceptions and variations, which omits one or more prices, which contains prices Terasen considers unbalanced.

14.5 Criteria which may be used by Terasen in evaluating Proposals and selecting the short-list of Proposers and the weight, if any, to be given to the criteria are in Terasen's sole and absolute discretion and, without limiting the generality of the foregoing, may include one or more of:

a) total cost to Terasen;

b) the Proposer's track record in similar or related projects;

c) ability to meet business requirements of the Project;

d) understanding of application requirements;

e) proposed support model;

f) proposed schedule; and

(g) quality and completeness of the Proposer's Proposal.

14.6 Should Terasen not receive any Proposal satisfactory to it in its sole and absolute discretion, Terasen reserves the right to cancel the Request for Proposal, re-tender the Request for Proposal, or negotiate a contract for the whole or any part of the Work and with any one or more persons whatsoever, including but not limited to one or more of the Proposers.

14.7 The Proposal shall remain valid, irrevocable and open for acceptance by Terasen without qualification for a period of one hundred and twenty

(120) calendar days from the Closing Time for submission of Proposals, or such later date as may be agreed upon. Terasen reserves the right to enter into negotiations with any one or more Proposers on any or all aspects of their Proposal.

14.8 If Terasen, in its sole and absolute discretion, considers it has received an acceptable Proposal from a Proposer, then after a Proposal review or negotiation meeting with that Proposer, if required, Terasen will include the Proposer in the list of Bidders to receive the Request for Quotation for the Project.

14.9 Notwithstanding the Clauses above, Terasen reserves the right, in its sole and absolute discretion, to include Proposer in the next stage of the process subject to internal Project review, obtaining Project approval and obtaining Project funding.

14.10 Notwithstanding any other provision of the Request For Proposal, it is a fundamental condition of this Request for Proposal and the receipt and consideration of Proposals by Terasen that Terasen and its employees, contractors, consultants and agents will not and shall not under any circumstances whatsoever, including without limitation whether pursuant to contract, tort, statutory duty, law, equity or otherwise, and including but not limited to any actual or implied duty of fairness, be responsible or liable for any costs, expenses, claims, losses, damages or liabilities (collectively and individually "Claims") incurred or suffered by Proposers as a result of, arising out of, or related to any of the Request For Proposal, any Addenda, the preparation, negotiation, acceptance or rejection of any conforming or non-conforming Proposal, the rejection of any Proposer, the cancellation, suspension or termination of the tendering process, or the postponement, suspension or cancellation of the Work, and by submitting a Proposal each Proposer shall be conclusively deemed to waive and release Terasen and its employees, contractors, consultants and agents from and against any and all such Claims. Proposers shall indemnify and hold harmless Terasen and its employees, contractors, consultants and agents against any and all Claims brought by third parties against Terasen or any of its employees, contractors, consultants and agents which arise out of or are related to any one or more of the preparation, submission and negotiation of any Proposal by the Proposer. Without limiting the generality of the foregoing, Terasen shall not be under any obligation whatsoever to award the Work to the Proposer or anyone else and may cancel the Request For Proposal and reject any or all Proposals received at any time for whatsoever reasons Terasen in its sole, absolute and unfettered discretion considers to be its best interest.

Part 3

Scope of Services

Table of Contents

1. BACKGROUND AND OVERVIEW

1.1 Terasen Gas

Terasen Gas Inc. ("Terasen") delivers natural gas and piped propane to homes and businesses throughout British Columbia. Terasen is focused on connecting its customers safely, efficiently and reliably to the energy and services they need.

With approximately 900,000 customers in 125 communities, Terasen provides service to 95 per cent of BC's natural gas customers and is the third largest utility in Canada. Terasen has more than $2.9 billion in assets, including more than 43,000 kilometres of pipeline, 11 compressor stations, and 416 gate and regulator stations. Terasen has 1,400 employees and is among the lowest O&M costs per customer of North American utilities.

Terasen is a subsidiary of Kinder Morgan Inc. www.kindermorgan.com

Terasen is regulated by the British Columbia Utilities Commission ("BCUC"). www.bcuc.com

Further information is available at:
http://www.terasengas.com/_AboutTerasenGas/default.htm

1.2 Distribution

As its core business, Distribution manages Terasen's distribution assets - from the inlet of pressure regulating stations to the outlet of gas meters at customers' premises. To support the management of these assets, Distribution organizes a field workforce comprised of a combination of internal employees and external contractors. Distribution has four general processes that generate field work, each with their own specific business requirements:

- **Customer Service Work** - Short predictable duration work, one technician per job, usually initiated via a call to the Customer Call Centre. Often involves an appointment with the customer for the morning or afternoon of a specific day. Terasen completes roughly 200,000 Customer Service field activities per year.
- **Maintenance Work** - Preventive and corrective work done on company assets, usually one technician per job. Terasen completes roughly 55,000 maintenance field activities per year.
- **Construction Work** - Installation of new pipe assets, typically performed by a two or three person crew. Durations range from a few hours to multiple days with dependent tasks. Appointments are

generally booked for a given "week of". Terasen completes roughly 35,000 Construction field activities per year.

- **Emergency Response Work** – Require immediate dispatching. Key performance measures reported to the BCUC for time for technician to arrive on site. Causes disruption to other scheduled work. Often initially dispatched to a Customer Service Technician. May also require a Construction Crew to be dispatched depending on the nature of the emergency.

1.3 Field Workforce

Terasen's field workforce is comprised of a combination of internal employees and external contractors. In general, Customer Service and Maintenance tasks are performed by internal employees, with the exception of Leak Survey work which is contracted in some areas. Construction work is performed by a mixture of internal and contracted crews. Terasen has approximately 300 internal technicians and crews who will be supported by the mobile solution.

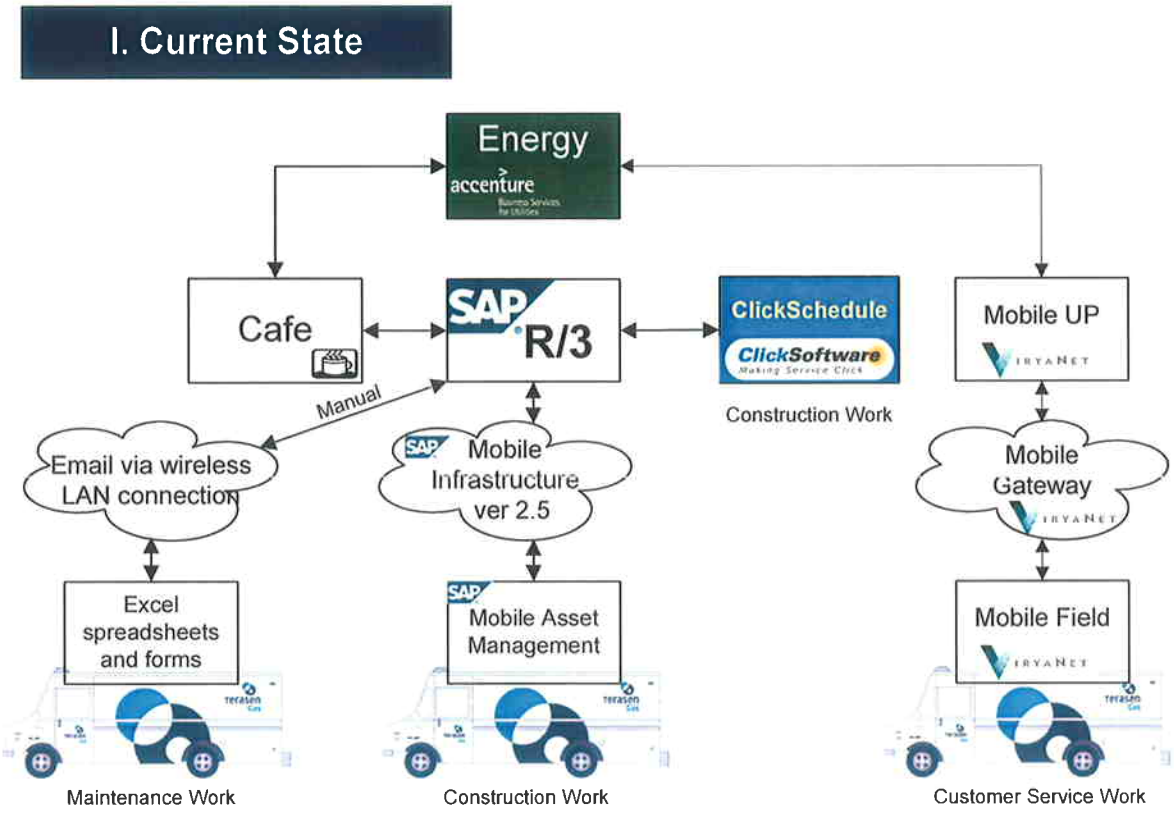
Many of Terasen's technicians are "home mustered" – that is, they do not report to an office or a "muster" point to start their day. Instead, they begin their day by logging into the current mobile application in their vehicle while their vehicle is still at their home. Once logged in, they receive their work list for the day and proceed directly to their first job. These technicians end their work day upon completion of their final job, and then proceed to drive their vehicles to their homes.

Construction contractors are also supported by an existing mobile solution, but work is not dispatched to individual contract crews. Instead, work is dispatched to a single mobile device for each contracting company where a coordinator decides which individual crew to give the work to (see the description of Terasen's current environment for Construction in Section 1.4.3.(c)).

1.4 Current State Environment

1.4.1 General Information

Customer Service, Maintenance, and Construction work are currently supported by three separate technology solutions, as is outlined in Figure I below. Emergency work is supported by a combination of the Customer Service and Construction solutions, depending on the workers involved in the incident. It is Terasen's intent to consolidate to a single technical solution for all four of its field work processes.



1.4.2 Current Applications

The following current applications form part of Terasen's existing solution:

a) **"Energy"** – Customer Information System, Peace Software: Energy supports Terasen's "meter-to-cash" process, from gathering meter reading information through to billing and processing receivables. It also provides call centre support for the customer call centre. The business processes and the Energy platform are fully outsourced to Accenture Business Services for Utilities (ABSU).

b) **"Café"** – **C**ustomer **A**ttraction **F**ront **E**nd, custom built Windows forms Sales and Marketing application: Café provides marketing, sales, and job planning support for the New Customer Attachment process.

c) **"SAP R/3 – ERP" -** for all back-office processes and the work management system for Maintenance and Construction work. R/3 is used to manage all Finance, Costing, Supply Chain, HR, Payroll, Projects, Meter Management, Maintenance and Work Management processes. It is Terasen's intent to continue to use R/3 as the work management system. Terasen currently uses version 4.6c, and does

not plan to upgrade until after the implementation of the new mobile solution.

d) **"ClickSchedule"** – Scheduling application, Click Software. ClickSchedule maintains the work calendars and skill sets of field resources and uses scheduling rules to automatically assign work orders to available crews. ClickSchedule has a real-time message-based interface with SAP R/3 to update each application with work order changes. ClickSchedule is currently only used for Construction work, but it is Terasen's intent to expand its usage to cover all resources and work types.

e) **SAP Mobile Asset Management / Mobile Infrastructure**. SAP MAM and MI are used to communicate Construction work order data to and from SAP R/3 and the construction field crews. The applications are primarily used for keeping R/3 and ClickSchedule up to date with real time job status information, such as whether jobs are starting and completing on time. It is Terasen's intent that these applications will be replaced by the solution selected through this RFP process.

f) **Mobile UP / Mobile Gateway / Mobile Field – Mobile Data Dispatch, Viryanet.** The Mobile UP suite of applications is used to dispatch "same day" tasks to Customer Service field technicians. It is Terasen's intent that these applications will be replaced by the solution selected through this RFP process.

g) **GIS – Geographic Information System, GE Smallworld**. Terasen also makes extensive use of its GIS application, although it is not shown in the figure as it is not directly involved in the scheduling or dispatching of field work.

1.4.3 Existing Processes

A brief description of each of the business processes as it relates to the scheduling and dispatching of field work is listed below:

a) **Customer Service Work** is initiated in the Customer Information System, "Energy", either through a customer call to the call centre or through the recognition of a metering irregularity. Jobs are sent via a periodic batch interface to the Mobile Data Dispatching application, Mobile UP, where they are assigned to qualified and available technicians. Jobs are wirelessly communicated to the field technicians, who status the jobs as they work them by going "en route" to the job, arriving at the job, and completing the job. Each status change triggers

a wireless message that updates the job status in Mobile UP. Upon job completion, completion information is filled out by the technician in the field application, which updates Mobile UP. Completion information is then interfaced back to Energy for job closing. The current process is entirely paperless, and the majority of jobs close without any intervention in the office. The status updates recorded by each technician through the day are stored in Mobile UP, and a daily interface converts the data to timesheet information and exports it to SAP's costing system.

b) **Maintenance Work** is initiated directly in SAP R/3's Plant Maintenance (PM) module. Preventive maintenance work orders are created automatically by SAP based on maintenance plans, and corrective work orders are created manually by Maintenance Analysts based on condition reports provided by the field technicians. SAP PM contains "functional location" and equipment objects for all the assets upon which maintenance is performed and for all the customer premises at which work is performed. Work is dispatched by manually exporting lists of work orders into Excel spreadsheets which are emailed to the technicians. Maintenance technicians use wireless air cards to periodically connect to the LAN and retrieve the emailed work lists. Completion information is recorded by the field technicians in a series of MS Word and Excel forms, which are returned to the office by email. These electronic forms are then converted to an input file and loaded into SAP PM via a custom program.

c) **Construction Work** is initiated in the Café application, usually as the result of a customer request for a new service attachment to the gas distribution network. Job planning and pricing information is gathered from the customer, and an interface is executed to ClickSchedule to check for crew availability. Once the customer agrees to the pricing and scheduling appointment, the quotation is accepted which triggers its automatic submission to SAP R/3. Each field activity within a job creates an SAP work order, which in turn creates an equivalent ClickSchedule task. ClickSchedule then works to optimize the task timing and assignment to produce an effective work schedule, accounting for scheduling rules, preferences, dependent jobs, and customer appointments. When the work is ready to go to the field, a status change in ClickSchedule triggers SAP R/3 to download the work orders to SAP's Mobile Asset Management. As the field crews process the work, status updates are sent to SAP R/3 which in turn updates ClickSchedule as the crews go "en route", arrive, and complete the work. Since the construction process still requires paper drawings, field sketches, and permit documents, it is not yet a

paperless process. Job completion information is recorded via paper documents which are returned to the office for clerical processing in SAP.

- **A Note on Contractors:** several contracting companies are used to provide crews to support the construction process. As opposed to Terasen's internal crews, each individual contractor crew does not have a separate mobile device for receiving work orders. Instead, the contracting company is provided with a single device to which the work orders for all of their crews are dispatched. The contracting company then decides which of their individual crews to give each job to. It is Terasen's intent to continue to operate with this model, and as result, it is expected that there will need to be separate versions of the Mobile Work Order Application for internal crews and contractors with slightly different functionality.

d) **Emergency Work** is usually initiated through a customer call to the ABSU customer call centre, and a Customer Service technician is dispatched as a "first responder" to assess the situation. This action triggers Mobile UP to send a short text message to the technician's pager to notify them of the emergency order. If an underground repair is required, an SAP work order is raised in R/3 and dispatched to a Construction crew via SAP's Mobile Asset Management.

1.5 The Requirement

Terasen requires a technology solution that replaces the existing separate solutions and consolidates them such that all field work can be managed through a single set of technology.

1.6 The Request for Proposal

1.6.1 Objectives and Scope of the RFP

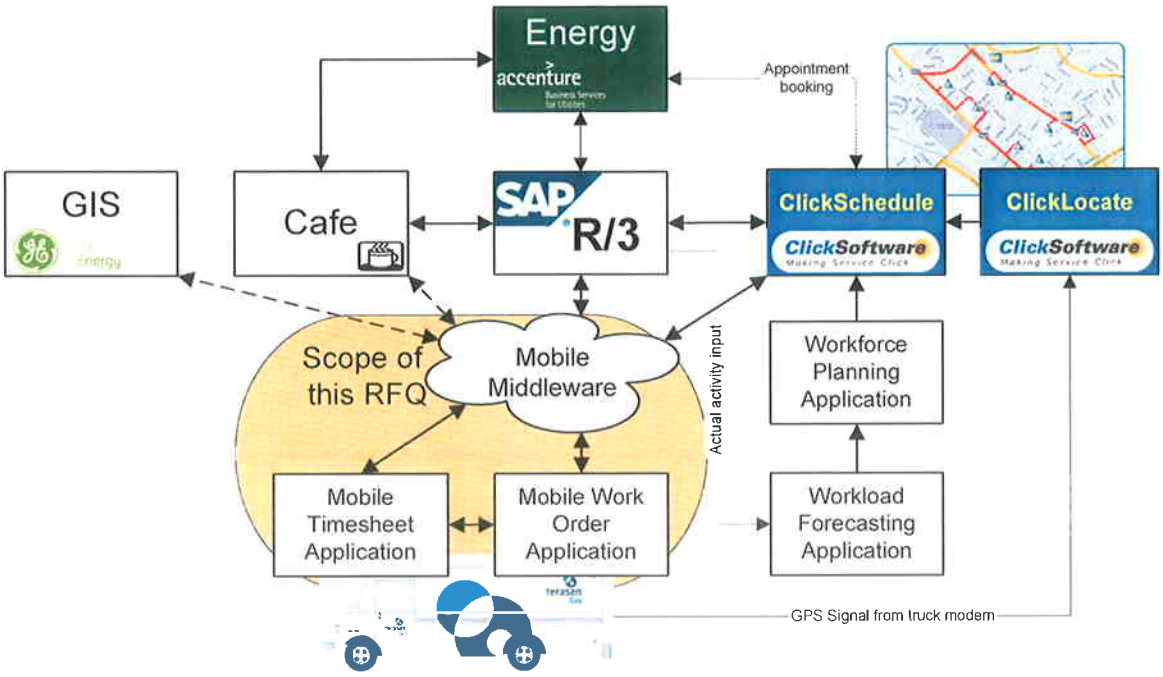
Terasen is requesting Proposals for solutions to support the mobile requirements of its Distribution field workforce. Terasen Gas uses SAP R/3 as its Maintenance and Work Management system, and is looking for a solution to communicate work order and time sheet data between its field technicians and SAP R/3 and potentially other applications. This RFP process covers the selection of the Proposers to enter into the subsequent Request for Quotation process to select both the solution and implementation of the solution. It is Terasen's objective to have the solution go live on January 1st, 2008.

2. FUTURE STATE VISION AND REQUIREMENTS

2.1 Application Overview

Terasen's overall Future State vision is outlined in Figure II below.

II. The Future State Vision



The key elements of the vision include:

1. Consolidation of all work types to a single suite of technology, based on using SAP R/3 as the work management system and ClickSchedule as the scheduling tool. All field work will be managed as SAP R/3 work order operations and as ClickSchedule tasks. All field resources will be managed via ClickSchedule where resource assignment and schedule optimization will occur.
2. Mobile work order and mobile timesheet applications that are used by all Terasen field resources, and that interact directly with SAP R/3 (and potentially other back-end applications) via mobile middleware. These applications including the mobile middleware are the specific scope of this RFP.

3. New workload forecasting and workforce planning applications to provide better long and mid-term planning and scheduling. These applications are not in scope for this RFP.
4. GPS mapping capability provided by Click Software's ClickLocate application. This is not in scope for this RFP.

2.2 Functional Requirements

2.2.1 Mobile Work Order Application Functional Requirements

The following is a general list of the type of features Terasen is looking for in a mobile work order management application:

- **Job Status Updating:** "Real time" status updates of work order progress provided to SAP R/3 and ClickSchedule as jobs progress through the "dispatched", "en route", "arrived" and "completed" status cycle. See the Mobile Middleware requirements section for the discussion on "real time". This is a key component of the Terasen solution as it allows dispatchers to see in close to real time the actual location and job status of each of the field technicians.
- **Technician Status and "Off Route" Activities:** Provide status information on the current status of each field technician, for example: "logged in", "not available to work", etc. This requirement includes the ability for technicians to perform "off-route" activities (i.e. items not dispatched from R/3) such as attending meetings and restocking vehicles.
    - Need the ability for technicians to trigger the start of an off-route activity and enter an estimated duration for how long it will last.
    - Completion of the off-route activity should return the technician's status to "ready to work" in ClickSchedule.
- **Suspending Work:** Ability for technicians to "Suspend" a job that they intend to return to later, or "Pull" a job that needs to be reassigned to another technician. In both cases, this would include the entry of "reason codes" to describe the circumstances of the change.
- **Display and Update Technical Objects:** Read and update access of technical structure objects for technicians in the field, such as customer premise data and equipment data. Terasen has approximately 40,000

equipment objects and 900,000 customer premises that are maintained in SAP.

- **Automated Field Data Capture:** Ability for technicians to enter data in the field to complete jobs, particularly for complex maintenance tasks and inspections. This would include the ability to record multiple historical entries for a single job, for example: a station inspection is dispatched as a single work order but since many pieces of equipment are inspected as part of the single job, several equipment "failure" documents may be generated.
- **Field Work Requests:** Ability for technicians to raise requests for future work. As much as possible, this should be facilitated through the use of drop down selections to simplify data entry.
- **Display Historical and Upcoming Work:** Provide the ability for the technician to display previous work performed and upcoming work at a customer premise.
- **Working Alone Monitoring:** Ability for a technician to set a timeframe within which they must provide a system update to acknowledge that they are safe when working alone. If the update is not received in the back-end system within the required timeframe, an alert would be triggered for the dispatcher to follow up with the technician.
- **Bar Code Reading:** A large amount of the field work performed involves updating meter information, and since all Terasen meters are barcode tagged, it would be useful to integrate the ability to scan bar codes into the work order processing work flow.

2.2.2 Mobile Timesheet Application Functional Requirements

The intent of the mobile timesheet application is to use the job status data collected through the day to generate a proposed timesheet for each technician or crew member. It should then be possible for the technician to review and alter this data to complete an accurate timesheet for them for the day. Posting of the timesheet would result in it being passed to SAP R/3 CATS (Cross Application Time Sheet) for posting.

2.2.3 Mobile Middleware Requirements

The following is a general list of the features Terasen is looking for in the mobile middleware:

- **Event driven:** To support the "real time" status updating for technicians and work orders, Terasen prefers that the mobile

middleware uses an "event driven" or "messaging based" communication model rather than a periodic synchronization model for work orders. It is expected that each status change made on the mobile client would be packaged as a message, which would then be queued for delivery to the mobile middleware and on to SAP or ClickSchedule.

- **Store and Forward:** Due to the large rural areas within Terasen's service territory, technicians frequently move in and out of areas with wireless network coverage. To compensate, the system will require store and forward capability to queue messages during periods of no network coverage and automatic resumption of processing when the network connection is restored. With this capability, "real time" updates are taken to mean updates that occur after an event has occurred and as soon as a network connection is available.

- **Connection Persistence / Network Isolation:** The application will need the ability to retain a network connection or automatically reconnect to the network as the technician moves in and out of wireless network coverage. Network isolation of the wireless connected laptops is required to minimize the risk of abuse, virus outbreak, and other security compromises to Terasen's network. Currently Terasen uses NetMotion's Mobility XE product for providing session persistence and policy based network isolation.

- **"Push" Capability:** It is Terasen's preference that the solution has "push" based capability to allow work orders to be sent from SAP R/3 to the mobile device without the mobile user or their client application initiating the download.

- **Bulk Synchronization Capability:** To support data heavy business processes, such as asset maintenance, it is also required that the solution provide a mechanism for bulk synchronization of large amounts of data. The solution should also include delta update capability for subsequent master data changes.

- **Confirmed Delivery:** The application requires a mechanism to provide a positive confirmation that delivery of a message has completed successfully.

- **Auto-paging for Emergency Work:** When an emergency type work order is dispatched to a technician, the application must also automatically send a short text message to the technician's pager to inform them that an emergency job has been dispatched.

2.2.4 Hardware

Terasen currently uses Panasonic Toughbook model CF29 as its mobile device, and has no current plans to change for the majority of its workforce. The devices are docked in vehicle mounted modems when in use. There is potential value for some technicians (e.g. leak survey technicians) to use a smaller PDA type device, so the ability for the application to be rendered on multiple device types is considered an asset.

2.2.5 Network

Terasen uses Telus Mobility's 1X wireless service for enterprises. This allows Terasen to run a private network over the Telus Mobility 1X network. This is accomplished by assigning the Terasen client devices a private network address for their devices use only. Another portion of private addresses is then assigned to Terasen to assign to their servers. The access control and routing then allows the client devices to speak to the servers on Terasen's network through what is known as the Private Network Gateway (PNG.).

2.2.6 Operating System and Database

Terasen standard is to use Windows XP clients, Windows 2000 and 2003 servers, MS SQL Server 2000 and Oracle databases. SAP R/3 currently uses Oracle 9.2.0.5 as its database.

Terasen utilizes VMware ESX virtualization infrastructure for server consolidation, especially for development and test environments.

2.2.7 Future Functional Considerations

While not defined as specific business requirements at this time, the ability of the solution to connect to other non-SAP back-end applications, specifically Café and GIS would be considered an advantage. Specifically, the ability for a single mobile transaction to update multiple back-end systems and conversely for data from several back-end systems to be combined and presented to the user as a single transaction would be useful.

Terasen is looking for a robust set of tools for managing its mobile workforce, and does not wish to select a solution that does not provide a robust and stable environment or that limits their ability to expand the capabilities of their mobile workforce in the future (integration with GIS is an important consideration here).

Part 4

Proposer's Proposal

FORM OF PROPOSAL

1. **REFERENCE :** **PO61465SLK**

   RFP NAME: **Field Workforce Mobile Solution for Distribution Project**

   CLOSING DATE: 12:00 p.m. (local time), November 15, 2006

   NAME OF PROPOSER: _____

   ADDRESS: _____

   _____

   PHONE: _____ FAX : _____ E-MAIL: _____

   GST NUMBER: _____ BCSST NUMBER: _____

2. **REQUIREMENTS:**

   EACH PROPOSAL SHALL INCLUDE THE INFORMATION AS OUTLINED IN SECTION 9 OF PART 2 HEREOF.

   ATTACH YOUR PROPOSAL TO THIS FORM.

3. In the event that Terasen issues any addenda please acknowledge receipt below:

Addendum #	Date Received

In Witness Whereof the Proposer has caused its seal to be affixed at _____ the _____ day of _____, 2006.

The seal of the Proposer was hereunder affixed in the presence of:

_____

_____
Signature

_____
Print name

OR

In Witness Whereof the Proposer has duly executed this Proposal at _____ on the _____ day of _____, 2006.

_____ _____
Signature Witness

_____
Print name

_____
Title

Appendix "A"

Statement of Proposer's Qualifications

Statement of Proposer's References

Provide a list of at least five references from major institutions of large private corporations and/or provincial governments where Proposer is currently providing or has provided field workforce mobile solutions.

Name of Company	Person to Contact	Phone No.
1. Company: Scope & Duration of Contract		
2. Company: Scope & Duration of Contract		
3. Company: Scope & Duration of Contract		
4. Company: Scope & Duration of Contract		
5. Company: Scope & Duration of Contract		

B. PROPOSER'S EXPERIENCE

Experience: Number of years experience of the company in providing field workforce mobile solutions: _____ years.

REQUEST FOR QUOTATION

Field Workforce Mobile Solution for Distribution

November 2006

Terasen Gas

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Part 1

Quotation Instructions to Bidders

1. Invitation to Bid:

Terasen Gas Inc. ("Terasen") invites Bidders ("Bidders") to submit quotations ("Quotations") for the Project described in Part 2 hereof (the "Project") in accordance with the following instructions.

2. Process:

This Request for Quotation ("RFQ") is the second stage of the selection process initiated with the Request for Proposal ("RFP") document issued November 2, 2006. This document is being issued to a short list of vendors selected on the basis of their responses to the RFP document.

3. Identification of Bidders:

Each Quotation shall include the Bidder's:

a) Name and address
b) Telephone number
c) Facsimile number
d) Signature of authorized signatory
e) Name (printed) of authorized signatory
f) Title of authorized signatory

4. Information/Clarification

4.1 The RFQ process will commence with an initial conference call with the Bidders to provide them the opportunity to ask questions of the quotation process and discuss any concerns with the information being requested or the timeline. This conference call is scheduled for November 27, 2006 from 10:00 to 11:00 AM. The dial-up information for the call is as follows: 1-877-385-4099, Participant code: 2347454#.

4.2 Terasen will host one (1) requirements clarification conference call with the Bidders to review the functional requirements outlined in Part 2 hereof. This will provide the opportunity for the Bidders to ensure they fully understand the stated business requirements. This call will take place between November 28 and December 1, 2006. The specific date and time will be agreed to during the initial conference call described in Section 4.1 above.

4.3 All other requests for information or clarification shall be addressed in writing to Hugh Smith at (604) 592-7520 (Fax) or hugh.smith@terasengas.com at least three (3) business days prior to the closing time. All replies shall be confirmed in writing by Terasen and any

reply other than in writing is invalid. Any instructions or information given to Bidders other than by Mr. Smith are invalid.

4.4 A reply to all questions, if any, shall be made in the form of an addendum(s) which will be forwarded to all Bidders.

4.5 No verbal agreement or conversation made or had at any time with any officer, agent or employee of Terasen, nor any oral representation by such officer, agent or employee, shall add to, detract from, affect or modify the terms of the Request for Quotation or be relied upon in any way whatsoever, unless specifically incorporated in a written addendum issued by Terasen.

5. Notice of Intent to Bid

Each Bidder shall submit written notice of its intention to submit a Quotation in response to this Request for Quotation on or before November 29th, 2006. The notice shall be sent to Hugh Smith at the fax number or email address set out in Section 4.3 above.

6. Joint Quotations/Subcontractors

A Bidder may submit a Quotation wherein more than one company will be providing the Quotation, either through a joint bid or through a subcontracting arrangement.

The Bidder submitting the Quotation shall:

a) identify all companies party to the Quotation;

b) identify the solution components to be provided by each participant;

c) identify the primary Bidder's representative who shall assume all responsibilities for the Quotation and if successful the contracted services and materials; and

d) not add or substitute other companies without first obtaining written consent from Terasen.

7. Knowledge of Work

7.1 Before submitting its Quotation, Bidders shall obtain all necessary information, local or otherwise as to risks, contingencies and other circumstances which may influence or affect its Quotation.

7.2 All communications during the Request for Quotation period shall be made directly with:

Hugh Smith, Consultant
Business & Information Technology Services
Terasen Gas Inc.
16705 Fraser Hwy
Surrey, B.C. V3S 2X7

Reference: PO614665SLK
Phone: (604) 592-7512
Facsimile: (604) 592-7520
Email: hugh.smith@terasengas.com

8. Time Line

The following table reflects the desired timing of the Field Workforce Mobile Solution for Distribution Project (the "Project") Quotation process.

Key Event	Deadline Date
RFP for solution short-list Issued (Complete)	November 2, 2006
Notice of Intent to Propose (Complete)	November 8, 2006
Close of Proposer Questions (Complete)	November 10, 2006 – 5:00 PM
Close of Proposals (Complete)	November 15, 2006 – 12:00 noon
RFQ for implementation quotation issued (to short-listed Bidders only)	November 24, 2006
Kick-off conference call with Bidders	November 27, 2006 – 10:00 to 11:00 AM
Notice of Intent to Bid	November 29, 2006 – 5:00 PM
Close of Bidder Questions	December 5, 2006 – 5:00 PM
Timeframe for requirements clarification conference call	November 28 to December 1, 2006
Close of Bids for implementation quotations	December 8, 2006 – 12:00 noon
Deadline for booking Presentation and Demonstration date and time	December 8, 2006 – 12:00 noon
Completion of Bidder Presentations	December 15, 2006 – 12:00 noon

9. Quotation Format

All Quotations must be submitted in the following structure:

9.1 Degree of Functional Fit

Part 2 of this document contains a detailed listing of the functional requirements Terasen is looking for in a mobile solution. The Quotation must include a ranking of each item in the list (not including summary level items) based on the following scale:

Ranking	Name	Description
5	"Out-of-the-box"	The item is met by the application without the need for any customization or configuration.
4	Configuration	The item can be met with configuration of the application.
3	Minor customization	The item can be met with minor customization of the application (i.e. the data elements and work flow required are present, but may need formatting changes).
2	Major customization	The item can be met, but requires major customization (i.e. the data elements or work flow required do not currently exist in the application).
1	Additional components required	The item cannot be met with the current proposed solution, but requires the purchase of additional hardware or software components. The additional components required must be described in the "Bidder's comments" column.

9.2 Approach to the Project

The Quotation must describe how the Bidder will satisfy the following critical requirements of the Project:

a) involving Terasen staff in the Project such that Terasen can take ownership of the Project effectively;

b) transferring technical design and deployment details to Terasen staff;

c) managing the Project cooperatively with Terasen as part of a broader program of work which includes the migration of Customer Service work from Viryanet's Mobile UP to SAP R3 and ClickSchedule;

d) providing flexibility in scheduling to ensure alignment across the program streams of key activities such as testing to accommodate critical path items that occur in other project streams;

e) meeting the critical deadlines for the delivery of the system;

f) getting the Project off to a quick and productive start.

9.3 Implementation Plan

9.3.1 Time is of the essence in the success of the Field Workforce Mobile Solution for Distribution Project.

9.3.2 Due to timing considerations with year-end reporting, it is Terasen's intent to have the solution converted to live operation for January 1, 2008.

9.3.3 Quotations must provide a plan for the complete Project that addresses these requirements, and that includes at a minimum:

a) any assumptions made;

b) a list of the project deliverables to be produced during the project, categorized by project phase, and including a description of each deliverable;

c) a Gantt chart with:
- activities identified at a resolution of weeks;
- key milestones identified; and
- types of resources involved in each activity;

d) resource loading;

e) the deliverables associated with each activity in the plan;

f) a description of the Project structure including both Terasen and Bidder team roles;

g) activities that are the responsibility of Terasen (it is anticipated that an integrated Terasen/Bidder schedule and plan will be agreed during the definition of the Contract contemplated as part of this RFQ).

h) a clear statement of the roles, expectations and time commitments of Terasen team members;

i) risks perceived by the Bidder;

j) the Bidder's mitigation strategies for the risks they perceive; and

k) contingency allowances.

9.4 User and Technical Documentation

Quotations must provide a detailed description of the user and technical documentation for the Field Workforce Mobile Solution that will be provided by the Bidder, including:

a) system set-up and administrator user documentation; and

b) standard system user documentation to provide a baseline for customization by Terasen to include Terasen specific procedures and instructions.

9.5 User and Technical Training

Quotations must describe the approach believed to be most appropriate for user and technical training, and list and describe proposed courses and their learning objectives.

9.6 Estimated Implementation Effort

Quotations must include a completed Costing Summary Template using the attached MS Excel spreadsheet in Part 3. This template provides both the basis for estimating the implementation effort and cost.

9.6.1 Design, Development and Testing Effort

Rows 13 through 85 in the spreadsheet are for determining the Bidder's work effort to design, develop, and test the solution. Each row represents a section of the requirements listed in Part 2 hereof. Entries can only be made in the white cells. Sub-totals for each section are calculated automatically and displayed in the blue cells. The overall totals for this section are displayed in row 12. The Quotation must include an entry in manhours required to complete each of the requirement items listed,

broken down by the items categorized as "core", "nice-to-have" or "future" requirements.

For example: Row 20 in the spreadsheet represents the requirements listed in Section 2.1 "Work List Display" in the requirements document in Part 3 which categorizes two items as "core" requirements, five as "nice-to-have" requirements, and zero as "future" requirements. In cell C20, the Bidder must enter the estimated hours required to design, develop and test the two core requirements. In cell D20, the Bidder must enter the estimated hours required to design, develop, and test the five "nice-to-have" requirements. In cell E20, the Bidder must enter "0" as there are no defined future requirements within this Section.

a) Note on requirements in Section 8.2. Several of the requirements in Section 8.2 are listed as being both "core" and "nice-to-have" as two potential solutions are proposed to support the requirement. It is considered core to provide the simpler solution and nice-to-have to provide the more complex solution. In the estimating spreadsheet, the effort required to meet the requirements with the solution described as core should be entered in cell C76 and the effort required to meet the requirements with the solution described as nice-to-have should be entered in cell D76.

9.6.2 Project Management and Quality Assurance Effort

The estimated effort to provide project management and quality assurance is entered in rows 6 and 7, and 9 and 10, respectively in the spreadsheet. Each item can be entered in two components, a fixed quantity and a variable amount (entered as a percentage rate of the total development effort shown in row 12). It is left to the Bidder's preference as to whether the estimated hours are entered as a fixed quantity, as a variable rate, or as a combination of both. The estimated hours must be separated out by the categories of the detailed requirements: core, nice-to-have, and future.

9.6.3 Additional Component Effort

Space is provided to enter estimated hours for other project components in rows 86 to 95. As with the project management and quality assurance effort, there is the ability to enter both a fixed quantity and a variable rate. The description of any additional components must be included in the Comments section in column H.

9.6.4 Labour Rates

To convert the estimated effort into cost, proposed labour rate values must be entered in the cells highlighted in green in column F. Labour rates can

be entered for project management time, quality assurance time, development time (a single value entered in cell F13 will automatically be applied to all the rows in the detailed requirements section), and for each of the additional component sections.

9.6.5 Potential Discount for Development Items

For items that require the Bidder to perform custom development, if the Bidder is willing to discount the cost of the development effort on the basis that the newly developed functionality will be added to the Bidder's core product, the discount rate to be applied can be entered in column G. The values should be entered as a percent discount to be applied (e.g. a 100% discount would result in the cost of the development being reduced to $0). Entering a discount rate only reduces the cost calculated; it does not affect the estimated manhours entered.

9.7 Bidder's License Agreement

Bidders shall include their standard Software License Agreement which will be reviewed and assessed for commercial reasonableness. This assessment will form part of the selection criteria. In addition, the successful Bidder will be required to sign Terasen's Software Development and Implementation agreement, the form of which is attached hereto in Part 4.

10. Presentation and Solution Demonstration

Each Bidder is asked to deliver a maximum 3 hour presentation and solution demonstration at Terasen's offices at 16705 Fraser Highway, Surrey, BC. While it Terasen's preference that the presentations be made in person by the Bidders, alternate arrangements, such as web-cast, can be made if necessary.

10.1 The presentations can be scheduled from 9:00 AM to 12:00 Noon, from Monday, December 11, 2006 to Friday, December 15, 2006.

10.2 The deadline for scheduling the presentations is Friday, December 8 at 12:00 Noon.

10.3 The solution demonstration must at a minimum cover the simple scenario outlined in Appendix C.

10.4 A minimum of one hour must be made available at the end of the presentation and demonstration for Terasen to ask questions of the presenters.

10.5 The presentation, at a minimum, must cover the following topics:

a) overall solution fit;

b) proposed technical set-up to accommodate the Telus Mobility 1X network;

c) proposed support model;

d) project approach;

e) implementation plan; and

f) technical and user documentation and training.

11. Delivery of Quotation

Three (3) paper sets of the Quotations, and one (1) electronic copy in MS Word 2002 and MS Excel 2002, shall be submitted in an envelope addressed to:

Hugh Smith
Business & Information Technology Services
Terasen Gas Inc.
c/o Mailroom
16705 Fraser Highway
Surrey, B.C.
V3S 2X7

indicating Terasen's reference number and delivered up to but not later than 12:00 noon Pacific Time on December 8, 2006.

Quotations delivered after the closing time will not be accepted.

Faxed Quotation will be accepted prior to closing time but must be followed by a written Quotation within two (2) working days. It is the sole responsibility of the Bidder to ensure that faxes have been received by Hugh Smith.

All Quotations including spreadsheets, must be provided in electronic form, as MS Word 2002 and MS Excel 2002.

12. Request for Quotation and Quotation Proprietary and Confidential

12.1 In addition to the specific information covered by the Agreement, all information in this Request for Quotation is confidential and should not

be disclosed by the Bidder except as required in the preparation of the Bidder's Quotation.

12.2 The Bidder may designate portions of its Quotation that are proprietary in nature and Terasen agrees not to disclose those portions except as required by the evaluation process.

13. Quotation Preparation Costs

Costs associated with preparing Quotations in response to this Request for Quotation are the sole responsibility of Bidders.

14. Acceptance and Rejection of Quotations

14.1 Quotations will be opened privately at the offices of Terasen. Following submission of the Quotation and within forty-eight (48) hours of being requested, Bidders shall provide such additional information as called for herein and as may be required by Terasen.

14.2 Terasen reserves the right to reject any or all Quotations, including without limitation the lowest Quotation even if the lowest Quotation conforms in all respects with the Request For Quotation, and to award the Contract to whomever Terasen in its sole and absolute discretion deems appropriate, notwithstanding any custom of the trade to the contrary nor anything contained in the Request For Quotation or herein. Terasen shall not, under any circumstances owe a duty of care or duty of fairness to any Bidder or, be responsible for any costs incurred by any Bidder in the preparation of its Quotation or for any damages whatsoever arising out of or related to the rejection of any Quotation.

14.3 Should a Bidder fail to complete its Quotation in strict compliance with the requirements of the Instructions to Bidders, Terasen, in its sole and absolute discretion, may nonetheless waive such non-compliance, seek clarification from and enter into negotiations with that Bidder and award the Contract to that Bidder, even if such failure in compliance would at law render the Quotation null and void. Failure to comply with any provision of the Instructions to Bidders described in mandatory terms such as "must" or "shall" shall not result in a Quotation being disqualified or rendered void unless Terasen, in its sole and absolute discretion, elects not to consider the Quotation any further, otherwise Terasen in its sole and absolute discretion may waive such non-compliance and still consider the Quotation.

14.4 Without limiting the generality of the foregoing, Terasen reserves the right, in its sole and absolute discretion, to accept or reject any Quotation

which in the view of Terasen, is incomplete, obscure, or irregular, which has erasures or corrections in the documents, which contains exceptions and variations, which omits one or more prices, which contains prices Terasen considers unbalanced.

14.5 Criteria which may be used by Terasen in evaluating Quotations and selecting the short-list of Bidders and the weight, if any, to be given to the criteria are in Terasen's sole and absolute discretion and, without limiting the generality of the foregoing, may include one or more of:

a) total cost to Terasen;

b) the Bidder's track record in similar or related projects;

c) ability to meet business requirements of the Project;

d) understanding of application requirements;

e) proposed support model;

f) proposed schedule,

g) commercial reasonableness of the Bidder's standard Software License Agreement;

h) Bidder's acceptance of Terasen's contract term and conditions; and

i) quality and completeness of the Bidder's Quotation.

14.6 Should Terasen not receive any Quotation satisfactory to it in its sole and absolute discretion, Terasen reserves the right to cancel the Request for Quotation, re-tender the Request for Quotation, or negotiate a contract for the whole or any part of the Work and with any one or more persons whatsoever, including but not limited to one or more of the Bidders.

14.7 The Quotation shall remain valid, irrevocable and open for acceptance by Terasen without qualification for a period of one hundred and twenty (120) calendar days from the Closing Time for submission of Quotations, or such later date as may be agreed upon. Terasen reserves the right to enter into negotiations with any one or more Bidders on any or all aspects of their Quotation.

14.8 If Terasen, in its sole and absolute discretion, considers it has received an acceptable Quotation from a Bidder, then after a Quotation review or negotiation meeting with that Bidder, if required, Terasen will include the Bidder in the list of Bidders to receive the Request for Quotation for the Project.

14.9 Notwithstanding the Clauses above, Terasen reserves the right, in its sole and absolute discretion, to include Bidder in the next stage of the process subject to internal Project review, obtaining Project approval and obtaining Project funding.

14.10 Notwithstanding any other provision of the Request for Quotation, it is a fundamental condition of this call for Quotations and the receipt and consideration of Quotations by Terasen that Terasen and its employees, contractors, consultants and agents will not and shall not under any circumstances whatsoever, including without limitation whether pursuant to contract, tort, statutory duty, law, equity or otherwise, and including but not limited to any actual or implied duty of fairness, be responsible or liable for any costs, expenses, claims, losses, damages or liabilities (collectively and individually "Claims") incurred or suffered by Bidders as a result of, arising out of, or related to any of the Request For Quotation, any Addenda, the preparation, negotiation, acceptance or rejection of any conforming or non-conforming Quotation, the rejection of any Bidder, the cancellation, suspension or termination of the tendering process, or the postponement, suspension or cancellation of the Work, and by submitting a Quotation each Bidder shall be conclusively deemed to waive and release Terasen and its employees, contractors, consultants and agents from and against any and all such Claims. Bidders shall indemnify and hold harmless Terasen and its employees, contractors, consultants and agents against any and all Claims brought by third parties against Terasen or any of its employees, contractors, consultants and agents which arise out of or are related to any one or more of the preparation, submission and negotiation of any Quotation by the Bidder. Without limiting the generality of the foregoing, Terasen shall not be under any obligation whatsoever to award the Work to the Bidder or anyone else and may cancel the Request for Quotation and reject any or all Quotations received at any time for whatsoever reasons Terasen in its sole, absolute and unfettered discretion considers to be its best interest.

15. Contract Documents

The successful Bidder shall be required to execute a Software Development and Implementation contract the form of which is attached hereto as Part 4.

Part 2

Functional Requirements

Functional Requirements

This document and the Appendices attached hereto outline the Functional Requirements of the Mobile Work Order and Mobile Timesheet Applications. Each requirement is categorized as being "core" (is considered to be an absolute requirement of the solution), "nice-to-have" (is considered as adding value to the solution, but is not an absolute requirements), or "future" (is not considered to be a current requirement but may be implemented in a future phase). Items in the table which are categorized as N/A are not specific requirements, but are included as structuring items only.

Functional Requirements:

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
1.0	General Features	N/A			
1.1	User log-in and password management	N/A			
1.1.1	User log-in and password	Core	The system must require the user to enter a valid user ID and password in order to log-in to the application.		
1.1.2	Single sign-on	Nice-to-have	The user should be able to log-in to their mobile device in a single step. They should not have to log-in to the hardware, the Terasen network, and the mobile applications in separate steps. Note: it is recognized that this item will likely require discussion with the Telus Mobility network provider to answer with confidence.		
1.1.3	Single sign-on for mobile applications	Nice-to-have	The user should not have to log into mobile applications separately. For example, the log-in process should provide them access to both the work order and timesheet applications.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
1.1.4	User ID and Password administration	Core	It must be possible for an administrator to lock and unlock user IDs, set ID validity periods, and reset user passwords in the server application. Note: this implies the User authentication occurs against the server not the mobile client application, or that there is an administrative process to push the reset password data to the mobile device prior to log-in.		
1.1.5	User password change prompt	Core	If the system detects the user is logging in with an initial password, or that the current password has expired, it should prompt and require that they change it prior to completing the log-in process.		
1.1.6	User password change	Core	The user must have the ability to initiate the changing of their password.		
1.1.7	Password expiration	Nice-to-have	An administrator should be able set an expiration date for a user's password, or set an expiration timeframe (e.g. every 3 months).		
1.1.8	Password expiration warning	Nice-to-have	The application should provide a warning to the user at log-in if their password is set to expire within a configurable time period (e.g. 10 days) and provide them the option to change their password then.		
1.2	Multi-users per device	N/A			
1.2.1	Multi-users per device	Core	It is necessary that different users be able to log-in to the same device at different times. Since the devices are vehicle mounted, each device is not always		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			"owned" by a single user. While a device may have been used by User 1 the previous day, it must be possible for User 2 to log-in and use the device today and have the application ensure that User 2's work is correctly synchronized and not confused with User 1's work.		
1.2.2	Warning of user change	Nice-to-have	It would be useful if the user logging in is different from the last user to log-in that they are prompted with a warning message that extra synchronization time may be required due to the user change. The user should be provided the option to cancel the log-in process at this point.		
1.3	Crew versus Individual Log-in	N/A			
1.3.1	Selection to log in as an individual or as a crew	Core	Application must provide a selection for the user to log in as an individual (only work dispatched to their employee ID will be downloaded to their mobile device) or as part of a crew (work dispatched to both their individual employee ID and to that of a specified "crew leader" will be downloaded to their mobile device).		
1.3.2	Crew Log-in: Entry of crew employee IDs and vehicle IDs	Core	Since many employees work as members of a crew that shares a single mobile device, the application must have the ability to enter the employee IDs of the members of the crew working that day. This information is used by the mobile timesheet application. For reference, a		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			screen shot of the current Mobile Application screen is included as Figure 1 in the section after this table.		
1.3.3	Individual log-in: assigning of employee ID based on user log-in	Core	If the user selects the option to log-in as an individual, there should be no option for them to enter an employee ID. The employee ID should automatically be known based on a mapping from the user log-in ID.		
1.3.4	Individual log-in: entry of vehicle ID	Core	With individual log-in, however, there is still a requirement for the user to enter the vehicle ID as it is required for the timesheet application.		
1.3.5	Validation of employee IDs and vehicle IDs	Core	Employee ID is a 4 character numerical field from the SAP HR module. Entry of employee ID's must be validated by the application and only valid SAP values accepted. Vehicles are set up as "dummy" employees with ID's in SAP HR to allow the time entry process to function.		
1.3.6	Display of employee name / vehicle description	Nice-to-have	Upon entry of the employee / vehicle ID, the employee's name or vehicle description should be displayed adjacent to the ID field to confirm data entered is correct.		
1.3.7	Entry of employee and vehicle position / charge out rate value	Core	Employee and vehicle time is charged out at a series of standard rates, referred to as "activity types" in SAP R3. Each employee must enter a valid charge out rate, or select from a drop-down list. Validation of the value entered should be		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			done against a list of valid activity types synchronized from SAP R3.		
1.3.8	Display of default position / charge out rate value	Nice-to-have	Each employee / vehicle is assigned a standard activity type in SAP R3. This value should be displayed as a default in the mobile application, with the option for the user to change it.		
1.3.9	Crew log-in: Selection of a "crew leader"	Core	When logging in as part of a crew, the user must enter a "crew leader" to indicate which crew they are part of and hence which work orders to download (since there is no defined connection between a user's ID and the crew they are working with on any given day).		
1.3.10	"Crew leader" validation	Core	"Crew leader" selection should happen from a drop down list of valid entries populated from the list of crew objects in ClickSchedule.		
1.3.11	"Crew leader" grouping by work Zone.	Nice-to-have	To reduce the list of "Crew leaders" to select from (Terasen currently has 80 crew objects), the application should only display the valid crews for the Zone (Terasen divides its workforce into 5 geographic zones) associated with the user ID logging in to the application.		
1.3.12	Retention of information from previous log-in as default.	Nice-to-have	The application should retain the data entered during the last log-in (including crew vs. individual log-in, employee ID's, vehicle ID number, and crew leader ID) and display as default information that can be changed by the user.		
1.4	Log-in and Connectivity	N/A			

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	Status				
1.4.1	Message with log-in information sent to ClickSchedule	Core	Upon completion of the log-in sequence, a message must be sent to the back-end applications so that the current status of the user can be statused as "logged-in" in ClickSchedule.		
1.4.2	Message with crew composition information sent to ClickSchedule	Core	Upon completion of the crew log-in sequence, a message containing the crew composition should be sent to the back-end applications. This should include the selected crew leader ID and the list of employees working as part of the crew. The intent is to compare this information with the planned crew composition in ClickSchedule.		
1.4.3	Warning of duplicate crew log-in	Core	If the selected crew leader ID is already showing as logged-in in ClickSchedule (another user has already logged-in and selected the specific crew leader ID), the application must receive a warning message and prevent the user from completing the log-in sequence until another crew leader ID is selected.		
1.4.4	Individual log-in: Auto-synchronization upon user log-in	Core	The application must automatically synchronize to ensure the user receives up to date information upon log-in. This must happen without any additional action by the end user.		
1.4.5	Crew log-in: Auto-synchronization upon user log-in	Nice-to-have	The application must automatically synchronize to ensure the user receives up to date information upon log-in. This must happen without any additional		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			action by the end user. For the crew log-in case, the system must download both the work assigned to the user logging in (as if they had logged in as an individual) as well as the work assigned to the crew leader ID they selected through the log-in sequence. This allows users to act as both members of a crew and as individuals through the day. Note: it is recognized that this will give rise to complications with the timesheet process, and so it may be necessary to resolve this requirement by requiring the user to first log-out the crew before logging in as an individual.		
1.4.6	Client time-clock synchronization	Core	As part of this initial log-in synchronization, the client application must set its time clock to match the current server time clock. Note: how do we deal with time zones?		
1.4.7	Synchronization confirmation	Core	Upon successful initial synchronization, a message should be displayed confirming that the synchronization was successful or indicating that errors occurred.		
1.4.8	Display of network coverage status in mobile application	Core	The application should display an indicator as to the current status of the mobile device with regard to the wireless network. This is currently achieved with an indicator light that appears in the top corner of the existing mobile application: the light is green if the device is		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			connected to the wireless network and red if it is not.		
1.4.9	Display of network connection status in ClickSchedule	Nice-to-have	It would be useful if the dispatchers using ClickSchedule could see the status of each logged-in mobile device with regard to whether it is currently in coverage and connected to the wireless network. Discussion may be required as to how the back-end applications would know a mobile device has moved out of network coverage.		
1.4.10	Check network connection status of a device from the back-end application	Nice-to-have	It would be useful to be able to trigger a function (ideally from within ClickSchedule) to "ping" a mobile device and check if it is currently connected to the wireless network.		
1.5	Text Messaging and Message of the Day	N/A			
1.5.1	Message of the Day	Core	Upon log-in, the application should display a short text "Message of the Day". Currently, this message is entered via custom function in SAP R/3, but would ideally be managed in ClickSchedule in the future.		
1.5.2	Text messaging between technicians	Nice-to-have	It would be useful if technicians could send short text messages to each other through the application.		
1.5.3	Text messaging to dispatchers	Nice-to-have	It would be useful if technicians and dispatchers could send short text messages to each other. This may require customization to ClickSchedule or the use of a 3rd party messaging		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			application to provide the dispatcher portion of the messaging capability.		
1.5.4	Integration with MS Outlook for email and messaging	Future	It may be useful to integrate the application with MS Outlook to provide mobile email capability.		
2.0	Work List Management	N/A			
2.1	Work List Display	N/A			
2.1.1	Work List Display	Core	It must be possible to display the list of work order operations currently dispatched to the technician / crew. As an example, a screen-shot of the current list display screen is shown in Figure 2.		
2.1.2	Configuration of the list display	Nice-to-have	It should be possible to configure which columns are displayed in the list, the order of their display, and the default sort sequence. This would likely be an administrator function, not an end user.		
2.1.3	Sorting of the list display on specific fields	Core	It must be possible to sort the list in ascending or descending order for at least a set of pre-defined fields. In the current application, the list can be sorted by: priority, start date/time, or city.		
2.1.4	Sorting of the list display for all fields	Nice-to-have	It should be possible to sort the list based on any displayed field.		
2.1.5	Highlighting of sort order logic	Nice-to-have	The current field upon which the list is sorted should be highlighted in some fashion.		
2.1.6	Filtering of the list display	Nice-to-have	It should be possible to filter the list of orders based on a single entry in any of the columns displayed. The value to filter upon should be selected from a list		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			based on the currently available values (e.g. if all the orders in the list are in DISP or SUSP status, filtering on status should provide the option to filter in SUSP and DISP not other values – similar to MS Excel "autofilter" functionality). It is not required to filter on multiple columns or multiple values (DISP or SUSP status) at a given time.		
2.1.7	Pre-defined filters	Nice-to-have	It should be possible to pre-define filters that the user can select from a list to simplify the filtering of lists. For example, filter for "today's work", "work past due", "Emergency work", or "Fill-in work" (i.e. short duration work with no appointment booked).		
2.2	"Customer Called" Check Box	N/A			
2.2.1	"Customer Called" Check Box	Core	It must be possible to have a check box in the list display that allows the user to indicate whether they have contacted the customer prior to finally scheduling the job (as is required by the process for some work types).		
2.2.2	Message to SAP upon setting of the customer called check box	Core	Upon setting the customer called check box, the application must send an update message to SAP R/3. The customer called indicator is stored as an un-numbered status on the work order operation in R3.		
2.2.3	Conditional display of the Customer Called check box	Core	Only certain work types (denoted by the 3 character Maintenance Activity Type		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			code) require a preceding call to the customer. The Customer Called check box should only be displayed for predefined work types. The list of which work types require a customer call should be maintained in an administrator configurable list.		
2.3	"Paper Received" Check Box	N/A			
2.3.1	"Paper Received" Check Box	Core	It must be possible to have a check box in the list display that allows the user to indicate whether they have received the paper package that accompanies some work types.		
2.3.2	Message to SAP upon setting of the Paper Received check box	Core	Upon setting the Paper Received check box, the application must send an update message to SAP R/3. The Paper Received indicator is stored as an un-numbered status on the work order operation in R3.		
2.3.3	Conditional display of the Paper Received check box	Core	Only certain work types (denoted by the 3 character Maintenance Activity Type code) include paper being sent to the field. The Paper Received check box should only be displayed for predefined work types. The list of which work types require paper should be maintained in an administrator configurable list.		
2.3.4	Conditional display: Paper not being sent	Core	In some cases although the work type is defined as requiring paper, a decision is made in the office to not send paper to the field. This is noted by setting the		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			Paper Received un-numbered status on the operation to "No". The field application must display this as an "N" in the order / operation list instead of displaying the usual check box.		
2.4	Free Text fields for contractor use	N/A			
2.4.1	Contractor free text field	Nice to have	The application used by the contractor should include 2 free text fields that the contractor can use to enter data for their own use about the jobs. This data would not be sent to the back-end system, but would just be used locally.		
2.4.2	Ability to filter and sort lists based on these free text fields	Nice to have	Should have the ability to include these fields in the list displays and use them for filtering and sorting of the work list.		
3.0	Work Processing	N/A			
3.1	Work Order Operation detail display	N/A			
3.1.1	Work Order Operation detail display	Core	It must be possible to display a detailed view of each work order operation. A screen-shot of the current operation detail screen is shown in Figure 3. The "Additional Details" data is stored as sub-operations in SAP R/3, with each line item being a separate sub-operation. The number of sub-operations within a given work order operation is variable.		
3.1.2	Long text display for the order operation	Core	It must be possible to view long text associated with a work order operation by selecting a "Long Text" button within the operation detail screen. A screen		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			shot of the current function is shown in Figure 4.		
3.1.3	Conditional display of the Long Text access button	Core	The Long Text button should only be displayed on the operation detail screen if the operation has long text.		
3.2	Operation Dependencies	N/A	For complex jobs, there are often dependencies – other operations that either must finish before an operation can start or that follow-on from the completion of an operation. These dependencies are maintained in SAP R3.		
3.2.1	Conditional display of dependency information	Core	Dependency information should only be displayed in the operation detail screen if the operation has one or more dependencies.		
3.2.2	Dependency information display	Core	The current dependency information display is shown in Figure 5. The information displayed must include the name of the person assigned to the dependant operation, their contact number, whether the operation comes before or after the current one, and the current status of the dependant operation. Note: this involves some complexity in SAP to ensure that an update message is sent when a status update occurs to a dependant operation.		
3.2.3	Warning of processing work when preceding dependency is not complete	Nice-to-have	If a user tries to go "En Route" to (i.e. begin processing) a job that has a preceding dependency that is not yet Field Complete (FCMP), the application should issue a warning to the use. The		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			user should have the option to proceed or not.		
3.2.4	Warning of rescheduling work with a succeeding dependency	Nice-to-have	If a user tries to reschedule an assigned job which has a dependant operation that follows it, the application should issue a warning to the user. The user should have the option to proceed or not.		
3.3	Status Flow	N/A	All jobs utilize the following statuses: DISP – "Dispatched" – jobs that have been sent to the mobile device but not yet processed ENRT "En Route" – the technician is travelling to the job site ARRV – "Arrived" – the technician is on the job site and is working on the job FCMP – "Field Complete" – the technician has successfully completed the job. This triggers the job completion process. SUSP – "Suspended" – indicates the job has been interrupted for some reason, but the technician expects to return to the job later (i.e. wishes to keep the job). PULL – "Pulled" – indicates the job cannot be completed and needs to be removed from the technician's mobile device. This initiates an office process to reassign the job or to return it to design for updating. EDAY – "End of Day" – indicates the job has been suspended because the technician has come to the end of their		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			work day.		
3.3.1	Status Flow Logic must be built into the application	Core	DISP jobs can go to ENRT. ENRT jobs can go to ARRV or SUSP. ARRV jobs can go to FCMP, SUSP, EDAY or PULL. FCMP jobs cannot be updated. SUSP jobs can go to ENRT. PULL jobs cannot be updated. EDAY jobs can go to ENRT		
3.3.2	Status changes triggered by update buttons	Core	Progression through the status sequence should be triggered by on screen buttons. Only the buttons for the valid status changes should be displayed. Screen-shots from the current application of jobs in ENRT and ARRV status are shown in Figures 6 and 7. The status update buttons appear down the right hand side of the screen.		
3.3.3	One job in progress at a time (Terasen employee version only)	Core	While it is possible to navigate from a job in ENRT or ARRV status back to the order list display (current navigation buttons are shown in Figures 6 and 7 down the left hand side of the screen), it is not possible to move a second job into ENRT status. The current job must be moved to FCMP, SUSP, PULL, or EDAY before it is possible to begin processing another job.		
3.3.4	Multiple jobs in progress at a time (Contractor version only)	Core	Since contractor work is dispatched to a single mobile device for multiple crews, the requirement stated in 3.3.3 does not apply to the Contractor version of the		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			application.		
3.3.5	Bulk setting of job statuses from the order list display (Contractor version only)	Core	To simplify the processing of multiple jobs at one time, it must be possible to select any number of work orders in the list display and select to change their statuses in a single step. The Status logic outlined in 3.3.1 still applies.		
3.3.6	Update message triggered upon status change	Core	Each status change must trigger an update message to the back-end systems, including the date and time stamp of the status change. Status changes are maintained as numbered operation statuses in SAP R3. Since setting FCMP, SUSP, PULL, or EDAY status requires the entry of other code data, the message should be triggered upon completion of the code entry as the user has the option to cancel the step and return to processing the order.		
3.3.7	Status change data recorded by mobile timesheet application	Core	Each status change must be recorded for use by the mobile timesheet application for use in creating the initial version of the technician's timesheet.		
3.3.8	Timing of removal of FCMP jobs from mobile device	Core	Technicians may wish to record additional problems at a premise (see requirements described in section 9.1) after they have set an order to FCMP status. As a result, they either need to have the work order remain on their mobile device past this point so they can easily locate the premise at which to raise the problem notification. The work		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			orders should likely remain on the technician's mobile device until the log-off at the end of the day.		
3.4	Re-dating of Jobs	N/A			
3.4.1	Function to allow job re-dating	Core	The application must include a function to allow certain job types to be re-dated by the technician. This is currently triggered from the order list display by clicking on the date field for a job. This launches a simplified calendar view for the technician to select the new date from. The screen-shot of this date selection screen is shown in Figure 8.		
3.4.2	Re-dating of jobs based on job type	Core	Only certain job types are allowed to be re-dated (e.g. emergencies cannot be re-dated). Which job types can be re-dated should be maintained in a configuration table. For jobs that cannot be re-dated, the option to re-date them should not be available.		
3.4.3	Restriction of date selection for re-dating jobs	Core	Jobs can only be re-dated with in a set window of time. A job can be re-dated any date from the current date to the Friday of the following week, but not beyond this time. The application must limit the date selection to this range.		
3.4.4	Updating of a job's scheduled time.	Nice-to-have	Within Terasen's current application, Technicians only have the ability to change the scheduled date of a job. It would be useful if they also had the ability through the same function to set the time of the job.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
3.4.5	Indication of why the job has been re-dated	Core	It must be possible in the re-dating function to indicate whether the job is being re-dated due to the Customer's request or a Terasen requirement.		
3.4.6	Update message triggered by re-dating process	Core	Upon completion of the re-dating function, a message must be triggered to the back end to update the operation date (time). This is done by setting a constraint date (time) on the operation in SAP R3.		
3.5	Calendar display of work / Technician time	N/A			
3.5.1	Calendar display function for work	Core	The application must provide a calendar type display that shows the current work list as if they were appointments in an Outlook calendar. A simplified screen-shot of the current application is shown in Figure 9.		
3.5.2	Flexible time frame display	Nice-to-have	While the current calendar display shows a fixed 7 day period, with options to navigate to preceding or following weeks, it would be nice for the user to be able to set the display to show from one to 14 days.		
3.5.3	Colour coding of work orders based on status	Nice-to-have	It would be useful if the current status of each job was colour coded or identified in some simple manner.		
3.5.4	Display of summary work order information	Nice-to-have	Each job displayed in the calendar should display some summary job information, such as job type and address information.		
3.5.5	Display of further work	Nice-to-have	Each job displayed in the calendar		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	order information on hover		should display further job information when the mouse is hovered over the job.		
3.5.6	Access to work order operation detail display screen	Nice-to-have	The technician should have the ability to access the work order detail screen for any job selected in the calendar display. The technician should have the option to return to the calendar display from the work order detail screen.		
3.5.7	Drag and drop order rescheduling	Nice-to-have	It would be useful if the technician had the ability to reschedule jobs by dragging and dropping them in the calendar view.		
3.5.8	Display of "non-availabilities" as items in the calendar	Nice-to-have	It would be useful if the technician's non-availabilities as identified in Click were also displayed in the calendar view.		
3.5.9	Colour coding of "non-availabilities" versus jobs	Nice-to-have	There should be some clear method (such as colour coding) to distinguish between non-availabilities and jobs.		
3.5.10	Drag and drop rescheduling of "non-availabilities" (and duration changes)	Nice-to-have	It would be useful if the technician could reschedule and change durations for non-availabilities by dragging and dropping.		
3.5.11	Creation of "non-availabilities" in the calendar view	Nice-to-have	It would be useful for the technician to be able to create a non-availability directly in the calendar view. This should then be communicated to ClickSchedule where the non-availability would be created.		
3.5.12	Integration with MS Outlook	Future			
3.6	Suspending a Job	N/A			
3.6.1	Entry of reason codes upon suspending a job	Core	Upon setting a job to Suspended "SUSP" status, the application must require the user to enter a reason code from a drop down list before completing the function.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			A current SUSP reason code selection screen is shown in Figure 10.		
3.6.2	Entry of reason text	Core	The application must also allow the ability to enter a short text reason (40 Chars Max.)		
3.6.3	Option to cancel suspension processing and return to the order operation	Core	Must have the ability for the user to cancel the processing of the suspension function up to the point they enter the reason code and confirm its entry.		
3.6.4	Variable reason codes based on job type	Core	The reason code selection that is displayed should vary depending on the type of job being suspended. The list of valid reason codes per job type should be maintained in a configuration table (likely in SAP R3). Updates to this configuration table must be synchronized to the mobile application at least upon the next log-in.		
3.6.5	Update message triggered to back-end applications based on confirmation of reason code entry.	Core	Upon confirmation of the reason code, the application must send an update message to the back-end application. The reason code and text are stored in SAP R3 in the “Reason” and “Confirmation text” fields on a completion confirmation document associated with the work order operation being suspended.		
3.6.6	Updating of valid reason codes	Nice-to-have	Valid reason codes are maintained in SAP R3 via a configuration table. Updating of this configuration table should trigger an update to the mobile application with the new valid reason		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			codes (i.e. it should not be necessary to separately update the mobile application's configuration). Note: since the same configuration table is used in SAP R3 for Suspending, Pulling, and EDaying of jobs, the codes are currently smart numbered to indicate how they should be used by the mobile application so that the correct codes are used by the separate functions.		
3.7	Pulling a Job	N/A			
3.7.1	Entry of reason codes upon pulling a job	Core	Upon setting a job to Pulled "PULL" status, the application must require the user to enter a reason code from a drop down list before completing the function. A current PULL reason code selection screen is shown in Figure 11.		
3.7.2	Entry of reason text	Core	The application must also allow the ability to enter a short text reason (40 Chars Max.)		
3.7.3	Option to cancel pull processing and return to the order operation	Core	Must have the ability for the user to cancel the processing of the pull function up to the point they enter the reason code and confirm its entry.		
3.7.4	Variable reason codes based on job type	Core	The reason code selection that is displayed should vary depending on the type of job being pulled. The list of valid reason codes per job type should be maintained in a configuration table (likely in SAP R3). Updates to this configuration table must be synchronized to the mobile application at least upon		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			the next log-in.		
3.7.5	Update message triggered to back-end applications based on confirmation of reason code entry.	Core	Upon confirmation of the reason code, the application must send an update message to the back-end application. The reason code and text are stored in SAP R3 in the "Reason" and "Confirmation text" fields on a completion confirmation document associated with the work order operation being pulled.		
3.7.6	Updating of valid reason codes	Nice-to-have	See 3.6.6		
3.8	Setting a job to End of Day status	N/A			
3.8.1	See sections 3.6 and 3.7	Core	The requirements for setting the End of Day status are similar to those for Suspending and Pulling jobs. The current selection screen is shown in Figure 12.		
3.9	Dispatching of Emergency work	N/A			
3.9.1	Pop-up with mobile app upon receipt of Emergency job	Core	When a new emergency work order is received on the mobile application, it must immediately display a pop-up message top notify the technician. The technician must acknowledge the message to continue processing.		
3.9.2	Message to back-end of technician acknowledgement	Core	Acknowledgement of the pop-up message must trigger an update message to the back-end (likely ClickSchedule).		
3.9.3	Warning message if job not acknowledged	Core	If the technician does not acknowledge the receipt of the emergency job within a		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			defined time, the application must trigger an alert message to the dispatcher. Note: this message may simply be triggered by ClickSchedule if it has not received the acknowledgement within a set time frame rather than being initiated in the mobile application.		
3.9.4	Warning message includes option to suspend current job	Nice-to-have	The pop-up message should provide the option to suspend the current job. Upon accepting this option, the current job is immediately set to SUSP status with a reason code of "Interrupted by Emergency".		
3.9.5	Option to go en route to Emergency	Nice-to-have	The technician should be prompted with the option to immediately go en route to the emergency job. Responding "yes" would take them into the order detail screen in en route status, and responding "no" would take them into the work order list.		
3.9.6	Auto-paging for emergency work	Core	Upon the work order being dispatched to a technician, a pager message must also immediately be sent to the technician to notify them of the job.		
3.9.7	Removal of unprocessed work order from a technician's mobile device (the "reverse push").	Core	Need a mechanism that removes a work order from a technician's mobile device if the order is reassigned to another user, and assuming the technician has not yet started to work the job (not in ENRT, ARRV, SUSP, or FCMP status).		
3.9.8	Wake up of device from hibernation mode	Nice-to-have	The dispatching of an emergency job to a mobile device should have the ability to		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			"wake up" the device if it is hibernating.		
4.0	Job Field Completion Processing	N/A			
4.1	Entry of Delay Codes	N/A	Delay code / delay time data is captured in order to assess where jobs are incurring delays so process improvements can be made to enhance service delivery.		
4.1.1	Entry of delay codes to indicate why a job did not execute as planned	Core	The application must provide the ability for the technician to select one or more delay codes from a drop down list at the completion of the job. The current screen is shown in Figures 13 and 14.		
4.1.2	Entry of delay time associated with each delay code	Core	For each delay code entered the technician must enter an amount of time (selected from a drop down list in 15min increments) for how long the delay was.		
4.1.3	Display of total delay time for the job	Core	Based on the various delay code / delay time entries, the application must display the total delay time.		
4.1.4	Entry of comment text for a delay	Core	The technician must have the ability to enter a short text (40 character) description of the delay in addition to the drop-down selection.		
4.1.5	Valid delay codes by job type	Core	The delay code selection that is displayed should vary depending on the type of job being completed. The list of valid delay codes per job type should be maintained in a configuration table (likely in SAP R3). Updates to this configuration table must be synchronized to the mobile application at least upon		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			the next log-in.		
4.1.6	Entry of delay codes and delay time by job type	Core	Not all job types require the entry of delay codes to complete the job. For job types not included in the configuration as requiring this function, the function should be hidden from the completion screen.		
4.2	Entry of Field Revision Data	N/A	Field revision data is used to captured differences between how jobs are planned versus how they are completed in the field.		
4.2.1	Entry of field revision information	Core	Provide the ability for the technician to select one or more field revisions that were completed as part of the job.		
4.2.2	Entry of comment text for field revisions	Core	Must be able to enter comment text associated with the field revisions.		
4.2.3	Valid field revision entries by job type	Core	The list of valid field revisions must vary with job type.		
4.2.4	Entry of field revision data by job type	Core	Entry of field revision data is only valid for certain job types and so this function should only occur for those job types.		
4.3	Entry of Missing Paperwork Data	N/A	Paperwork data is captured to identify jobs that were issued with incomplete paperwork		
4.3.1	Entry of missing Paperwork information	Core	Provide the ability for the technician to select one or more types of missing paperwork that should have been included with the job		
4.3.2	Entry of comment text for missing paperwork	Core	Must be able to enter comment text associated with the missing paperwork.		
4.3.3	Valid Paperwork entries by job type	Core	The list of valid types of missing paperwork must vary with job type.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
4.3.4	Entry of Paperwork data by job type	Core	Entry of missing paperwork data is only valid for certain job types and so this function should only occur for those job types.		
4.4	Triggering of update message to back-end applications	N/A			
4.4.1	Triggering of update message	Core	Upon confirmation of entered completion data, the application must trigger an update message to be sent to SAP R3. This will include the update of the order operation status to FCMP, and the update of the various closing data. The closing data will either be stored on confirmation documents or notification documents in R3 (this portion of the solution design has not been finalized).		
5.0	Display and Update of Technical Objects	N/A			
5.1	Display and update of functional location data	N/A	All SAP work orders are assigned to a primary "functional location", essentially a location where work can be performed. The majority of functional locations represent customer premises, although others represent a group of assets (e.g. a regulator station) or an geographic area.		
5.1.1	Display functional location data	Core	The application must be able to display data associated with the work order's primary functional location. This data includes address and customer information.		
5.1.2	Updating of functional	Core	It must be possible to update Address		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	location data		data associated with a functional location. This function must only be available to certain users and controlled by authorization profiles.		
5.1.3	Display of functional location "classification data"	Nice-to-have	It should be possible to display data stored in SAP's classification system. The data fields associated with a functional location vary depending on the "class" to which it is assigned.		
5.1.4	Update of functional location "classification data"	Nice-to-have	It should be possible to update data stored in SAP's classification system. This function must only be available to certain users and controlled by authorization profiles.		
5.1.5	Access of technical object detail data from within the work order detail screen	Core	It must be possible to access the display of the functional data from within the work order detail screen.		
5.1.6	Updating of functional location data in SAP R3	Core	Updating functional location data in the mobile application must trigger an update to the same data in SAP R3.		
5.1.7	Synchronization of functional location master data changes in SAP R3	Core	Delta changes to functional location master data must synchronize to the mobile devices upon the technicians' next log-in.		
5.1.8	Synchronization of master data based on geography	Core	Since not all users require access to all 900,000 functional locations, the system must only download the items assigned to the technician's assigned zone. Likely controlled via the "Plant Section" field in R3.		
5.1.9	Display of documents attached to a technical object	Nice –to-have	It would be useful to have the ability to list and display electronic documents		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	through SAP's document management tool		associated with a technical object in SAP's document management system.		
5.2	Display of technical object structure	N/A	Technical objects in R3 are built into a hierarchy, which at its most complex has 5 levels: a functional location, a sub-functional location, a piece of equipment, a bill-of-material, and a material item. An example from SAP R3 is shown in Figure 15 (not including materials). It is also possible for equipment objects to be installed directly in the superior functional location as well as in the sub-functional location.		
5.2.1	Display of 3 level object structure	Core	The application must be able to display in a hierarchy view the current functional location, any sub-functional locations, and any installed equipment. Equipment may be installed in either of the functional locations.		
5.2.2	Display of 5 level object structure	Nice-to-have	The application should have the ability to also display the two levels of materials associated with equipment objects in the structure.		
5.2.3	Access of object hierarchy from within work order detail screen	Core	It must be possible to navigate to the technical object hierarchy display for the primary technical object associated with the work order from within the work order detail screen.		
5.2.4	Access to object detail data from within the hierarchy display	Core	It must be possible to navigate to display any object's detailed data display from within the object hierarchy display.		
5.2.5	Hierarchy structure based on	Nice-to-have	Functional locations are categorized as		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	functional location category		one of three types: surveys, premises, or facilities. Surveys have no structure, premises are a single functional location which may have equipment installed, and facilities have two levels of functional location with equipment installed. The display format of each should adjust based on the functional location category.		
5.3	Display and Update of equipment data	N/A			
5.3.1	Display of equipment data	Core	The application must be able to display data associated with the work order's equipment. This data includes description, size, manufacturer, model #, manufacturer part #, and manufacturer serial #.		
5.3.2	Update of equipment data	Core	It must be possible to update data associated with a functional location. This function must only be available to certain users and controlled by authorization profiles.		
5.3.3	Other equipment master data functions		See items 5.1.3 to 5.1.8. Similar requirements exist for equipment as for functional locations.		
5.4	Display of meter data	N/A	Meters are special types of equipment that have these additional requirements.		
5.4.1	Indication that object represents a meter	Nice-to-have	There should be some easy indication that the technical object represents a meter and not another type of equipment. This could occur through the use of colour coding or the use of the word		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			"meter". Whether a piece of equipment is a meter is indicated by the equipment category.		
5.4.2	Meter data display	Core	When displaying the detailed information for a meter, the following additional data must be displayed: serial number, certification year, certification number, next replacement year, install date, and install reason.		
5.4.3	Latest meter reading data display	Nice-to-have	The application should have the ability to display the latest meter reading information. Note: this is only identified as a separate requirement from 5.4.2 as this data is not currently stored in SAP but in Energy the CIS.		
5.4.4	Consumption history display	Nice-to-have	It would be useful if the application displayed the recent consumption history for the meter. Possibly done as a call to Energy triggered by the technician if they require the information.		
6.0	Field Data Capture for Construction Work	N/A			
6.1	General Field Data Capture for Construction requirements	N/A			
6.1.1	Data capture required based on job type	Core	Construction jobs are broken down into the following job types, and the data capture required must vary based on the job type. Service install, abandonment, alteration. Main install, abandonment, alteration. Meter install, abandonment, alteration.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
6.1.2	Crew sign-off	Core	The final stage of capturing field data must be the crew sign-off. This includes the confirmation of the following message "I hereby certify that the work was completed in accordance with the company standard practices". The crew leader name and employee id should display (based on the entries made at log-in), and provide the ability to be updated by the user.		
6.1.3	Electronic signature capture	Nice-to-have	It would be useful to be able to capture the crew leader's signature as part of the crew sign-off function.		
6.1.4	Trigger of update message to back end systems	Core	Upon completion of the data capture, messages must be triggered to update the back-end systems including SAP and the Service Information Manager (SIA) in GE Smallworld.		
6.2	New service install data capture	N/A	A service is the gas line that runs from a Main line in the roadway to the customer's meter.		
6.2.1	Service line data capture	N/A			
6.2.1.1	Capture of service install length information	Core	Must have the ability to record the following length information: Main to property line (PL), PL to safe meter location, extended past safe meter location, and horizontal jog at meter location. For each item, must also be able to record the service material (from a drop down, either "Steel" or "PE") and service size (from a drop down of standard sizes).		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
6.2.1.2	Display total length	Core	Must display the total length entered based on the individual length entries made.		
6.2.1.3	Display of length data provided on customer quote	Core	The application should display the length values provided by the customer and that were used to develop the quoted price (same components and total as listed in 6.2.1 and 6.2.2).		
6.2.1.4	Capture of riser data	Core	Must have the ability to record the riser material (from a drop down, either "Steel" or "PE") and riser size (from a drop down of standard sizes).		
6.2.1.5	Display of default material and size information	Core	Based on data provided on the work order, the pipe material and size information should default. The technician must have the ability to change the data.		
6.2.1.6	Capture of customer trench / sleeve data	Core	Must have the ability to record the length of trenching or sleeving provided by the customer.		
6.2.1.7	Capture of additional installation information	Core	Must have the ability to select a number of check boxes to indicate other characteristics of the installation, including: service valve, mag anode installed, underground house lines, insert through old pipe, protection posts (and entry of number installed, selected from a drop down), dresser, frost encountered, stub marker ball, and flex hose.		
6.2.1.8	Standard versus non-standard service	Core	Must have the ability to indicate whether the service is standard or non-standard, either from a drop down selection or a		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			check box.		
6.2.1.9	Tie-in Method, service depth, and Tap Size	Core	Must have the ability to capture the tie-in method (select from drop down), the service depth (numerical entry), and the Tap Size (from a drop down list).		
6.2.1.10	Capture of test method data	Core	Must have the ability to select a number of check boxes to indicate the test method: air, nitrogen, soap test, tracer wire continuity, radiography, and other (with other, must also provide short text entry for description). Also need to be able to capture the test pressure and duration.		
6.2.1.11	Capture of additional comments	Core	Must have the ability for the crew to enter additional comments describing the job. Text entry, up to 80 characters.		
6.2.1.12	Service location data capture	Core	Must have the ability to capture the service location data, including the distance (numerical entry), the direction (from drop down), and the datum from which the measurement is being made (from drop down).		
6.2.1.13	Meter location data capture	Core	Must have the ability to select the meter location, either from a drop or radio button selection: Front left, Back left, left-hand side, Front right, Back right, Right-hand side, or remote.		
6.2.2	Capturing of sketches	N/A			
6.2.2.1	Ability to scan and attach sketch	Nice-to-have	Ability to scan a sketch of the installation using a connected or blue-tooth scanning device and attach it to the completion information.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
6.2.2.2	Capture of an electronic sketch	Nice-to-have	Ability to generate the field sketch electronically as part of the job.		
6.2.2.1	Select from template installation sketches	Future	Ability to select a sketch layout from a list of standard templates and enter dimension information. This item should capture the data required in items 6.2.1 and 6.2.12.		
6.2.2.4	Use of GIS premise display as basis for electronic sketch capture	Nice-to-have	Ability to display the premise from the GE Smallworld GIS, including property lines, north direction, and main location as the starting point for the sketch capture.		
6.2.2.5	Use of GIS premise display to capture main and location data.	Nice-to-have	Ability to use the GIS display to connect the service to the main it is served from and place the geographic location "dot".		
6.2.2.6	Use of GPS to generate sketch	Future	Ability to "walk the line" and mark datum points to automatically generate sketch.		
6.2.3	Meter installations	N/A			
6.2.3.1	Meter installation data capture	Core	The technician must be required to enter meter installation data including the meter number, the meter reading, the PFM number, and the Permit number, or select a reason code for why no meter has been installed.		
6.2.3.2	Display of meter data	Core	Based upon the entry of the meter number, the following meter data should be displayed: manufacturer's number, number of dials, and delivery pressure.		
6.2.3.3	Meter number validity check	Core	Application must confirm that the meter number entered is valid and prevent the technician from proceeding if it is not.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
6.2.3.4	Meter installation for multi-premise jobs	Core	For jobs with multiple premises (as indicated in the premise list provided with the work order) the technician must select the premise from a displayed list at which to perform the install.		
6.2.3.5	Warning of meter already installed	Core	If the technician attempts to install a meter at a premise that has already had a meter installed, a warning should be issued. The technician should have the option to proceed or cancel and return to the previous screen.		
6.2.3.6	Use of bar-code scan to populate meter number	Future	Must have the option to use a scanned bar code reading to populate the meter number or key the number in manually.		
6.2.3.7	Use of RF signal to populate meter number and reading data.	Future	In the future, Terasen expects to use electronic meters that have the ability to broadcast an RF signal that includes meter number, meter reading, and meter condition data. It would be useful to integrate this ability into the meter installation process.		
6.2.3.8	Update message to R3	Core	Confirmation of entry of meter installation data must trigger an update message to create a meter installation notification document in SAP R3 linked to the work order document.		
6.2.4	Updated pricing information for new services				
6.2.4.1	Display of job pricing data	Core	For jobs that have pricing information it must be possible to display the pricing information, likely on a separate screen accessed from the order detail screen.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			This must include the pricing components (i.e. condition records) and the total price.		
6.2.4.2	Access to function based on job type	Core	Only certain job types have pricing information, and so only those job types should have this function occur as part of the job completion.		
6.2.4.3	Additional length charges based on length data entered	Core	The application must calculate whether additional length charges apply by: taking the length of the service from the PL to the safe meter location (based on the data entered in 6.2.1.1) less the total length allowed (this value is provided with the work order data) and – if greater than 0 – multiplying it by a per meter price (this value is also proved with the work order data).		
6.2.4.4	Additional meter location charges	Core	The application must calculate whether additional meter location charges apply by: taking the actual extended past meter location length (entered in 6.2.1.1) less the quoted extended past meter location length and multiplying by a per meter price (this value is provided with the work order data).		
6.2.4.5	Price check prior to job completion	Core	Must have the ability to trigger a price check function prior to completing the job. Technician enters the length data and has application calculate an updated price. If price change greater than $X (configurable value, currently $400) they set the job status to Pull with reason code		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			"Additional charges not approved".		
6.2.4.6	Aborted visit charge	Core	When a crew either "Suspends" or "Pulls" they must be prompted as to whether an "Aborted site visit charge" should be applied to the job. If yes, a charge of $X (configurable value) should be added to the job. Note: have not yet modeled how to do this if occurs multiple times for the same job.		
6.2.4.7	Site clean-up charge	Core	Technician must be prompted as to whether a "Site clean-up charge" should be applied to the job. If yes, a charge of $X (configurable value) should be added to the job.		
6.2.4.8	Display of updated price information	Core	The application must display the updated price based on the entered data.		
6.2.4.9	Customer contacted with pricing change information	Core	Must have the ability to indicate whether the customer has been notified of the pricing change and whether they agreed with the change.		
6.2.4.10	Capture customer electronic signature to accept price change	Future	It would be useful to have the ability to capture an electronic signature from the customer signifying their acceptance of the new price.		
6.2.4.11	Print updated quote for customer	Future	It would be useful to be able to print the updated quote document locally to provide to the customer.		
6.2.4.12	Email or fax of updated quote to customer	Future	It would be useful if the updated quote document was automatically emailed or faxed to the customer.		
6.2.4.13	Trigger of message to back-end system	Core			

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
6.3	New main install data capture	N/A			
6.3.1	Pipe length data capture	N/A			
6.3.1.1	Capture of main install length information	Core	Must have the ability to record the following information for up to four pipe segments: length installed, material (from a drop down, either "Steel" or "PE") and pipe size (from a drop down of standard sizes).		
6.3.1.2	Capture of test method data	Core	Must have the ability to select a number of check boxes to indicate the test method: air, nitrogen, soap test, tracer wire continuity, radiography, and other (with other, must also provide short text entry for description). Also need to be able to capture the test pressure and duration.		
6.3.1.3	Capture of additional comments	Core	Must have the ability for the crew to enter additional comments describing the job. Text entry, up to 80 characters.		
6.3.2	Capturing of sketches	N/A			
6.3.2.1	Display of GIS design drawing	Future	All new main installations are designed in the GE Smallworld GIS. Rather than printing and issuing paper drawings with the job package, it would be useful if the crew could view the drawing electronically.		
6.3.2.2	Redlining of GIS design with as-built data	Future	It would be useful for the crew to be able to capture their as-built data by redlining the GIS design.		
6.3.2.3	Combining capturing of as-built sketch with length data	Future	Entering as-built data in the sketch should include the capture of the length		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	in 6.3.1.1		data described in item 6.3.1.1.		
6.3.2.4	Update message to GE Smallworld	Future	Confirmation of the data entry should trigger an update to show as-built redline data in GE Smallworld.		
6.4	Service alteration data capture	N/A	In general the data capture requirements for service alterations are the same as listed for new service installs as outlined in section 6.2, with the following additions.		
6.4.1	Pipe abandoned data capture	N/A			
6.4.1.1	Pipe abandoned data capture	Core	Must have the ability to enter the length, material (from drop down “PE” or “Steel”) and size (from a drop down of standard sizes) of the pipe being abandoned.		
6.4.2	Capturing of sketches	N/A			
6.4.2.1	Display of scanned service sketch	Future	All existing service sketches are scanned and linked to the premise location in the GE Smallworld GIS. It would be useful if this sketch could be transmitted electronically to the mobile device for the crew to display.		
6.4.2.2	Redlining of sketch with alteration details	Future	It would be useful for the crew to be able to use the sketch to add the details of the alteration.		
6.4.2.3	Update message to GE Smallworld	Future	Confirmation of the data entry should trigger an update to show as-built redline data in GE Smallworld.		
6.5	Service Abandonment data capture	N/A			
6.5.1	Abandoned pipe data capture	N/A			

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
6.5.1.1	Pipe abandoned data capture	Core	Must have the ability to enter the length, material (from drop down "PE" or "Steel") and size (from a drop down of standard sizes) of the pipe being abandoned.		
6.5.1.2	"Stub marker ball" check box	Core	Must provide a check box for the crew to indicate whether the stub has been marked with a stub marker ball.		
6.5.1.3	Service Cut-off location	Core	Must be able to record either via a drop-down selection or radio buttons the location of the cut-off: At Main, Inside PL (requires entry of distance from PL), Outside PL (requires entry of distance from main), At PL, At Header, or Other (requires short text entry to describe location).		
6.5.1.4	Capture of additional comments	Core	Must have the ability for the crew to enter additional comments describing the job. Text entry, up to 80 characters.		
6.5.1.5	Service location data capture	Core	Must have the ability to capture the service location data, including the distance (numerical entry), the direction (from drop down), and the datum from which the measurement is being made (from drop down).		
6.5.2	Capturing of sketches	N/A	See requirements in sections 6.2.2 and 6.4.2.		
6.5.3	Meter removal data	N/A			
6.5.3.1	Display meter data	Core	Based on the premise at which the job is to be performed, the application must be able to display data for the meter currently installed at that location.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
6.5.3.2	Meter reading entry	Core	Upon triggering the meter removal function, the technician must be required to enter the meter reading.		
6.5.3.3	Meter reading logic check	Nice-to-have	It would be useful if the application had some simple logic to check that the reading entered is consistent with the last recorded reading (e.g. is greater than the last reading, is not more than some value greater than the last reading). If the value fails the logic check, a warning should be displayed with the option to continue or correct the entry.		
6.5.3.4	Update message to R3	Core	Confirmation of entry of meter removal data must trigger an update message to create a meter removal notification document in SAP R3 linked to the work order document.		
6.6	Underground leak repair data capture	N/A			
6.6.1	Leak repair data	N/A			
6.6.1.1	Temporary repair, permanent, or no repair data	Core	Must be able to indicate whether the repair is temporary or permanent, or whether no leak was found (no repair made).		
6.6.1.2	Permanent repair type data	Core	For permanent repairs, the technician must be required to select the type of repair performed (repair clamp, fuse PE, tightened fitting, weld patch, etc.)		
6.6.1.3	Temporary repair type	Core	For temporary repairs, the technician must be required to select the type of repair performed (denso tape, wrapped, polyken tape, temporary repair clamp,		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			etc).		
6.6.1.4	Temporary repair follow-on work required	Core	For temporary repairs, the technician must be required to select a follow-on work type required to permanently complete the repair. This should also include entry of a short text description.		
6.6.1.5	No repair made reason	Core	For "no repair made" jobs, the technician must be required to select a reason (Marsh gas, unable to locate leak, service/main to be replaced).		
6.6.1.6	No repair details on check done	Core	For "no repair made" jobs, the technician must be required to select one or more checks done to determine that no leak exists.		
6.6.1.7	Valve ID	Core	Must have the ability to record a valve ID number if the leak occurred at a valve.		
6.6.1.8	Type of leak	Core	Must be able to select the type of leak (Cat 1, Cat 2, Cat 3) from a drop down list.		
6.6.1.9	Capture of test method data	Core	Must have the ability to select a number of check boxes to indicate the test method: air, nitrogen, soap test, tracer wire continuity, radiography, and other (with other, must also provide short text entry for description). Also need to be able to capture the test pressure and duration.		
6.6.1.10	Additional leak repair data	Core	Must be able to select check boxes to indicate other repair activities performed (Pipe Coating Report completed, Bottle Sample submitted).		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
6.6.1.11	Location and description of work	Core	Must provide text entry for technician to describe the location of the leak and the work performed.		
6.6.2	Capture of sketches	N/A			
6.6.2.1	Display of GIS leak location data	Future	All leaks are recorded in the GIS as data objects. It would be useful to be able to display the area around the leak as a sketch within the mobile application.		
6.6.2.2	Redline sketch and indicate leak location	Future	It would be useful for the technician to be able to update dimension information and indicate the leak location on the GIS sketch.		
6.6.2.3	Use of GPS to aid in identifying leak location	Future	It would be useful if the technician's current location as provided by their GPS enabled vehicle modem was displayed on the GIS sketch.		
6.6.2.4	Update message to GE Smallworld	Future	Confirmation of the data entry should trigger an update to show as-built redline data in GE Smallworld.		
6.7	Entry of Plant Unit data	N/A	Plant units are used to record the quantity of work completed, such as the length of pipe installed. This data is ultimately posted as statistical key figures in R3.		
6.7.1	Plant unit data required based on job type	Core	Different job types require that different plant units be recorded (e.g. meters of pipe installed, number or risers installed, meters of pipe abandoned, etc.)		
6.7.2	Entry of plant unit data	Core	The application must be able to derive the plant units from the other data captured for the job (i.e. pipe lengths etc.) and should not require additional		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			data entry.		
6.7.3	Trigger of message to back-end system	Core	Upon confirmation of completion of the data capture, the application must trigger an update message to post the statistical key figures against the work order.		
6.8	Capture of contract materials / services used		Gravel, flag people, saw cutting, etc.		
6.8.1	Ability to indicate materials used on the job	Core	Must have the ability to indicate what support materials were used on the job (e.g. gravel, flaggers, saw cutting, etc).		
6.8.2	Access to function based on job type	Core	Only certain job types require this function and so access to it should only occur for those job types.		
6.8.3	Capture of quantities used	Nice-to-have	It would be useful to be able to record the quantities of the support materials used. Unit of measure varies for material type.		
6.8.4	Charge material usage to work order	Nice-to-have	Entry of the material usage data should trigger the posting of the material costs against the work order in R3.		
6.9	Pipeline Coating Report	Future	It would be useful to be able to capture the pipe coating report as an electronic document.		
7.0	Customer Service work field data capture	N/A			
7.1	As completed data capture	N/A			
7.1.1	As completed job code	Core	Must have the ability to record the job code for how the job was completed (i.e. some jobs a dispatched as one type, but are completed as something else once the technician is on site and can really diagnose the issue).		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
7.1.2	Code selection based on job type	Core	The code selection must be restricted based on the type of job being dispatched (i.e. only certain job types can become certain other job types). This should be controlled via a configuration table.		
7.1.3	Completion actions and data required based on job type	Nice-to-have	The application should vary the completion data capture requirements based on the job type, e.g. a meter exchange would require the completion of meter exchange data, while a meter lock-off would just require entry of up to date meter reading. More examples of this are discussed in the maintenance inspection forms section in 8.2.		
7.1.4	Update message to back-end systems	Core	The as completed job code will update the Maintenance Activity Type on the work order in SAP R3.		
7.2	Job comment data capture	N/A			
7.2.1	Selection of standard comments from list	Core	Must have the ability to select one or more standard completion comments via a check list.		
7.2.2	Available comments filtered by job type	Core	The comments that are available to select from must vary depending in the job type. This should be controlled via a configuration table.		
7.2.3	Option to display all comments	Nice-to-have	Although the initial list of comments should be filtered by job type, the technician should have the option to display all the complete list of comments to select from.		
7.2.4	Entry of free form comments	Core	Must have the ability to enter free text completion comments (up to 250		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			characters)		
7.2.5	Flag job as requiring office review	Core	Must have the ability to set a flag on the job so that it is reviewed in the office prior to closing.		
7.3	Red / Pink tagging for equipment	N/A	Red and Pink tags are physical tags used to indicate items that the technician finds to be in need of attention.		
7.3.1	Indication of tag being issued	Core	The technician must be able to indicate that a Red or Pink tag has been issued.		
7.3.2	Confirm and correct address and customer data	Nice-to-have	The premise address and customer information associated with the work order should be displayed for confirmation by the technician. The technician should be able to update the data if required.		
7.3.3	Selection of Pink Tag defects found	Core	For Pink Tags, the technician should be able to select one or more defects from a list of check boxes (Code Violation, House Piping, Appliance, Venting, Other).		
7.3.4	Entry of text comments	Core	The technician should have the ability to enter a textual description of the defect.		
7.3.5	Selection of person notified for Red Tag	Core	For a Red Tag, the technician should have the ability to select who has been notified of the problem (Owner, Tenant, No one home, Refused to sign, or Other). Other should include text entry for explanation.		
7.3.6	Gas Turned Off information for Red Tag	Core	For a Red Tag, the technician should have the ability to indicate whether the		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			gas was turned off at the meter, at an appliance (select appliance from drop-down), or at Other (provide text entry).		
7.3.7	Hazardous Conditions Found for Red Tag	Core	For a Red Tag, the technician should have the ability to select one or more check boxes to indicate the hazards found (e.g. Improper venting, No relief valve, Gas leak in piping, etc.)		
7.3.8	Update message to back-end systems	Core	Upon confirmation of the Red / Pink Tag information, an update message should be sent to SAP R3 where the data will be recorded on a Notification document associated with the assigned customer premise and the work order.		
7.4	Gas Leak Completion data	N/A	For reference, the current Mobile UP Leak Completion screen is shown in Figure 16.		
7.4.1	Access to function based on job type	Core	Only certain job types require the capture of this data. This should be controlled via a configuration table.		
7.4.2	Condition found data	Core	Must be able to select the condition found from a drop-down list of values.		
7.4.3	Leak location data	Core	Must be able to select the leak location from a drop-down list of values.		
7.4.4	Appliance data	Core	If the leak location selected is “Appliance” then the technician must select an appliance from a drop-down list of values.		
7.4.5	Leak classification	Core	Must be able to select the leak classification (i.e. severity) from a drop-down list of values.		
7.4.6	Gas reading data	Core	Must be able to record numerical entries		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			for the amount of gas detected at the job site (% LEL, %Gas, and CO PPM).		
7.4.7	Selection of work performed	Core	Must be able to select one or many entries from a list describing the work that was performed.		
7.4.8	Selection of other completion conditions	Core	Must be able to select one or more entries to describe other conditions of the work, including: Red Tag Issued, Damage Report Issued, Leak Report Issued, CO in Air, CO at Appliance, or Referred.		
7.4.9	Condition left information	Core	Must be able to select one or more entries from a list describing the condition left upon completion of the job.		
7.5	Meter Install / Exchange / Read / Remove	N/A			
7.5.1	Selection of meter activity: install new meter, exchange meter, remove meter, update meter.	Core	Must have the ability to trigger the following functions as part of processing the job: install new meter, exchange meter, remove meter, and update meter.		
7.5.2	Cannot remove meter unless one already installed	Nice-to-have	The option to remove a meter should not be available if a meter is not installed at the premise.		
7.5.3	Meter installations		See requirements in section 6.2.3		
7.5.4	Meter exchange	Core	The meter exchange function combines the requirements of a meter removal (see section 6.5.3) and meter installation (see section 6.2.3) into a single step.		
7.5.5	Meter removal		See requirements in section 6.5.3		
7.5.6	Meter Update	Core	Must have the ability to enter updated meter information, including meter		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			reading information.		
7.5.7	Update message to back-end	Core	Meter data changes / activities will be stored as a notification document in SAP R3.		
7.6	System Damage Report	Nice-to-have	It would be useful to replace the current paper System Damage Report with an electronic form. The current form is shown in Figure 17.		
8.0	Maintenance work field data capture	N/A			
8.1	Recording of equipment failure data	N/A			
8.1.1	Selection of failed item from hierarchy display	Core	The technician must be able to initiate failure reporting for a technical object from the technical object structure as described in item 5.2.		
8.1.2	Entry of malfunction data	Core	For the selected item the technician must be able to indicate whether a breakdown has occurred and indicate the start date and end date of the malfunction. The start date should default to be blank, and the end date should default to the current date.		
8.1.3	Failure item data	Core	For the selected item, the technician must have the ability to enter the following failure item data: the object part that has failed (from drop-down list), the failure code (from drop-down list), the failure text, the cause code (from drop-down list), and the cause text.		
8.1.4	Activity item data	Core	For the selected item, the technician must have the ability to enter the		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			following activity item data for one or many activities: the activity code (from drop-down list), and the activity text.		
8.1.5	Catalogue codes	Core	The drop down list selections described in 8.1.3 and 8.1.4 must be populated based on the catalogue codes configured in SAP PM, and must synchronize from SAP when values are changed.		
8.1.6	Catalogue profile assigned to technical object in SAP	Core	Each technical object in SAP is assigned to a catalogue profile which defines which set of catalogues codes are available for history recorded for that technical object. The codes available in the drop-down lists described in 8.1.3 and 8.1.4 must vary based on the catalogue profile assigned to the technical object for which the failure is being recorded.		
8.1.7	Multiple failures associated with a single work order	Core	Since inspection orders are issued at a functional location typically representing a station, and multiple failures at different pieces of equipment may be discovered, the application must have the ability to report multiple failures from within a single work order completion. Each failure will be recorded as a notification document associated with the specific technical object selected from the hierarchy and assigned to the work orders object list in SAP PM.		
8.2	Maintenance Inspection forms	N/A	A number of standard forms are used by maintenance technicians to report asset		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			condition and readings. Upon completion, this data is stored in a Notification document in SAP PM. Specific readings are stored as "Activity Text" against a pre-defined activity code that represents the specific reading type. It is a Core requirement that these forms can continue to be completed in Word or Excel and attached to the job for sending to the back-office. It is a Nice-to-have requirement that these forms are integrated into the mobile application eliminating the need for the existing Word and Excel templates. The existing templates are included in the ZIP file "Maintenance Forms.zip".		
8.2.1	Mandatory completion of form	Nice-to-have	The technician should not be able to fully complete a work order until they have completed the appropriate maintenance inspection form.		
8.2.2	Form type based on job type and equipment type data	Nice-to-have	The specific form that the technician must be required to complete will depend on a combination of the job type and the equipment type assigned to the job.		
8.2.3	Form 1672: Huntington Flow Control Operational Check form	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.4	Form 2021: Gate Station Annual Maintenance BSB Fire Tube Boiler form	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.5	Form 2022: Gate Station Annual Maintenance	Core / Nice-to-have	See template in supplied ZIP file.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	Atmospheric Boiler Inspection form				
8.2.6	Form 2273: PFM – Inches Maintenance	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.7	Form 2274: Instrument Drive Maintenance	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.8	Form 2277: Stations Maintenance form	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.9	Form 2435: Heater Fluid Maintenance Form	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.10	Form 2506: Meter set upgrade request	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.11	Form 2595: Injection Odourization Inspection form	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.12	Form 2692: Viessmann Heater Checklist	Core / Nice-to-have	See template in supplied ZIP file.		
8.2.13	Form 2693: Cold Weather Checklist	Core / Nice-to-have	See template in supplied ZIP file.		
8.3	Equipment / Asset Change Control	N/A	See template 2276 Equipment Asset Change Control form		
8.3.1	Identify equipment replacement items	Core	The technician must have the ability to identify equipment items that have been removed in the field and enter information about the replacement item.		
9.0	Field Work Requests and display of other work	N/A			
9.1	Field Work Request for general work	N/A			
9.1.1	Ability to raise field work requests	Core	Technicians must have the ability to raise field work requests including the following data: the object part that has		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			failed (from drop-down list), the failure code (from drop-down list), the failure text, the cause code (from drop-down list), and the cause text. Note: this is the same data as discussed in item 8.1.3.		
9.1.2.	Select object from technical object hierarchy to raise Field Work Request Against	Core	Must be able to select any technical object in the hierarchy display for an order and raise a field work request against that object.		
9.1.3	Field Work Requests for Multi-premise jobs	Core	For multi-premise jobs, where the multiple premises are listed as additional technical objects in the order object list in R3, it must be possible to select any one of the premises in the list and raise a field work request against it.		
9.1.4	Field Work Request against an object not associated with a work order	Core	It must be possible to raise a field work request against a technical object not associated with an assigned work order. This implies there needs to be a function for locating technical objects easily, likely through an address search.		
9.1.5	Use of GPS to locate technical object / premise	Nice-to-have	It would be useful if the technician could use their current GPS location to help them locate a premise at which to raise a field work request. Ideally this would happen via a graphical GIS display.		
9.1.6	Update message to back-end systems	Core	Upon confirmation of entering the field work request data, a message must be sent to the back-end system where the request would be created as a notification associated with the appropriate technical object in SAP R3.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
9.2	Display of Historical and Upcoming work	N/A			
9.2.1	Display of historical and upcoming work	Core	For any selected technical object, it must be possible to display a summary of all the recently completed work orders (i.e. last 5), upcoming work orders, and raised but not issued notifications.		
9.2.2	Display order and notification details	Core	For any of the listed orders or notifications, the technician must be able to display the order detail.		
9.2.3	Display notification detail associated with a work order	Core	Job history is stored on notifications associated with a work order (there may be several notifications per one work order). The technician must be able to see the notifications associated with the historical work orders and drill into the notification detail for any one.		
9.2.4	Previous maintenance readings	Nice-to-have	Maintenance readings are stored as activity codes and activity text on notifications. It would be useful for those codes that represent maintenance readings to be displayed so as to represent a sequence of previous readings. Should show when the reading was taken and what the reading was in a list.		
10.0	"Off Route" Activities Terasen employees only.	N/A	"Off-route" activities are used to track tasks that are not dispatched as work orders from SAP, such as attending meetings, restocking vehicles, etc.		
10.1	Indicate start of off-route activity	Core	The technician must be able to select a "Start off-route" function. The		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			application must require them to select an activity type from a drop-down list and enter an estimated duration for the activity.		
10.2	Trigger of message to back-end application	Core	Upon confirmation of the entered off-route activity information, the application must send a message containing the time stamp for the start of the off-route activity, the type of activity, and the estimated duration. It is the intent to use this data to update the technician status in ClickSchedule as "off-route" (i.e. unavailable to work), indicate what activity they are performing, and show the estimated time for how long the activity will last.		
10.3	On screen counter display of off-route activity time	Nice-to-have	Once an off-route activity has been started, an on screen counter should display and count up each second until activity is completed. This screen should also display the estimated duration entered initially by the technician.		
10.4	Display of actual versus estimated activity duration upon completion	Nice-to-have	Upon completion of the off-route activity the application should display how long the activity took and how this compared to the estimated duration.		
10.5	Navigation while performing off-route activity	Core	The technician must be able to navigate through the application while performing an off-route activity, but must not be able to process a job (i.e. move into "ENRT" or "ARRV" status).		
10.6	Restriction on starting off-	Core	The application must not allow the user		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	route activity while processing another job		to start an off-route activity while they have an operation in "ENRT" or "ARRV" status, nor while they are already performing an off-route activity.		
10.7	Trigger of message to back-end application on activity completion	Core	Upon completion of the off-route activity, a message must be automatically sent to the back-end application. This will return the technician status to "available for work" in ClickSchedule.		
10.8	Off-route activity time stamp information recorded by timesheet application	Core	Start and stop of off-route activity timestamp information must be recorded by the mobile timesheet application as it will be used in the generation of the technician's timesheet.		
10.9	Late log-in by technician	Core	Each technician is assigned a target start time when they should log in each day. If the technician logs in more than "X" minutes after their target time, the application must require them to select an off-route activity to account for the time. The value of "X" should be a configurable entry.		
10.10	Timestamp for late log-in time	Core	If the technician has logged in late, the application must create timestamp entries for the mobile timesheet application as if the technician had logged-in on time and started the off-route activity at that point and completed the off-route activity when they actually logged-in.		
11.0	Mobile Timesheet Application	N/A	See timesheet mock-up Excel spreadsheet		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
11.1	Initial entries based on status change and off-route activity timestamps	Core	The timestamps collected through the day must generate the initial timesheet for the technician.		
11.2	Ability to edit entries to ensure time adds up to a complete day	Core	The technician must have the ability to adjust the time entries to ensure the timesheet adds up to fill a complete day. A warning should be issued if the technician tries to complete this process and the time entries do not equal 7.5 hours.		
11.3	Ability to adjust charge rates	Core	While the standard charge rate for an employee should be based on the value entered at log-in, the technician must have the ability to select other rates (SAP activity types) from a drop down list.		
11.4	Crew timesheets	Core	The crew leader must be able to make overall adjustments to the crew's timesheet, but than also be able to make individual adjustments to specific crew member's timesheet.		
11.5	Vehicle timesheet	Core	This process must also create a timesheet for the technician's vehicle.		
11.6	Entry of "entitlement" time	Core	Technician must be able to indicate the entry of entitlement time, where if called-out for work, they are paid for a minimum of 4 hours regardless of whether they actually worked that much.		
11.7	Posting of timesheets	Core	Upon completion of the process, the timesheet data must be posted into SAP CATS		
11.8	Viewing of previously submitted timesheets	Nice-to-have	It would be useful if the technician could display previously submitted timesheets.		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
11.9	Routing of timesheets for manager approval	Nice-to-have	It would be useful to be able to automatically route the entered timesheet to a manager for approval.		
11.10	Display of performance standards in the timesheet	Nice-to-have	It would be useful if the timesheet also displayed the technician's performance against standard (i.e. how long it took the technician to perform a job versus how long it is expected to take).		
11.11	Ability to request time off	Nice-to-have	It would be useful for the technician to be able to request time off through the application.		
12.0	Working Alone Monitoring	N/A			
12.1	Working Alone Monitoring	Core	Ability for a technician to set a timeframe within which they must provide a system update to acknowledge that they are safe when working alone. If the update is not received in the back-end system within the required timeframe, an alert would be triggered for the dispatcher to follow up with the technician		
12.2	Alerts based on standard timeframes	Core	If no activity has occurred on the mobile device within a defined time period, an alert must be triggered to the back-end system.		
12.3	Ability to send a "panic" notification	Nice-to-have	It would be useful for the technician to be able to trigger a "panic" type notification to the back-end system at any point while using the application.		
13.0	Integration with GIS and mapping information	N/A			
13.1	Display of GIS data on the	Nice-to-have	It would be useful to be able to display		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	mobile device		GIS data graphically on the mobile device		
13.2	Display of leak survey package data from GIS	Nice-to-have	Leak survey routes are currently maintained in the GIS. These are printed as paper packages for the technicians to use. It would be useful to eliminate the paper packages and have the leak survey route displayed on the mobile device.		
13.3	Ability to enter problem notifications from graphical leak survey package	Core / Nice-to-have	It would be useful for the technician to be able to enter a problem notification while processing a leak survey package. This problem notification is raised as both a notification in SAP PM and an object in the GIS.		
13.4	Location of problem based on GPS location	Future	It would be useful for the technician to be able to set the location of the problem based on their current GPS coordinates.		
13.5	Display of Shut-off and relight lists	Core / Nice-to-have	During emergency events, the GIS is used to identify lists of customers to be shut-off or requiring relight. It would be useful for the technician to see this data graphically.		
13.6	Processing of relight lists	Core / Nice-to-have	It would be useful for the technician to be able to process a relight list be indicating the status of each customer as they are processed.		
13.7	Display current location on map	Core / Nice-to-have	It would be useful for the technician to be able to display their current location on a map display. It is assumed mapping information is provided from ClickLocate.		
13.8	Display driving directions to	Future	It would be useful if the technician could		

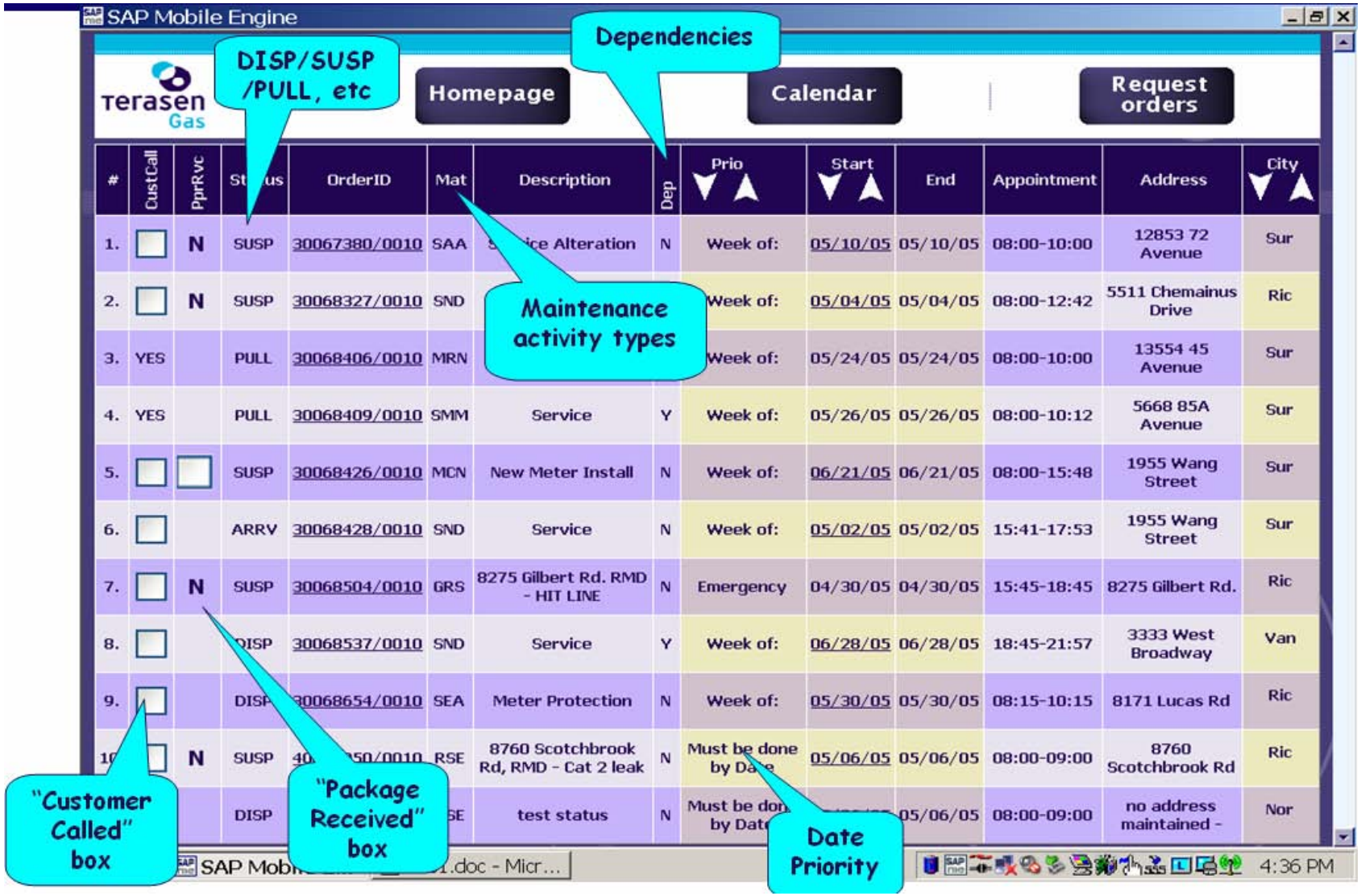
Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
	next job		display, both graphically and as a textual set of instructions – the directions to their next job based on the information in ClickLocate.		
13.9	Display driving route	Future	It would be useful if the technician could display their planned driving route for the entire day based on the information in ClickLocate.		
14.0	Integration with document management and standards				
14.1	Access to Knowledge Base and Standards information	Nice-to-have	It would be useful to integrate Standards and other Knowledge Base (i.e. work instructions) into the work processing. These documents are currently stored in web based applications. Synchronization of the documents to the mobile device would be useful.		
14.2	Selection of standards and knowledge base items based on job type	Nice-to-have	It would be useful if the job type being worked provided a proposed selection of standards and knowledge base items that are defined as being relevant to the specific job.		
14.3	Access to premise sketches from DCRS	Nice-to-have	Each premise has a scanned sketch that is linked to the premise via the GIS and is stored as an electronic file in a system called DCRS. It would be useful if the technician had the ability to view a DCRS sketch for any selected premise.		
14.4	Attaching of documents from the field	Future/ Nice-to-have	It would be useful if the technician has the ability to attach documents to the job and send them to the office. For example, the taking of a digital		

Item	Name	Core / Nice-to-have	Details	Degree of Functional Fit	Bidder Comments
			photograph for inclusion with a field work request.		
14.5	Sending electronic (such as permits) documents attached to job package.	Nice-to-have	It would be useful to be able to transmit electronic documents attached to the work order in SAP to the mobile device (e.g. job permit documents, written weld procedures, etc).		

Figures:

Figure 1: Screenshot of Current SAP MAM Employee ID Entry Screen

Figure 2: Current SAP MAM Order Operation List Display



#	CustCall	PprRvc	St us	OrderID	Mat	Description	Dep	Prio	Start	End	Appointment	Address	City
1.	☐	N	SUSP	30067380/0010	SAA	ice Alteration	N	Week of:	05/10/05	05/10/05	08:00-10:00	12853 72 Avenue	Sur
2.	☐	N	SUSP	30068327/0010	SND			Week of:	05/04/05	05/04/05	08:00-12:42	5511 Chemainus Drive	Ric
3.	YES		PULL	30068406/0010	MRN			Week of:	05/24/05	05/24/05	08:00-10:00	13554 45 Avenue	Sur
4.	YES		PULL	30068409/0010	SMM	Service	Y	Week of:	05/26/05	05/26/05	08:00-10:12	5668 85A Avenue	Sur
5.	☐	☐	SUSP	30068426/0010	MCN	New Meter Install	N	Week of:	06/21/05	06/21/05	08:00-15:48	1955 Wang Street	Sur
6.	☐		ARRV	30068428/0010	SND	Service	N	Week of:	05/02/05	05/02/05	15:41-17:53	1955 Wang Street	Sur
7.	☐	N	SUSP	30068504/0010	GRS	8275 Gilbert Rd. RMD - HIT LINE	N	Emergency	04/30/05	04/30/05	15:45-18:45	8275 Gilbert Rd.	Ric
8.	☐		DISP	30068537/0010	SND	Service	Y	Week of:	06/28/05	06/28/05	18:45-21:57	3333 West Broadway	Van
9.	☐		DISP	30068654/0010	SEA	Meter Protection	N	Week of:	05/30/05	05/30/05	08:15-10:15	8171 Lucas Rd	Ric
10	☐	N	SUSP	40 50/0010	RSE	8760 Scotchbrook Rd, RMD - Cat 2 leak	N	Must be done by Da	05/06/05	05/06/05	08:00-09:00	8760 Scotchbrook Rd	Ric
			DISP		SE	test status	N	Must be don by Dat		05/06/05	08:00-09:00	no address maintained -	Nor

Figure 3: Current SAP MAM Operation Detail Screen

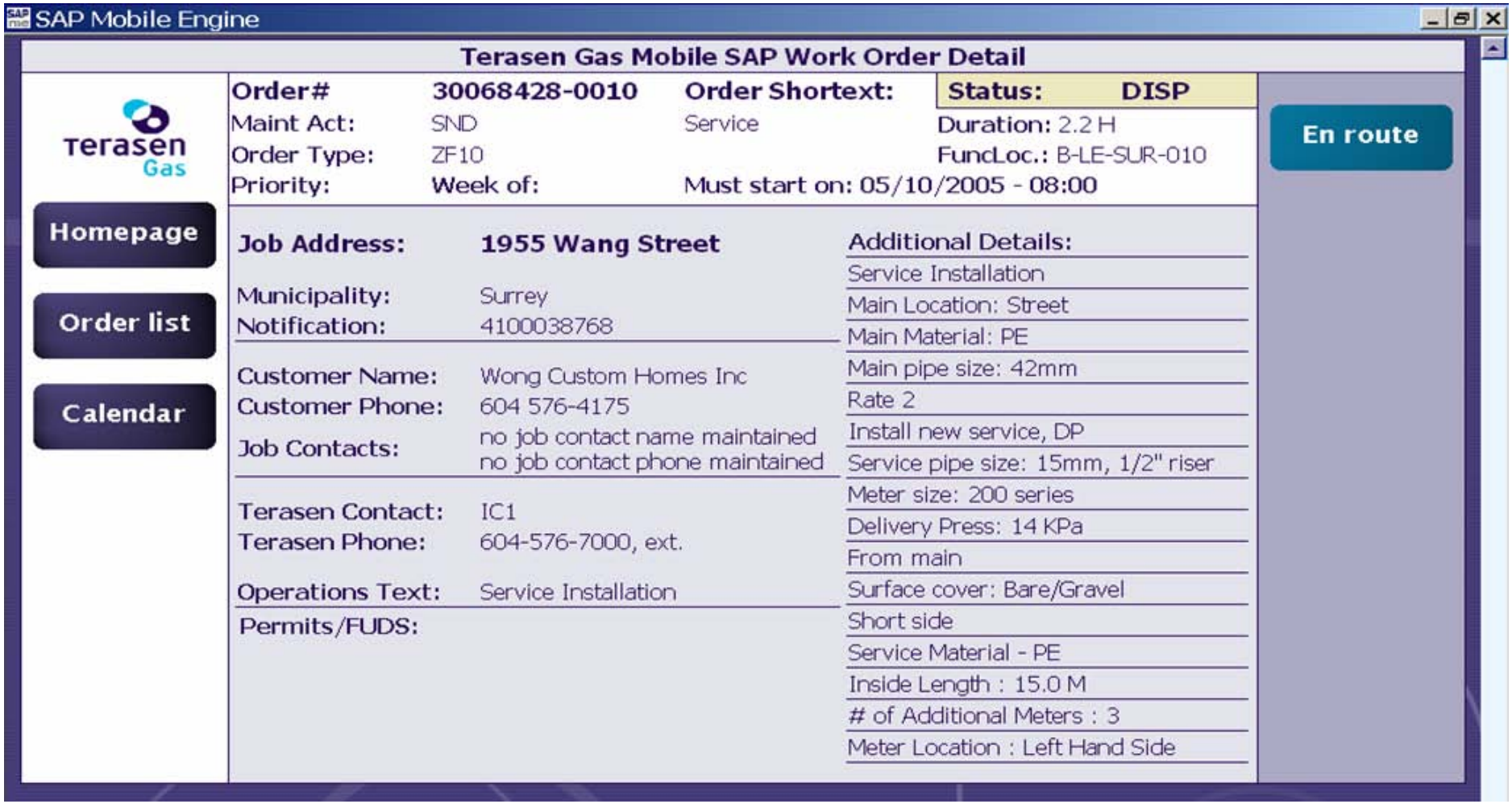


Figure 4: Current SAP MAM Long Text Display

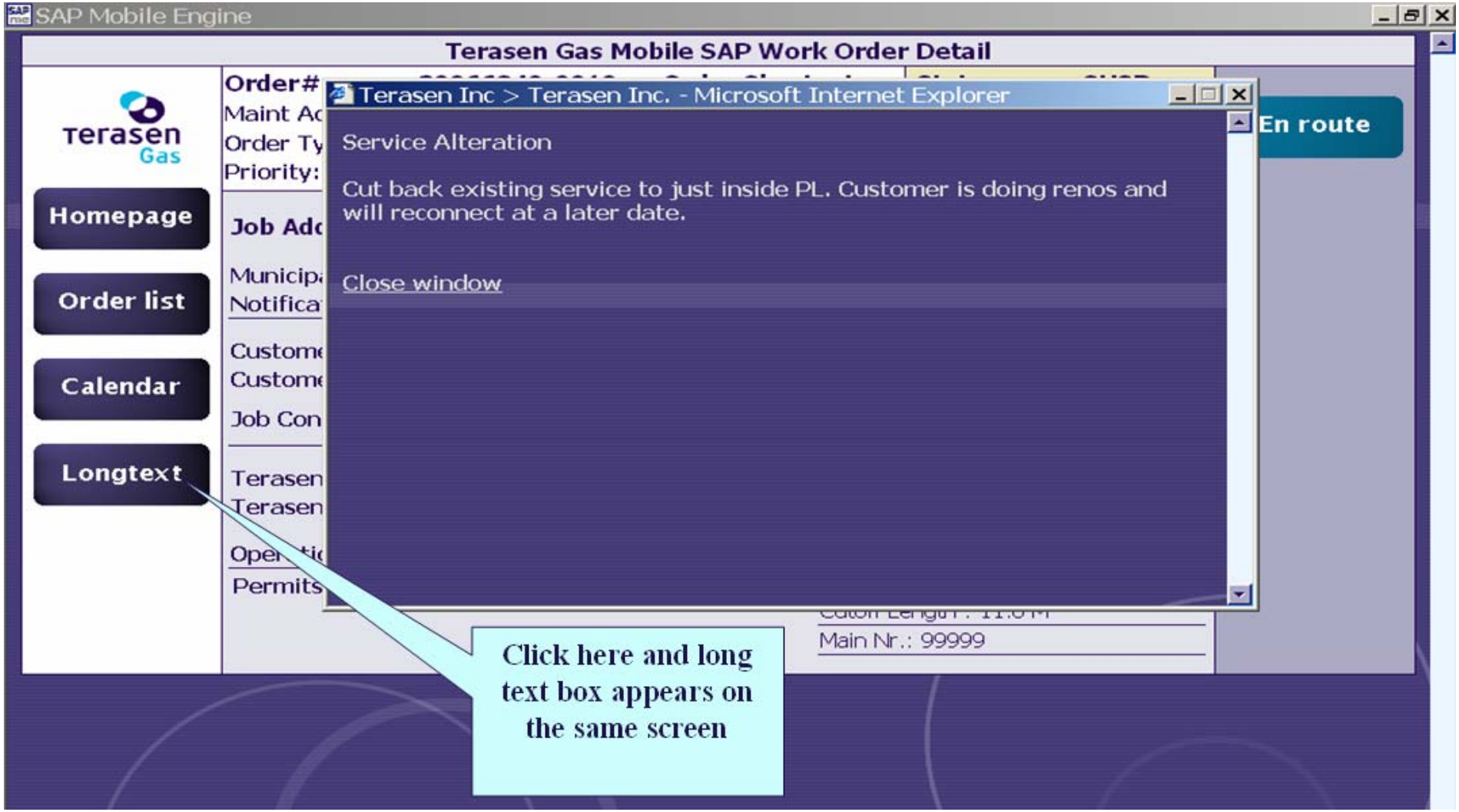


Figure 5: Current SAP MAM Dependency Display

Figure 6: Current SAP MAM Order in ENRT Status

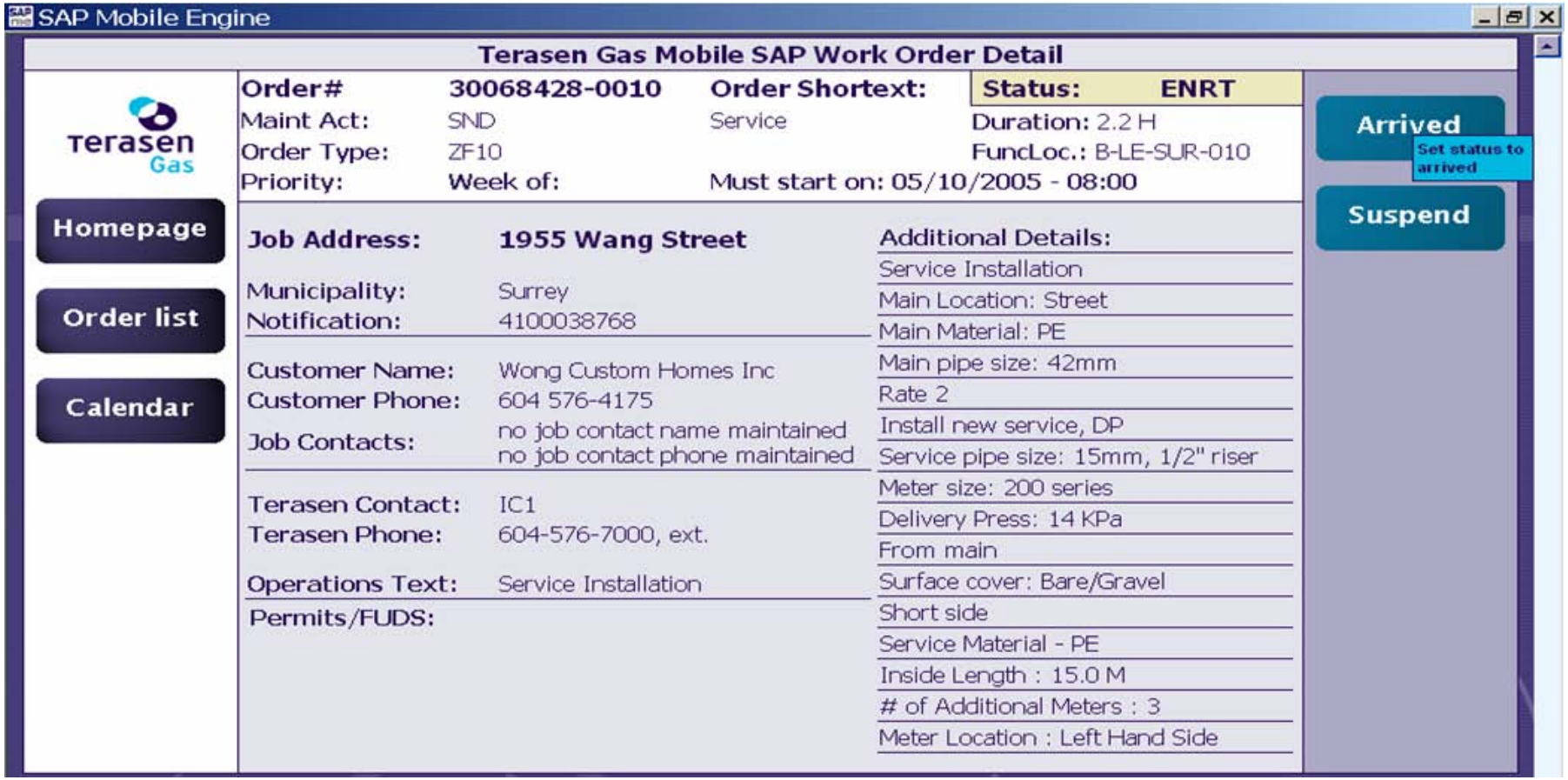


Figure 7: Current SAP MAM Order in ARRV Status

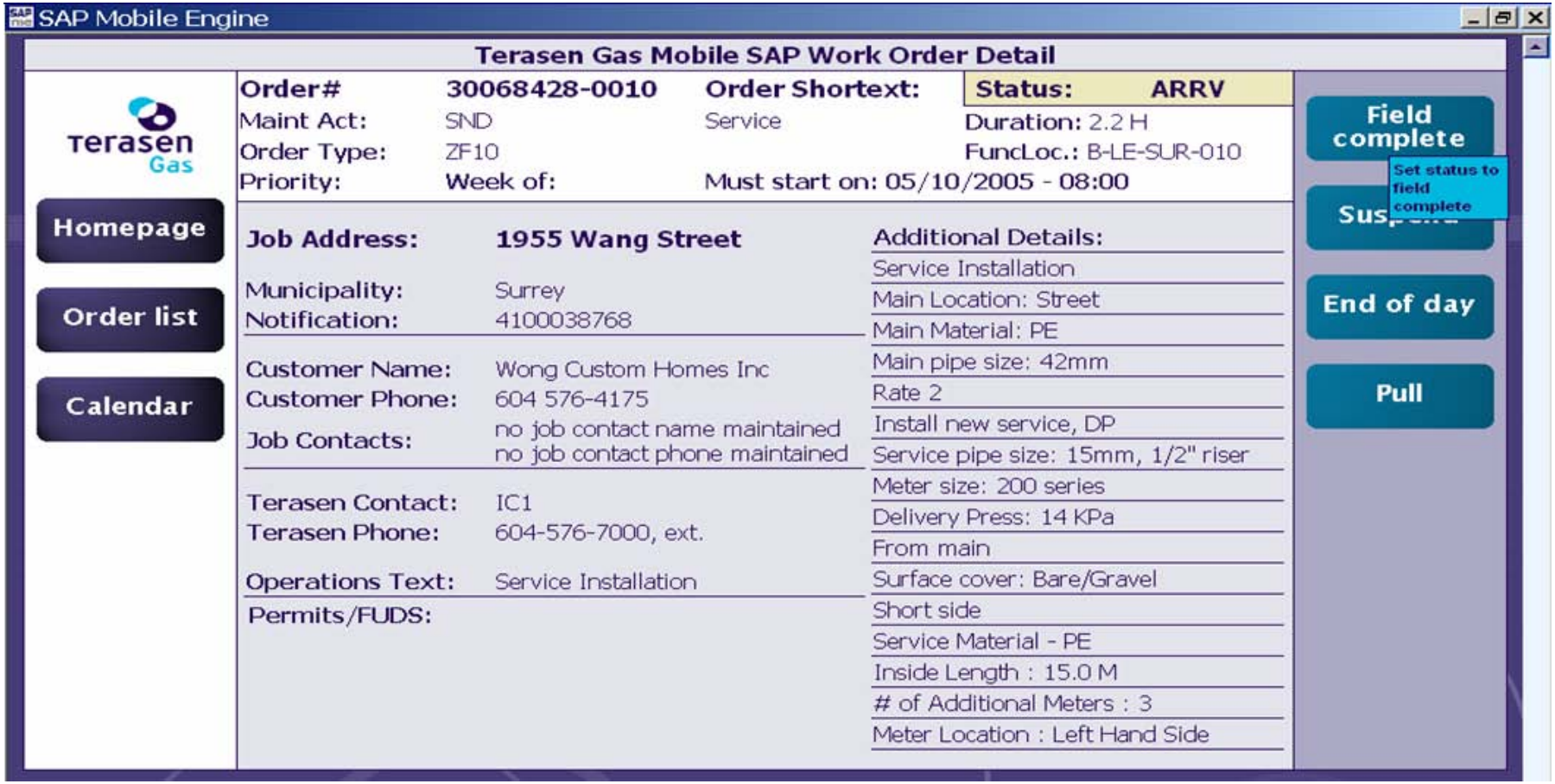


Figure 8: Current SAP MAM Date Selection Screen

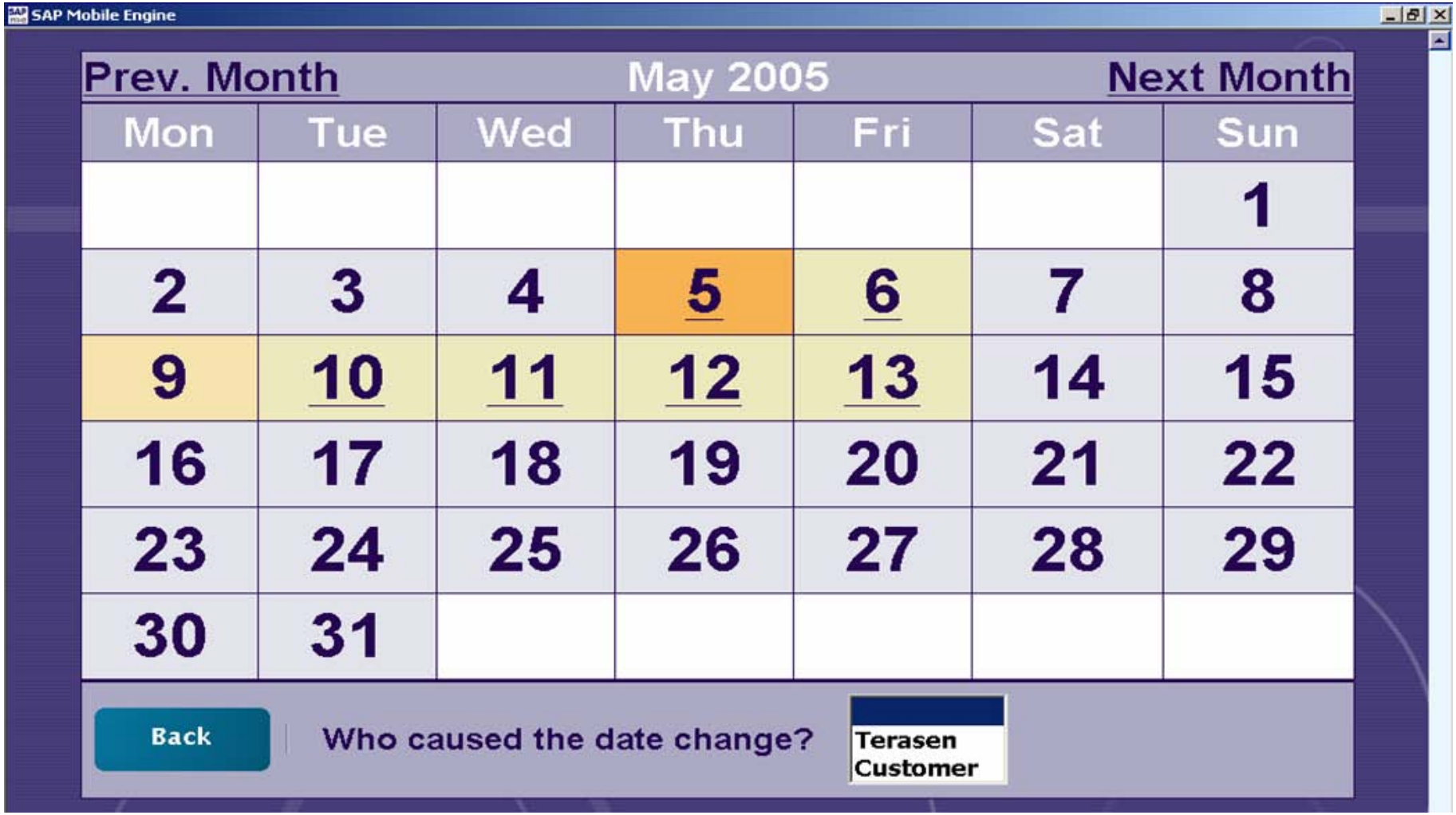


Figure 9: Current SAP MAM Calendar Display of Work

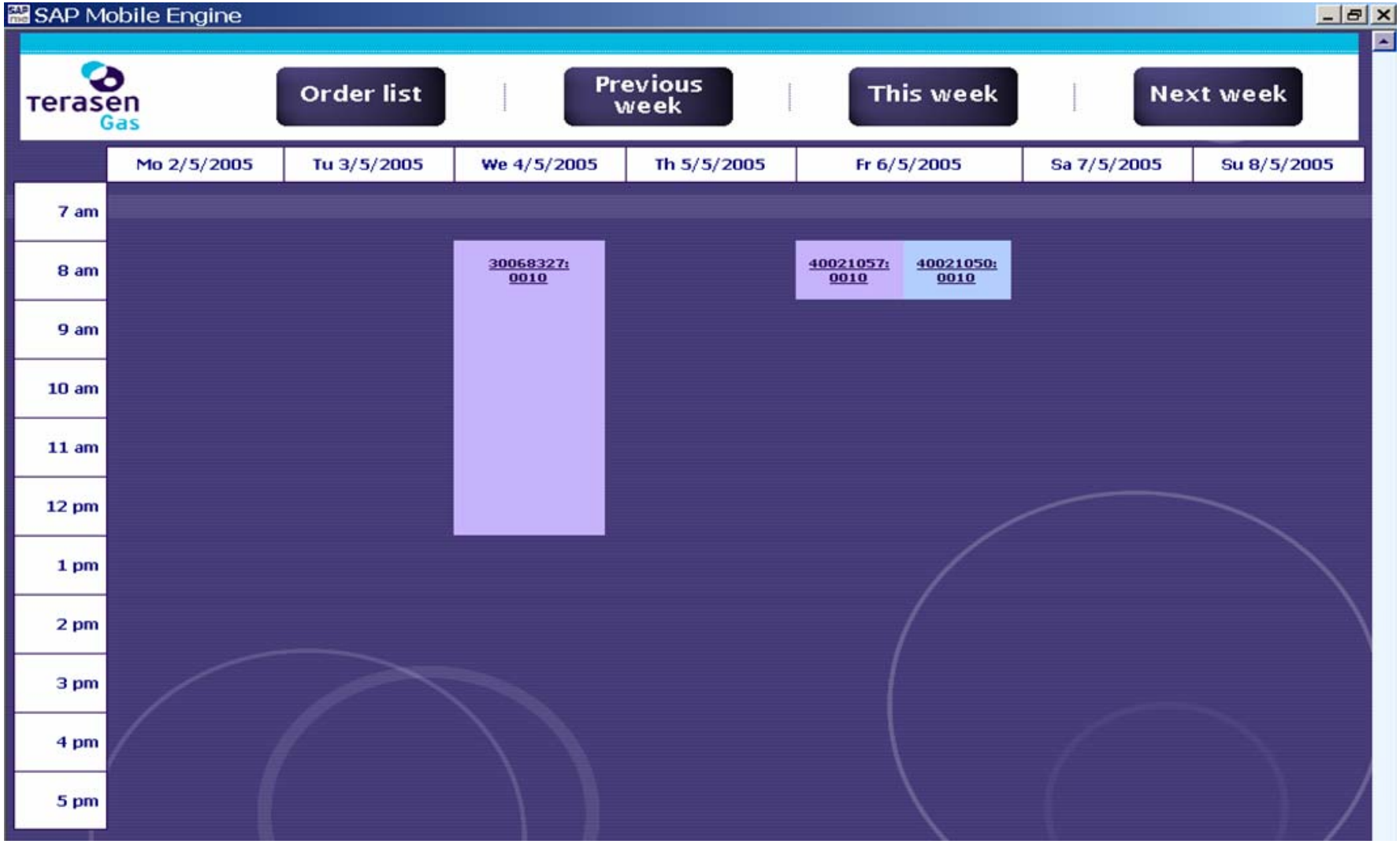


Figure 10: Current SAP MAM Suspended Job Reason Code Selection

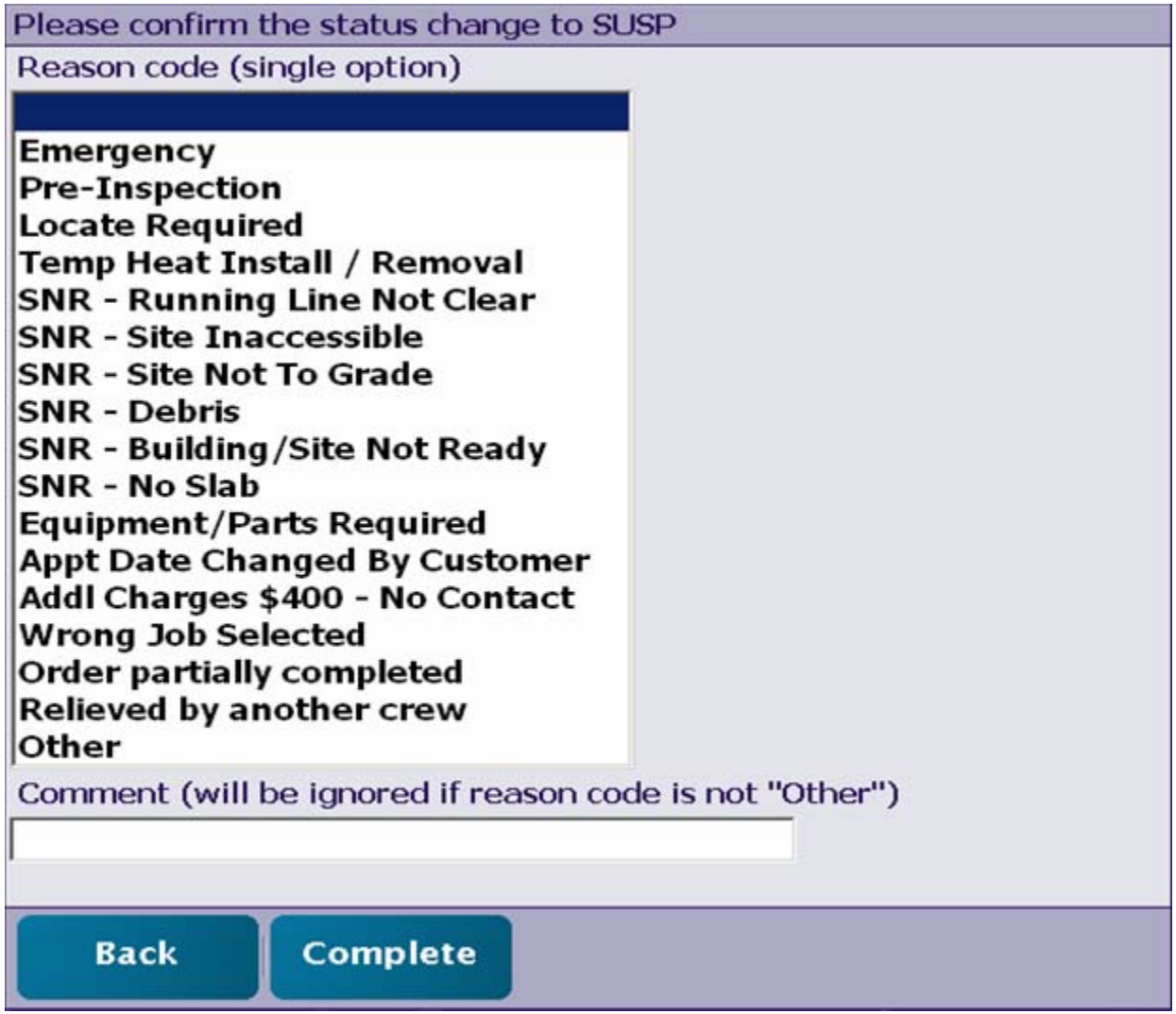


Figure 11: Current SAP MAM Pulled Job Reason Code Selection

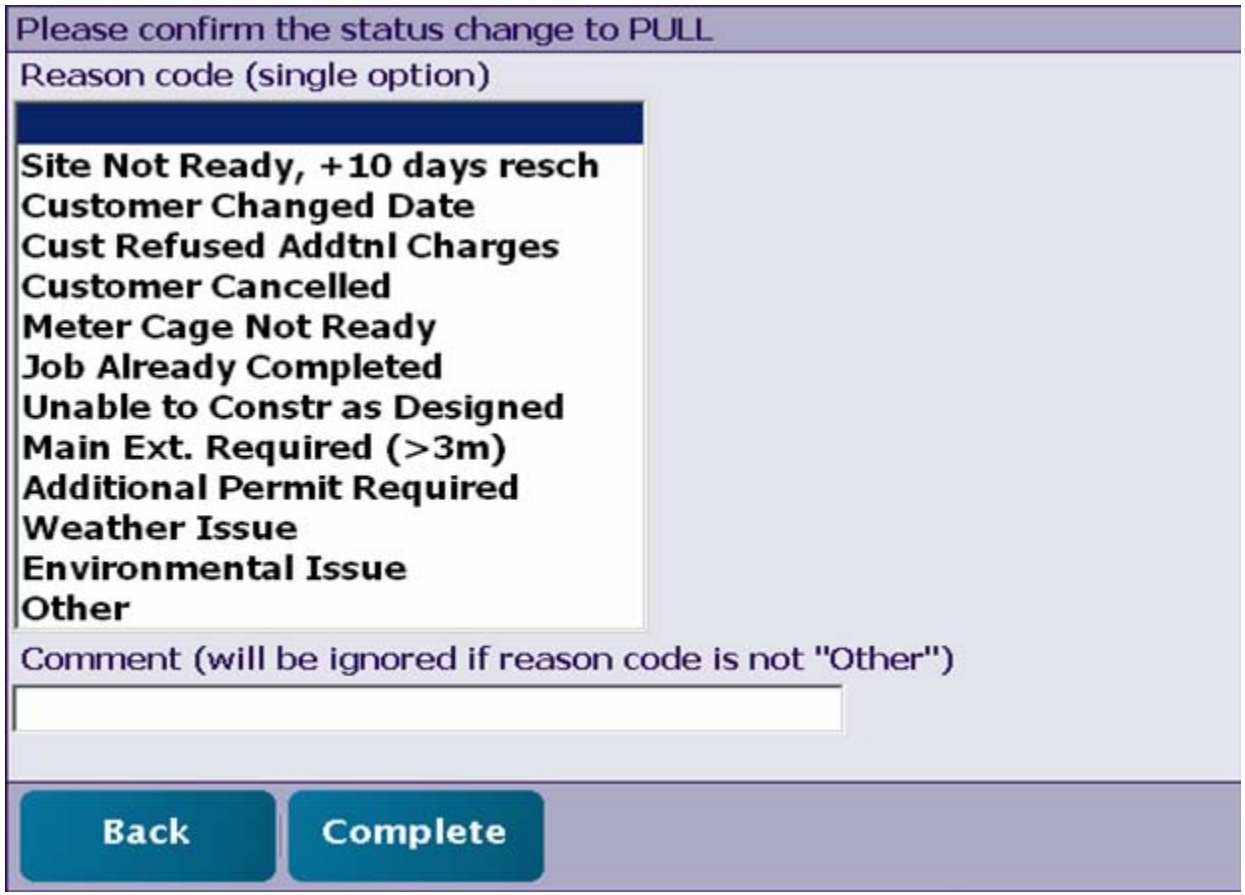


Figure 12: Current SAP MAM End-of-Day Status Screen

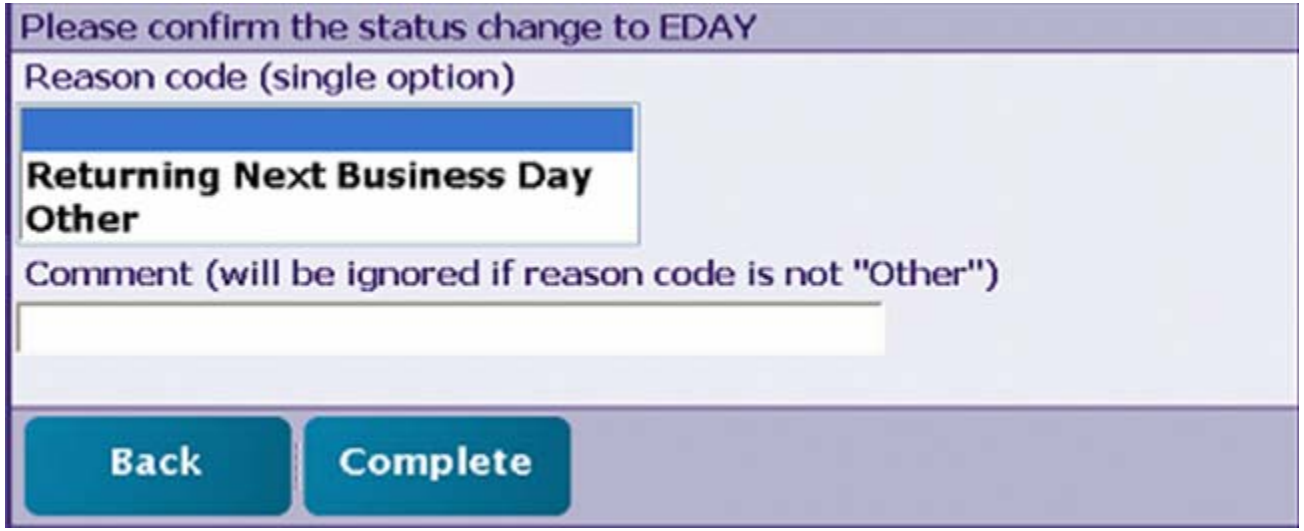


Figure 13: Current SAP MAM Completion Delay Code Selection Screen

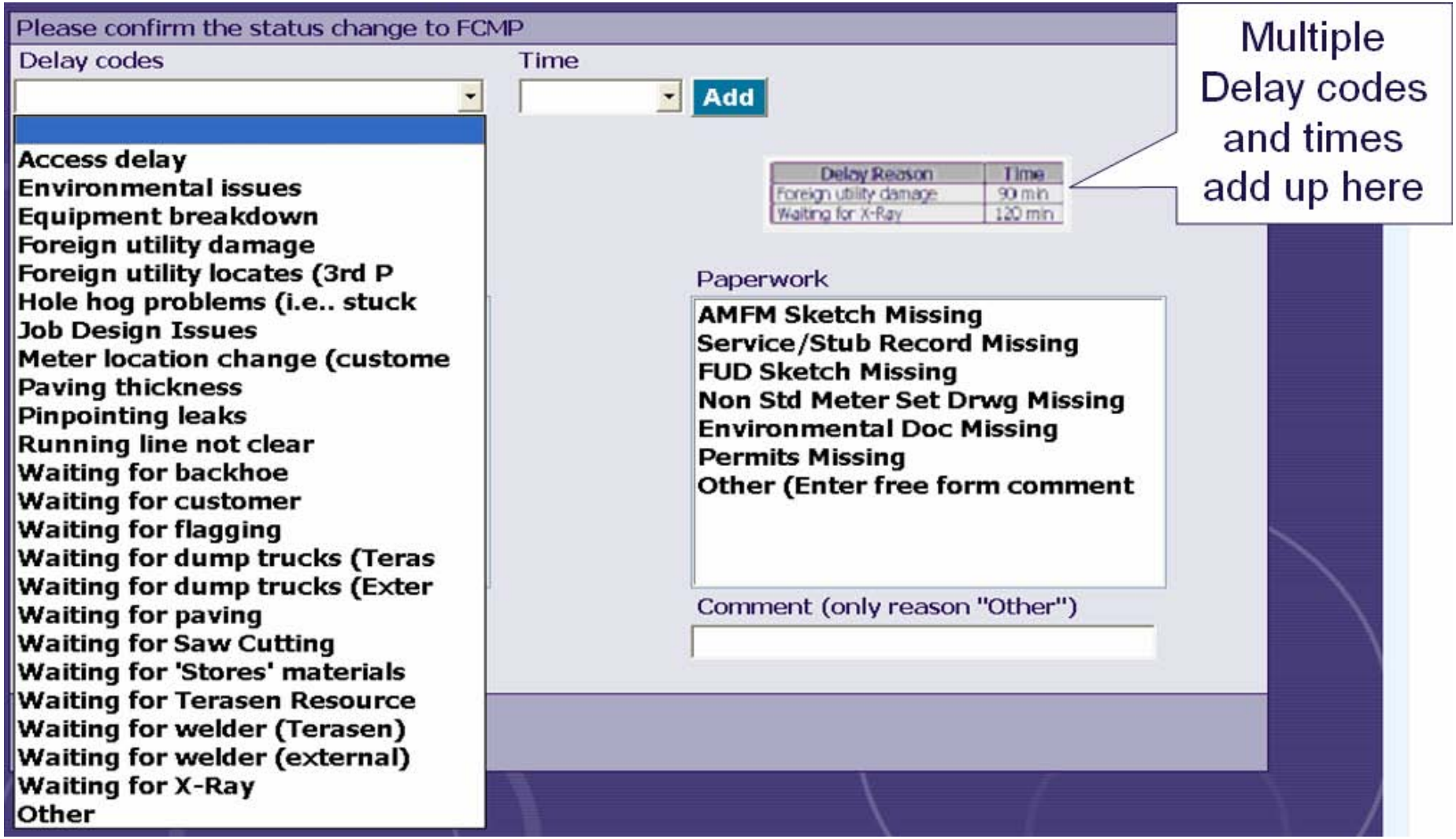


Figure 14: Current SAP MAM Completion Screen

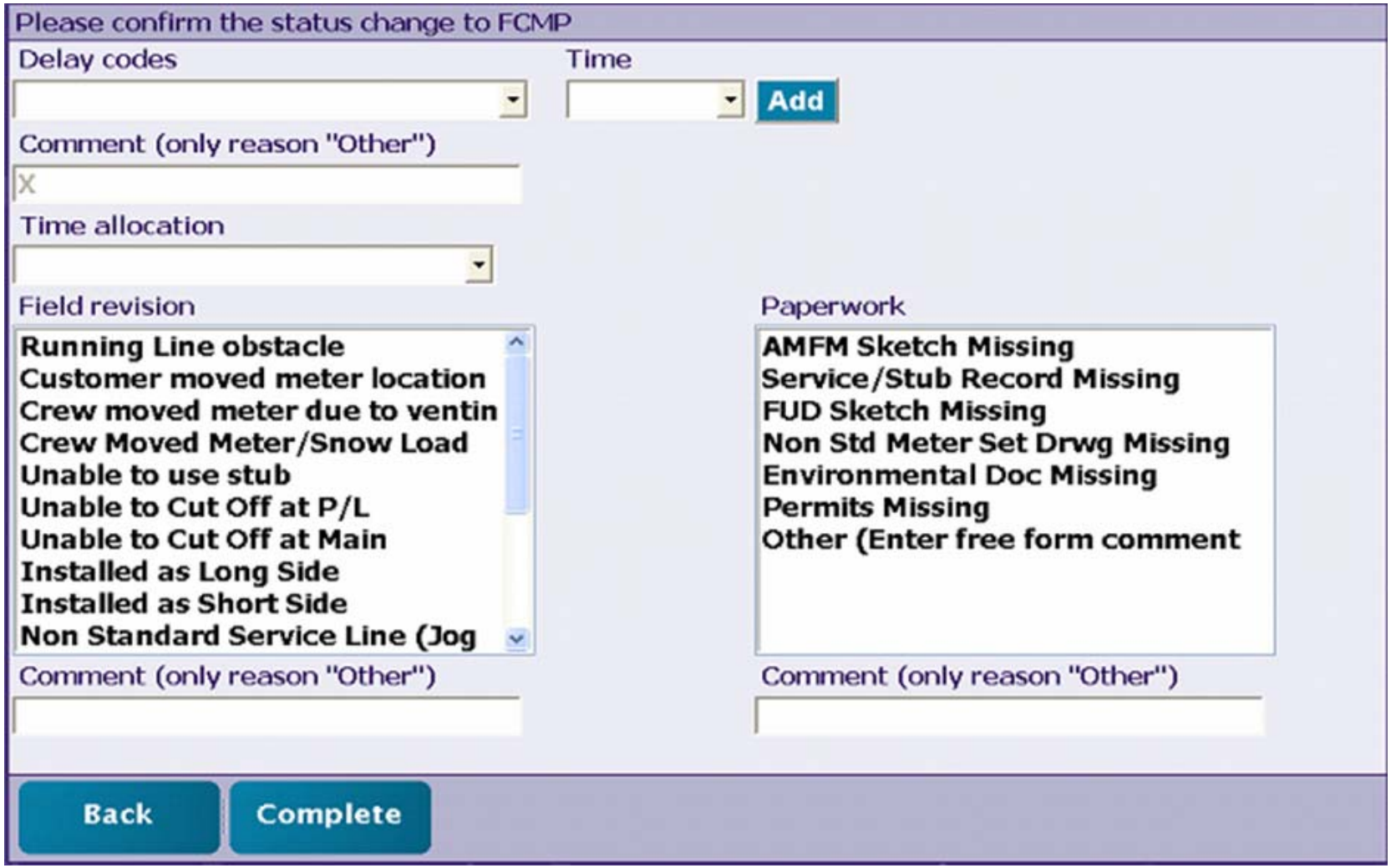


Figure 15: SAP R3 Technical Object Hierarchy Display – Regulator Station Example

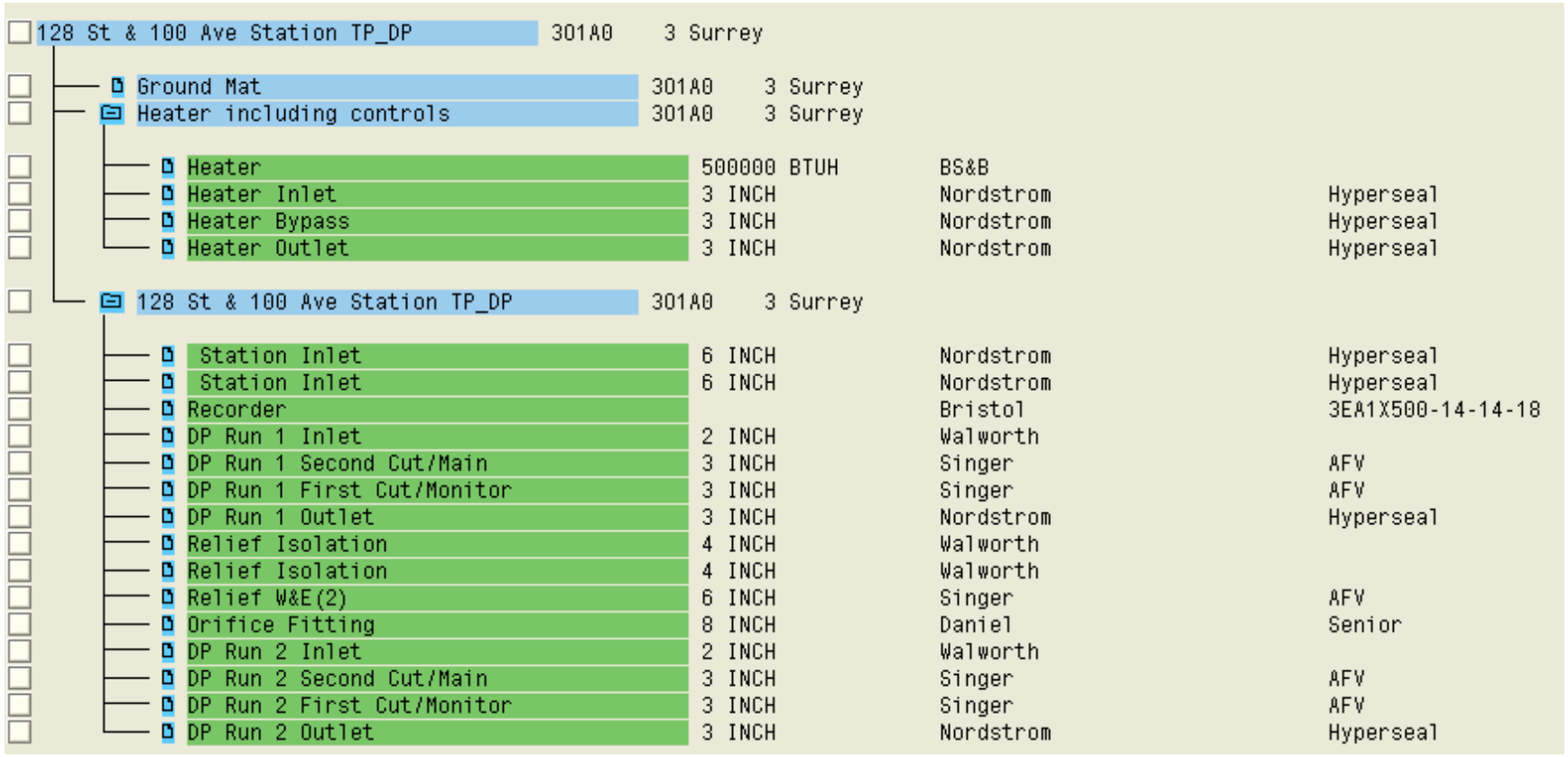


Figure 16: Current Mobile UP Gas Leak Completion Screen

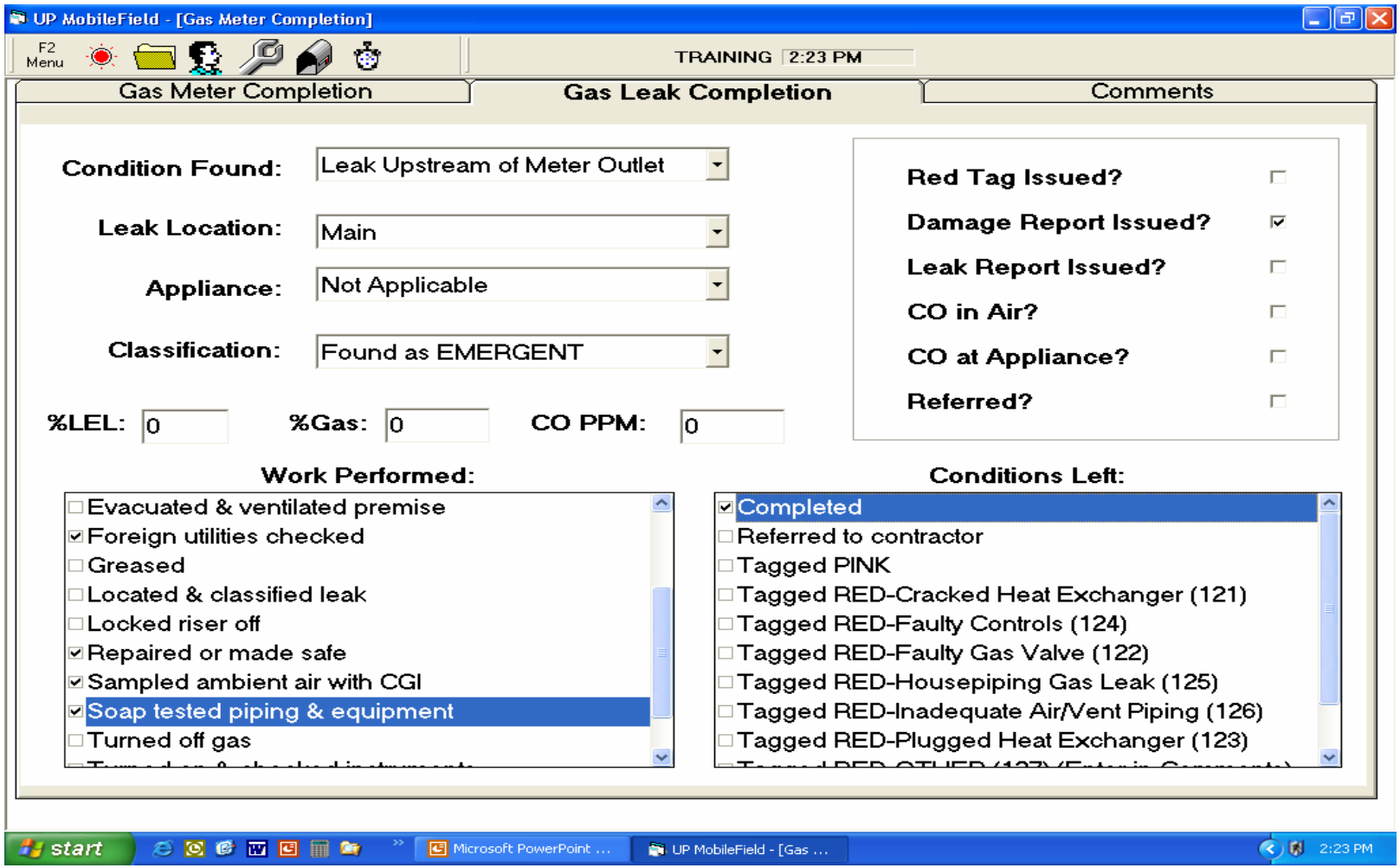


Figure 17: System Damage Report

BCGas
Naturally Resourceful.

SYSTEM DAMAGE REPORT

Location | Job Number | Reported By

Municipality | Date (Yr/Mth/Day) | Telephone No.

Emergency Questions

BC One Call Ticket # | Type: ☐ Main ☐ Station ☐ Meter (Provide Meter No.) ☐ Service ☐ Pipeline | Material: ☐ Steel ☐ Plastic | Pipe Size: ____ mm | Pressure: ☐ LP ☐ IP ☐ DP ☐ TP

Gas Blowing: ☐ Clear ☐ Underground | On Site: ☐ Fire Dept ☐ Ambulance ☐ Prov. Gas Inspector ☐ WCB ☐ Police ☐ News Media ☐ Fire Commissioner ☐ Other | Service Standard: ☐ No ☐ Yes

Was Location Information Requested: ☐ No ☐ Yes | Hand Located: ☐ No ☐ Yes | Uncontrolled Release of Gas: ☐ No ☐ Yes If Yes, for how long? | Further Work Required: ☐ No ☐ Yes

Method of Control of Escaping Gas

☐ Remote Squeeze ☐ Stopple Equipment ☐ Other (Explain)
☐ 3rd Party Control ☐ Low Press. System Entered Gas Envelope ☐ No ☐ Yes If "Yes" explain (refer to Decision Tree Logic OHS 03-15)
☐ Valve(s)

Estimate Size of Hole/Fracture in Pipe: X mm | Depth of Pipe at Time of Incident: mm

Pavement Repairs Required: ☐ No ☐ Yes | Average Thickness of Pavement: mm | Area of Pavement: (m^2) | Photographs: ☐ No ☐ Yes | Taken By

Witness Name | Telephone No.

Address

Describe Emergency

Damager

☐ Contractor ☐ City/District ☐ Operator ☐ Unknown
☐ Utility ☐ Public
☐ Homeowner ☐ Other (Specify)

Name | Address | Town/City | Telephone No.

Equipment or Vehicle Licence Number | Equipment Type/Model/Fleet No.

Signature (Damager)

Charged To

Name | Company Name (If Applicable) | Address | Town/City | Postal Code | Telephone No.

Signature (Party to be Charged)

Cost to be Charged: ☐ Nil ☐ All ☐ Partial % | Reviewed By (Signature) | Date (Yr/Mth/Day)

Initial Upon Completion

CIS Keyed
WMS Field Complete Date Keyed
WMS Data Entry Complete Keyed

Customer Service (Signature) Date (Yr/Mth/Day)
Crew Leader (Signature) Date (Yr/Mth/Day)
Supervisor Attending (Signature) Date (Yr/Mth/Day)

1564 Rev 03/06

Describe Work Or Repair On This Job (include the type of pipe used)

Sketch Main(s) & Service(s) Indicating Damage

N

Contract Services (Not M&S Contractor)

Backhoe/Equipment: No. X Hrs. | Flag Persons: No. X Hrs. | Other: No. X Hrs.

Test Method

Pressure | Duration

☐ Air ☐ Nitrogen ☐ Hydrostatic
☐ Soap Test ☐ Test Chart ☐ Other
☐ Radiograph (X-Ray) ☐ FI ☐ CGI

Test Instrument Serial No.

Names of All BC Gas Employees in Attendance | Comments

Forward original to: **EDS FINANCE**. Retain copy for local file (3 months)

Appendix A

Maintenance Forms

Huntingdon Flow Control Station Operation Check

Terasen Gas

FID No.	Order No.
43030	

Regulators	Yes	No		Yes	No
Change Control to Standby Station	☐	☐	Checked Manual Pneumatic Control Station 1	☐	☐
Change Over OK	☐	☐	Checked Manual Pneumatic Control Station 2	☐	☐
Standby Odour Pump Checked	☐	☐			

Station No. 1

Stroke Regulators

I/P Signal At:	Start	50%	100%
Run 1			
Run 2			
Run 3			

Monitor Settings

Test Pressure At:	Start	50%	Closed	
Run 1				625psi ± 5psi
Run 2				
Run 3				

Reverse Flow System Tested ☐ Yes ☐ No

Power Gas Systems

Filters Checked ☐ Yes ☐ No

Monitors - Panel A

700 kPa (1) _____ (2) _____ Mon (1) _____ (2) _____

Regulators - Panel B

700 kPa (1) _____ (2) _____ Mon (1) _____ (2) _____

140 kPa (1) _____ (2) _____ Rel (1) _____ (2) _____

Generator Supply

Regulator Setting _____

Station No. 2

Stroke Regulators

I/P Signal At:	Start	50%	100%
Run 1			
Run 2			
Run 3			

Monitor Settings

Test Pressure At:	Start	50%	100%
Run 1			
Run 2			
Run 3			

Reverse Flow System Tested ☐ Yes ☐ No

Power Gas Systems

Monitors - Panel A

700 kPa (1) _____ (2) _____ Mon (1) _____ (2) _____

700 kPa (1) _____ (2) _____ Mon (1) _____ (2) _____

140 kPa (1) _____ (2) _____ Rel (1) _____ (2) _____

Odorant Building

Odour Supply Panel

Filters Checked ☐ Yes ☐ No Heaters ☐ Yes ☐ No

420 kPa (1) _____ (2) _____ Rel _____

Power Gas Systems

Transfer Panel Supply Rel _____

Import System Supply (1) _____ 700kPa (2) _____ 690kPa Rel _____

210 kPa Supply (1) _____ (2) _____ Rel _____

85 kPa Supply (1) _____ (2) _____ Rel _____

Import - Export Valve Actuators

Cycle Export Valve Checked ☐ Yes ☐ No

Cycle Import Valve Checked ☐ Yes ☐ No

General Station Conditions

Piping O.K. ☐ Yes ☐ No Specify _____

Valves O.K. ☐ Yes ☐ No Specify _____

Locks O.K. ☐ Yes ☐ No Specify _____

Fencing O.K. ☐ Yes ☐ No Specify _____

Lighting O.K. ☐ Yes ☐ No Specify _____

Fire Equipment O.K. ☐ Yes ☐ No Specify _____

Remarks

Station Mechanic | Inspection Date (Y/M/D) | Supervisor

Gate Station: Annual Maintenance BSB Fire Tube Boiler

Date (Yr/Mth/Day)	SAP Order No.	Station Name	Station Address	Boiler Number	Clock Input

Annual Maintenance For Meter Set If Required – Confirm All Control Limits

☐ LWC		☐ Flow Switch		☐ Other Limits	
☐ Main Burner Pressure		☐ Pilot Pressure			
☐ Temperature Operator		☐ High Limit			
☐ Pilot Flame Signal		☐ Main Burner Flame Signal			
☐ Perform Pilot Turn Down Test					

General Inspection

- ☐ Inspect Flame Rods and Leads
- ☐ Check Spark Ignitor & Gap
- ☐ Remove, Inspect & Clean Burner Components
- ☐ Check Operation of Modulating Firing Unit
- ☐ Remove & Clean Flash Arrestor
- ☐ Remove Stack Inspection Plate & Stack & Fire Tube
- ☐ Check Water Level
- ☐ Water Treatment Performed By Pressure Control

Efficiency Test

	On Arrival	On Departure
Net Stack Temperature		
CO		
O_2		
CO_2		

Efficiency Remarks and Recommendations

To report follow on work or repairs complete Stations Maintenance Form (2277). Return completed forms to PM Maint mail box

Gate Station: Annual Maintenance Atmospheric Boiler Inspection

Date (Yr/Mth/Day)	SAP Order No.	Station Name	Station Address	Boiler Number	Clock Input

Annual Maintenance For Meter Set If Required – Confirm All Control Limits

Temperature Control _____ High Limit _____ Low Water Cutoff ☐ Yes ☐ No Flow Switch ☐ Yes ☐ No

Other Limits _____

☐ Check Reading of Thermopile or Thermocouples _____

Open _____ Closed _____

☐ Check Operation Of Pilot Safety Relays _____

Open _____ Closed _____

☐ Test For Gas Tight Close Off of Operating Valves on Gas Train _____

Open _____ Closed _____

☐ Pressure Differential Across Pumps

Inlet _____ Outlet _____

Inlet _____ Outlet _____

☐ Water Pressure _____

☐ Check T&P Relief _____

☐ Compression Tanks _____

☐ Check Compression Tanks _____

☐ Water Treatment Performed By _____

☐ Pressure Control Pumps Lubricated By _____

☐ Check General Condition of Burners - Clean if Dirty

☐ Check General Condition of Boiler
- Looking for Hot Spots or Signs of Corrosion

Efficiency Test

	On Arrival	On Departure
Net Stack Temperature		
CO		
O_2		
CO_2		

Efficiency Remarks and Recommendations

To report follow on work or repairs complete Stations Maintenance Form (2277). Return completed forms to PM Maint mail box

PFM/Inches Maintenance

Terasen Gas

Technician	Employee number	Phone number	Date (Yr/Mth/Day)

PM order	SAP Equipment number	Facility functional location	Facility name or address

Follow on work required?	Priority	AMR Number	PFM Number	Meter Number

Meter Reading	

Note: This form must be completed and forwarded to the PM Maint Mail box within 7 calendar days of completion of the work.

Measurement Readings

Set Inlet Pressure – As Found _____ kPa
Set Outlet Pressure – As Found _____ kPa
Set Outlet Pressure – As Left _____ kPa

Main Lockup Press As found _____ kPa
Main Lockup Press As Left _____ kPa
Monitor Lockup Press As found _____ kPa
Monitor Lockup Press As Left _____ kPa

Internal Mon. Reg. to Monitor As Found _____
Internal Mon. Reg. to Monitor As Left _____

Regulator Internal Relief Activated _____
Relief Valve Set Point As Found _____ kPa
Relief Valve Set Point As Left _____ kPa
Security Operation OK _____

First Cut Lockup Press As Found _____ kPa
First Cut Lockup Press As Left _____ kPa
First Cut OPP Set Point As Found _____ kPa
First Cut OPP Set Point As Left _____ kPa

Notifications - Click button to open Notification Entry form

(•) **Repair**
( ) Follow on

☐ Break Down

Comment

Equipment Type	Function	Object	Failure	Cause	Activity

(•) **Repair**
( ) Follow on

☐ **Break Down**

Comment

Equipment Type	Function	Object	Failure	Cause	Activity

Meter Exchange

	Meter Number	Dial Reading	No. of Dials	Seal Year	Serial Number	Reason for Change
Installed						
Removed						

Permits Required

Identify any permits or special requirements to do this job		

INSTRUMENT DRIVE MAINTENANCE

Technician	Employee number	Phone number	Date (Yr/Mth/Day)

PM order	SAP Equipment number	Facility functional location	Facility name or address

Follow on work required?	Priority	AMR Number	EVC number	Meter number

Note: This form must be completed and forwarded to the PM Maint Mail box within 7 calendar days of completion of the work.

Counter Readings

	Hardware	Software
Corrected As Found (S/W: 38)		
Uncorrected As Found (S/W: 37)		
Corrected As Left (S/W: 38)		
Uncorrected As Left (S/W: 37)		

Instrument Error Check

Line Pressure (S/W: 00) ____ PSIA
Line Pressure Calibrator ____ PSIA

Line Temperature (S/W: 01) ____ Deg F
Line Temp Calibrator ____ Deg F

Time As Found ____
Time As Left ____
Date As Found ____
Date As Left ____

Pressure Factor Error 0.00%
Temperature Factor Error 0.00%
Overall Error 0.00%

Note to Tech: The instrument and calibrator pressures and temperatures must be entered psi absolute and degrees Fahrenheit. Replace the instrument if any of the above errors are greater than ± 2.00%.

Regulators

Set Outlet Pressure As Found ____ kPa
Set Outlet Pressure As Left ____ kPa

Run 1 Main Reg Lockup Press As Found ____ kPa
Run 1 Main Reg Lockup Press As Left ____ kPa
Run 1 Mon Reg Lockup Press As Found ____ kPa
Run 1 Mon Reg Lockup Press As Left ____ kPa

Run 1 Relief Valve Set Point As Found ____ kPa
Run 1 Relief Valve Set Point As Left ____ kPa

Run 2 Main Reg Lockup Press As Found ____ kPa
Run 2 Main Reg Lockup Press As Left ____ kPa
Run 2 Mon Reg Lockup Press As Found ____ kPa
Run 2 Mon Reg Lockup Press As Left ____ kPa

Run 2 Relief Valve Set Point As Found ____ kPa
Run 2 Relief Valve Set Point As Left ____ kPa

Turbine Meter

Spin Time (Main Rotor) As Found ____ Sec
Spin Time (Main Rotor) As Left ____ Sec

Sense Rotor Factor ____
Main Rotor Factor ____
A Bar ____

Spin Time (Sense Rotor) As Found ____ Sec
Spin Time (Sense Rotor) As Left ____ Sec

Test Flow Rate ____
Test Pressure ____
Deviation As Found ____
Deviation As Left ____

PM order	SAP Equipment number	Facility functional location	Facility name or address

Notifications - Click button to open Notification Entry Form.

◉ Repair ○ Follow on ☐ Break Down	Comment

Equipment Type	Function	Object	Failure	Cause	Activity

◉ Repair ○ Follow on ☐ Break Down	Comment

Equipment Type	Function	Object	Failure	Cause	Activity

Meter Exchange

	Meter Number	Serial Number	Reason for Change
Installed			
Removed			

Instrument Exchange

Installed

Inst Number	Serial Number	Seal Year	Drive	Drive Units	

	HW Reading	SW Reading	Number of Dials	Multiplier	
Corrected Counter					
Uncorrected Counter					
Change Plate #					

Removed

Inst Number	Serial Number	Seal Year	Drive	Drive Units	

	HW Reading	SW Reading	Number of Dials	Multiplier	
Corrected Counter					
Uncorrected Counter					
Change Plate #					

Unmetered Gas Turbines Only

Reason for Interruption	Flow Rate	Units	Time (hrs)	Total Volume	Units

Permits Required

Identify any permits or special requirements to do this job		

EQUIPMENT/ASSET CHANGE CONTROL

Technician	Employee number	Phone number	Date (Yr/Mth/Day)

PM order	SAP Equipment number	Facility functional location	Customer/Facility Name

House Number	Street Name	Unit Number	City/Municipality

Postal Code	Meter Location	Facility Type	Skill Set Required

Reason For Change	Drw No.	PFM No.

			Meter Set Material Number
☐ [redacted]	☐ [redacted]	☑ [redacted]	

Note: This form must be completed and forwarded to the PM Maint Mail box within 7 calendar days of completion of the work.

On Site Meter/Instrument Information

	1	2	3	4	5	6	7
Install/Remove							
Terasen Number:							
Device Type:							
Inlet:							
Unit No:							
Inlet Press:							
Delivery Press:							

Equipment Information

	1	2	3	4	5	6	7
Install/Remove							
Function:							
Make:							
Model:							
Serial No:							
Terasen Number:							
Connection:							
Orifice Size:							
Main Spring:							
Pilot Spring:							

Comment

Stations Maintenance

Technician	Employee number	Phone number	Date (Yr/Mth/Day)

PM order	SAP Equipment number	Facility functional location	Facility name or address

Follow on work required?	Priority	Units Of Measure
		☐ Imperial - TGVI ☑ Metric - TGI Distrbution

Note: This form must be completed and forwarded to the PM Maint Mail box within 7 calendar days of completion of the work. Stations with multiple pressure cuts require a maintenance form for each system pressure.

Measurment Readings - Complete and measurement points appropriate for this station

Station Inlet Pressure – As Found _____ kPa
Station Outlet Pressure – As Found _____ kPa
Station Outlet Pressure – As Left _____ kPa

Filter Differential As Found _____ kPa
Filter Differential As Left _____ kPa

Orifice Opening Diameter _____ Inch
Amount of Oil Recoverd _____ liters

CGI Reading On Arrival _____

Heater in Operation _____
Heater Bath Temperature _____ Deg C
Heater Fluid Level – As Found _____
Heater Fluid Level – As Left _____
Heater Pump Working – As Left _____

Day Tank Odourant Level – As Left _____ cm
Odourant Pump Working – As Left _____
Station Security OK _____

All Station Valves Operable _____

Regulator Lock Up and Set Points

	Operating Set Point			Monitor SP			Lock Up	
	As Found	As Left		As Found	As Left		As Found	As Left
Run 1 First Cut/Monitor	kPa	kPa		kPa	kPa			
Run 1 Second Cut/Main	kPa	kPa						
Run 2 First Cut/Monitor	kPa	kPa		kPa	kPa			
Run 2 Second Cut/Main	kPa	kPa						
Run 3 First Cut/Monitor	kPa	kPa		kPa	kPa			
Run 3 Second Cut/Main	kPa	kPa						
Relief 1	kPa	kPa						
Relief 2	kPa	kPa						
Relief 3	kPa	kPa						
Relief 4	kPa	kPa						

	Alarm Set Points	
	As Found	As Left
IP Hi Outlet Pressure	kPa	kPa
IP Low Outlet Pressure	kPa	kPa
DP Hi Outlet Pressure	kPa	kPa
DP Low Outlet Pressure	kPa	kPa
Low Temp	Deg C	Deg C

PM order	SAP Equipment number	Facility functional location	Facility name or address

Notifications - Click button to open Notification Entry form.

(●) **Repair**
( ) Follow on

[ ] Break Down

Comment

Equipment Type	Function	Object	Failure	Cause	Activity

(●) **Repair**
( ) Follow on

[ ] Break Down

Comment

Equipment Type	Function	Object	Failure	Cause	Activity

(●) **Repair**
( ) Follow on

[ ] Break Down

Comment

Equipment Type	Function	Object	Failure	Cause	Activity

Permits Required

Identify any permits or special requirements to do this job		

Heater Fluid Maintenance

Date (Yr/Mth/Day)	SAP Order No.	Heater	Functional Location	Contact

Capacity

litres Imperial Gallons

Glycol (Vol %)

Existing	Required

Make Up Instructions

Drain _____ litres / _____ Imp. gal

Add

_____ litres / _____ Imp. Gal UCARTHERM (50% solution)

_____ litres / _____ Imp. Gal DOWTHERM SR-1 (100%)

_____ litres / _____ Imp. Gal WATER

_____ litres / _____ Imp. Gal INHIBITOR 1216

_____ litres / _____ Imp. Gal INHIBITOR 2213

Comments

Date Completed (Yr/Mth/Day)	Technician Name

Return completed forms to PM Maint mail box

METER SET UPGRADE REQUEST

Save Form

Terasen Gas

Technician	Tech number	Phone number	Date (Yr/Mth/Day)

Facility functional location	SAP equipment number	Facility name or address

Reason for upgrade

Specify no.

- ☐ Security as primary OPP
- ☐ Relief as primary OPP
- ☐ Insufficient relief capacity
- ☐ Corrosion
- ☐ Does not meet PFM requirements
- ☐ Obsolete and unsupported equipment
- ☐ Filtration required (non-diaphragm meter)
- ☐ Unable to perform operational check
- ☐ More than 5 appliances
- ☐ Extension ladder required
- ☐ Meter location change
- ☐ Load change

Priority	Meter type	Meter number	PFM number
☐ Urgent ☐ Routine	☐ Diaphragm ☐ Rotary ☐ Turbine		

Delivery pressure	Load
☐ kPa ☐ psi	☐ M3/hr ☐ scfh

Additional details

Each upgrade will be evaluated against the criteria set out in **CUS 02-02**. Ensure there is sufficient detail supplied in order to evaluate each upgrade request, i.e. if the upgrade is required to replace obsolete equipment list the equipment in the additional details section of the form.

Return this form to: Preventative Maintenance e-mail: PM Maint@terasengas.com

INJECTION ODORIZATION INSPECTION

Technician	Employee number	Phone number	Date (Yr/Mth/Day)

PM order	SAP Equipment number	Facility functional location	Facility name or address

Follow on work required?	Priority	

Note: This form must be completed and forwarded to the PM Maint Mail box within 7 calendar days of completion of the work.

Williams/YZ Odorizor Inspection Check List

(1) Oil Level As Found .....
Oil Level As Left .....
Odorant Tank Level ..... cm
Station Flow Rate 103 M3/Hr kM3/Hr
(2) Injection Ratio mg/m3 ..... mg/m3
Odorant Counter .....
Stroke Setting .....
#Min/25 mm .....
Total kg Injected (YZ) .....

Confirmed Ratio w Gas Control .....

Power Gas Press As Found ..... psig
Power Gas Press As Left (75 PSI) ..... psig

Pump Actuation Press As Found ..... psig
Pump Actuation Press As Left (60 PSI) ..... psig

Bulk Tank Blanket Press As Found ..... psig
Bulk Tank Blanket Press As Left (35 PSI) ..... psig

(3) Bulk Tank Vacuum As Found ..... psig
Bulk Tank Vacuum As Left(-7 PSI) ..... psig

Expansion Tank Press As Found ..... psig
Expansion Tank Press As Left (25 PSI) ..... psig

(4) Battery Voltage (after 30 min) ..... volts
(5) cc per stroke .....

Williams Notes:

(1) Check oil level. Williams DSP requires silicone oil. Wilroy pump requires Mobile SHC-524 or equivalent. Fill to approx. 3/8" below top of oil fill

YZ-NJEX Notes:

(3) If vacuum pressure is -3 psi or greater, investigate the cause of the leak.

(4) For N300 controllers, check the battery by turning off the power supply and noting the battery voltage after 1/2 hour.

(5) Pump displacement reduction along with excessive oil usage indicates a pump diaphragm failure.

Notifications - Click button to open Notification Entry Form.

☉ Repair
○ Follow on

☐ Break Down

Comment

Equipment Type	Function	Object	Failure	Cause	Activity

Viessmann Heater - Checklist

Save Form

Terasen Gas

Technician	Employee number	Phone number	Date (Yr/Mth/Day)

PM order	SAP Equipment number	Facility functional location	Facility name or address

Follow on work required?	Priority	

Note: This form must be completed and forwarded to the PM Maint Mail box within 7 calendar days of completion of the work.

Viessmann Operational Check List

Bioler Gas Pressure Check (Valve PG) As Found		psig	Pressure at outlet is negative when running, pressure should return to zero when bioler cycles off
Bioler Gas Pressure Check (Valve PG) As Left		psig	
Water/Glycol System Pressure As Found		psig	
Water/Glycol System Pressure As Left		psig	12 psi min, 45 psi max
Clock Burner Input As Found		MBTHU	
Burner Condition			
Flame Rod Cleaned/Replaced			
Ignition Electrodes Cleaned/Replaced			
Condensate Drain Clear/Cleaned			
Siphon Trap Clear/Cleaned			
Combution Chamber Cleaned			
Flame Signal		5 micro amps min	
High Temp Limit As Found		Deg C	
High Temp Limit As Left		Deg C	
Low Water Cut Off As Found			
Low Water Cut Off As Left			

Efficiency Test

	As Found	As Left
Stack Temp Deg C		
CO ppm		
O2 %		
CO2 ppm		

PM order	SAP Equipment number	Facility functional location	Facility name or address

Notifications - Click button to Open Notification Entry Form

◉ **Repair** ○ Follow on ☐ **Break Down**	Comment

Equipment Type	Function	Object	Failure	Cause	Activity

Permits Required

Identify any permits or special requirements to do this job		

Cold Weather Technologies - Checklist

Save Form

Terasen Gas

Technician	Employee number	Phone number	Date (Yr/Mth/Day)

PM order	SAP Equipment number	Facility functional location	Facility name or address

Follow on work required?	Priority	

Note: This form must be completed and forwarded to the PM Maint Mail box within 7 calendar days of completion of the work.

Cold Weather Technologies Operational Check List

Second Stage Reg Operation OK As Found _____
Second Stage Reg Operation OK As Left _____

Thermolpile mV Output As Found _____ mV 600 mv open circuit is a good reading
Thermolpile mV Output As Left _____ mV

Burner Condition _____

Flame Arrestor Cell _____

Temperature Control Contacts _____
Discharge Temperature Control Contacts _____
Stack Temperature Control Contacts _____

System Vacuum _____ " Hg -26 "Hg is a good Reading

Fluid Level At Operating Temp _____ Full if halfway or more up the site glass at operating temp
Fluid Color _____

Operating and Safety Controls OK As Found _____
Operating and Safety Controls OK As Left _____

Outlet Temperature _____ Deg C

Note:
To add fluid (Dowtherm 4000) or to pull a vacuum, refer to manufactures instructions.

Efficiency Test

	As Found	As Left
Stack Temp Deg C		
CO ppm		
O2 %		
CO2 ppm		

PM order	SAP Equipment number	Facility functional location	Facility name or address

Notifications - Click button to Open Notification Entry Form

◉ **Repair** ○ Follow on ☐ **Break Down**	Comment

Equipment Type	Function	Object	Failure	Cause	Activity

Permits Required

Identify any permits or special requirements to do this job		

Appendix B

Time Sheet Mock-Up

Appendix "B" - Time Sheet Mock-Up

Daily Timesheet **Status**

1. Activity / Costing

1.1 Working Time (from orders worked)

	Order #	Work type	Travel time	work time	ST/OT	End status	Total Time	Time/unit	Plant units	Target time/unit
Add item	30001234		0:20	1:30	ST	FCMP	1:50	1:50	1	
	30001235		0:15	1:00	ST	FCMP	1:15	0:37	2	
	30001236		0:35	0:45	ST	EDAY	1:20	1:20	1	
	30000999		0:15	1:00	OT	FCMP	1:15	1:15	1	
	Subtotal		1:25	4:15			5:40			

1.2 Nonworking Time (from off-route activities)

	Work type	Start Time	End Time	ST/OT	Total Time
Add item	Meeting - General/Safety	8:21	10:03	ST	1:42
	Vehicle stocking	10:04	10:24	ST	0:20

2. Time for Payroll	Work Time	Idle Time	Total Time	Target time	Current difference
2.1 Straight time	4:25	2:02	6:27	7:30	1:03
2.2 Overtime	1:15	0:00	1:15		
Daily Total			**7:42**		

Populated from elsewhere in application

Editable by end user

Calculated by application / not editable

Appendix "B" - Time Sheet Mock-Up

Comments

Part 3

Form of Quotation

1. PROJECT: **Field Workforce Mobile Solution for Distribution**

CLOSING TIME: 12:00 P.M. (local time) December 8, 2006
Quotations are irrevocable during the Term.

NAME OF BIDDER: _____

ADDRESS: _____

_____

PHONE: _____ FAX _____

GST NUMBER: _____ BCSST NUMBER* : _____

E-Mail: _____

2. FUNCTIONAL REQUIREMENTS DOCUMENT

2.1 The Bidder shall complete the Functional Requirements document including all Appendices thereto as set out in Part 2 of the RFQ and attach it to this Quotation as Appendix 1.

3. DEMONSTRATION SCRIPT

The Bidder shall complete the Demonstration Script attached hereto as Appendix 2.

4. PRICING REQUIREMENTS (GST extra, BCSST included if applicable)

4.1 Costing Summary Template

The Bidder shall complete the Costing Summary Template attached hereto as Appendix 3 in accordance with the instructions set out in Part 2.

---

* In accordance with the British Columbia Social Service Tax ("BCSST") Act, Bidders are required to pay BCSST on materials incorporated into the Work whether the materials are purchased within or outside British Columbia. The Bidder shall remit the BCSST to the British Columbia Minister of Finance. Terasen will not, under any circumstance be responsible for any BCSST not remitted, nor for any interest or penalties imposed on unremitted taxes.

4.2 Currency

All prices shall be quoted in Canadian dollars. Where applicable, prices shall contain all duties and excise taxes.

4.3 Form of Standard Software Licensing Agreement

The Bidder shall attach their Standard Software License Agreement as Appendix 4 of this Quotation.

4.4 All prices must be firm for the duration of the resulting order of this Request for Quotation. Unless otherwise indicated on the face of this form or in a covering letter, any Federal or British Columbia sales taxes applying against the goods covered by this Quotation shall be separate line items and shall **not** be included in the base price.

4.5 The prices quoted shall include all the consideration to be received by the Bidder from Terasen for the Work and shall cover all overhead profit, labour, equipment, vehicles, tools, consumables, and other materials and supplies, and all other costs and expenses incurred by the Bidder in the performance of the Work.

5. The Bidder agrees that all work shall be performed in accordance with the Workers' Compensation Act of the Province of British Columbia; the Contractor's Workers' Compensation Board Registration number is _____ .

6. In the event that Terasen issues any addenda please acknowledge receipt below:

Addendum #	Date Received

In Witness Whereof the Bidder has caused its seal to be affixed at _____ the _____ day of _____, 2006.

The seal of the Bidder was hereunder affixed in the presence of:

_____
Signature

_____

OR

_____
Print name

In Witness Whereof the Bidder has duly executed this Quotation at _____ on the _____ day of _____, 2006.

_____ _____
Signature Witness

_____
Print name

_____
Title

Appendix "1"

Functional Requirements

Appendix "2"

Demonstration Script

Demonstration Script

The following outlines the minimum steps that must be demonstrated by the Bidder. Additional functionality can be demonstrated at the bidder's discretion as long as the overall presentation fits within the prescribed timeframe.

Step	Description	Bidder's Comments	Do not use
1	Simple work order process		
1.1	Raise a PM work order in SAP R3 with two operations, and assigned to a functional location.		
1.2	Assign one of the operations to a technician in SAP R3.		
1.3	Have technician log-in to the mobile device		
1.4	Display the assigned work order operation in a list of assigned order operations.		
1.5	Display the detail information for the assigned work order operation		
1.6	Change the status of the operation on the mobile device		
1.7	Display the operation in SAP R3 to show the updated status		
1.8	Display a log of the messages communicated to and from SAP R3 and the mobile device		

Step	Description	Bidder's Comments	Do not use
1.9	Have the technician complete the order operation by raising a notification and entering object part, failure code, and failure reason data (from SAP R3 catalog code drop-down lists).		
1.10	Display the notification in R3, associated with the dispatched work order and appropriate functional location.		
1.11	Raise another notification on the mobile device to identify a new problem associated with a piece of equipment installed in the original functional location.		
1.12	Display the notification created in SAP R3 associated with the correct piece of equipment.		
2	Display of Technical Object Data		
2.1	Assign the second operation created in step 1.1 to a technician		
2.2	Display the operation on the technician's mobile device		
2.3	Display detailed information about the functional location assigned to the work order		
2.4	Display detailed information		

Step	Description	Bidder's Comments	Do not use
	about a piece of equipment installed in the functional location (but not assigned to the work order).		
2.5	If possible, display a list of functional locations assigned to a work order's "object list" in SAP R3.		
3	Administrative and Support tools		
3.1	Demonstrate the tools available for administering and supporting the application in operation.		
4	Application development tools		
4.1	Demonstrate the delivered tools available for delivery custom application development.		

Appendix “3”
Costing Summary Template

Part 3, Appendix 3											
Costing Summary Template		**Version 1.0**									
		Core Requirements	**Nice-to-have Requirements**	**Future Requirements**	**Rate CDN Dollars / Hr**	**Potential Discount**	**Comments**	**Cost of Core Requirements**	**Cost of Nice-to-have**	**Cost of Future**	**Total Cost**
	Total Calculated Manhours	0	0	0				$0.00	$0.00	$0.00	**$0.00**
	Project Management and QA	0	0	0				$0.00	$0.00	$0.00	**$0.00**
	Project Management fixed hours							$0.00	$0.00	$0.00	**$0.00**
	Project Management variable rate										
	Project Management variable hours	0	0	0				$0.00	$0.00	$0.00	**$0.00**
	QA fixed hours							$0.00	$0.00	$0.00	**$0.00**
	QA variable rate										
	QA variable hours	0	0	0				$0.00	$0.00	$0.00	**$0.00**
	Design, Development, and Testing	0	0	0				$0.00	$0.00	$0.00	**$0.00**
1.0	**General Features**	0	0	0				$0.00	$0.00	$0.00	**$0.00**
1.1	User log-in and password management				0			$0.00	$0.00	$0.00	**$0.00**
1.2	Multi-users per device				0			$0.00	$0.00	$0.00	**$0.00**
1.3	Crew versus Individal log-in				0			$0.00	$0.00	$0.00	**$0.00**
1.4	Log-in and Connectivity Status				0			$0.00	$0.00	$0.00	**$0.00**
1.5	Text messaging and Message of the Day				0			$0.00	$0.00	$0.00	**$0.00**
2.0	**Work List Management**	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
2.1	Work List Display				0			$0.00	$0.00	$0.00	**$0.00**
2.2	"Customer Called" Check Box				0			$0.00	$0.00	$0.00	**$0.00**
2.3	"Paper Received" Check Box				0			$0.00	$0.00	$0.00	**$0.00**
2.4	Free text fields for contractor use				0			$0.00	$0.00	$0.00	**$0.00**
3.0	**Work Processing**	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
3.1	Work Order Operation detail display				0			$0.00	$0.00	$0.00	**$0.00**
3.2	Operation Dependencies				0			$0.00	$0.00	$0.00	**$0.00**
3.3	Status Flow				0			$0.00	$0.00	$0.00	**$0.00**
3.4	Redating of jobs				0			$0.00	$0.00	$0.00	**$0.00**
3.5	Calendar display of work / technician time				0			$0.00	$0.00	$0.00	**$0.00**
3.6	Suspending a job				0			$0.00	$0.00	$0.00	**$0.00**
3.7	Pulling a job				0			$0.00	$0.00	$0.00	**$0.00**
3.8	Setting a job to "End of Day" status				0			$0.00	$0.00	$0.00	**$0.00**
3.9	Dispatching of emergency work				0			$0.00	$0.00	$0.00	**$0.00**

4.0	**Job Field Completion Processing**	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
4.1	Entry of Delay Codes				0			$0.00	$0.00	$0.00	**$0.00**
4.2	Entry of Field Revision Data				0			$0.00	$0.00	$0.00	**$0.00**
4.3	Entry of Missing Paperwork Data				0			$0.00	$0.00	$0.00	**$0.00**
4.4	Triggering of Update message				0			$0.00	$0.00	$0.00	**$0.00**
5.0	**Display and Update of Techncial Objects**	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
5.1	Display and Update of functional location data				0			$0.00	$0.00	$0.00	**$0.00**
5.2	Display of Techncial Object Structure				0			$0.00	$0.00	$0.00	**$0.00**
5.3	Display and Update of equipment data				0			$0.00	$0.00	$0.00	**$0.00**
5.4	Display of meter data				0			$0.00	$0.00	$0.00	**$0.00**
6.0	**Field Data Capture for Construction**	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
6.1	General Field Data Capture for construction requirements				0			$0.00	$0.00	$0.00	**$0.00**
6.2	New service install data capture	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
6.2.1	Service line data capture				0			$0.00	$0.00	$0.00	**$0.00**
6.2.2	Capturing of sketches				0			$0.00	$0.00	$0.00	**$0.00**
6.2.3	Meter installations				0			$0.00	$0.00	$0.00	**$0.00**
6.2.4	Updated pricing information for new services				0			$0.00	$0.00	$0.00	**$0.00**
6.3	New main install data capture	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
6.3.1	Pipe length data capture				0			$0.00	$0.00	$0.00	**$0.00**
6.3.2	Capturing of sketches				0			$0.00	$0.00	$0.00	**$0.00**
6.4	Service alteration data capture	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
6.4.1	Pipe abandoned data capture				0			$0.00	$0.00	$0.00	**$0.00**
6.4.2	Capturing of sketches				0			$0.00	$0.00	$0.00	**$0.00**
6.5	Service abandonment data capture	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
6.5.1	Abandoned pipe data capture				0			$0.00	$0.00	$0.00	**$0.00**
6.5.2	Capturing of sketches				0			$0.00	$0.00	$0.00	**$0.00**
6.5.3	Meter removal data				0			$0.00	$0.00	$0.00	**$0.00**
6.6	Underground leak repair data capture	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
6.6.1	Leak repair data				0			$0.00	$0.00	$0.00	**$0.00**
6.6.2	Capturing of sketches				0			$0.00	$0.00	$0.00	**$0.00**
6.7	Entry of Plant Unit Data				0			$0.00	$0.00	$0.00	**$0.00**
6.8	Capture of contract materials / services used				0			$0.00	$0.00	$0.00	**$0.00**
6.9	Pipeline Coating Report				0			$0.00	$0.00	$0.00	**$0.00**

7.0	**Customer Service Work field data capture**	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
7.1	As Completed data capture				0			$0.00	$0.00	$0.00	**$0.00**
7.2	Job comment data capture				0			$0.00	$0.00	$0.00	**$0.00**
7.3	Red / Pink tagging for equipment				0			$0.00	$0.00	$0.00	**$0.00**
7.4	Gas leak completion data				0			$0.00	$0.00	$0.00	**$0.00**
7.5	Meter Install / Exchange / Read / Remove				0			$0.00	$0.00	$0.00	**$0.00**
7.6	System Damage Report				0			$0.00	$0.00	$0.00	**$0.00**
8.0	**Maintenance work field data capture**	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
8.1	Recording of equipment failure data				0			$0.00	$0.00	$0.00	**$0.00**
8.2	Maintenance Inspection forms				0			$0.00	$0.00	$0.00	**$0.00**
8.3	Equipment / Asset change control				0			$0.00	$0.00	$0.00	**$0.00**
9.0	**Field Work Requests and Display of Other Work**	0	0	0	0			$0.00	$0.00	$0.00	**$0.00**
9.1	Field Work Request				0			$0.00	$0.00	$0.00	**$0.00**
9.2	Display of Historical and Upcoming work				0			$0.00	$0.00	$0.00	**$0.00**
10.0	**"Off route" activities**				0			$0.00	$0.00	$0.00	**$0.00**
11.0	**Mobile Timesheet Application**				0			$0.00	$0.00	$0.00	**$0.00**
12.0	**Working Alone Monitoring**				0			$0.00	$0.00	$0.00	**$0.00**
13.0	**Integration with GIS and Mapping information**				0			$0.00	$0.00	$0.00	**$0.00**
14.0	**Integration with Document Management and Standards**				0			$0.00	$0.00	$0.00	**$0.00**
	Additional Components	0	0	0				$0.00	$0.00	$0.00	**$0.00**
	Additional Component 1	0	0	0				$0.00	$0.00	$0.00	**$0.00**
	Component 1 fixed hours							$0.00	$0.00	$0.00	**$0.00**
	Component 1 variable rate										
	Component 1 variable hours	0	0	0				$0.00	$0.00	$0.00	**$0.00**
	Additional Component 2	0	0	0				$0.00	$0.00	$0.00	**$0.00**
	Component 2 fixed hours							$0.00	$0.00	$0.00	**$0.00**
	Component 2 variable rate										
	Component 2 variable hours	0	0	0				$0.00	$0.00	$0.00	**$0.00**

Appendix “4”

Standard Software Licensing Agreement

Part 4

Form of Agreement

Terasen shall issue the Form of Contract by way of Addendum on or before December 1, 2006.

Addendum Number 1
Dated December 1, 2006
to
Terasen Gas Inc. Request for Quotation Field Workforce Mobile Solution for Distribution

---

This Addendum consists of 4 pages, revises, supersedes and/or clarifies the Request for Quotation noted above.

1. **INCORPORATION INTO REQUEST FOR QUOTATION AND PURCHASE ORDER**

1.1. The Addendum forms part of and shall henceforth be read together with the Request for Quotation and the Purchase Order.

2. **DEFINITIONS AND INTERPRETATIONS**

2.1. All terms used in this Addendum which are defined in the Request for Quotation shall have the meaning assigned by the Request for Quotation unless the context otherwise requires.

2.2. In the event of any inconsistency between the terms of this Addendum and the Request for Quotation or Purchase Order as supplemented or amended in writing from time to time prior to the date hereof, the terms of this Addendum shall prevail. Where the conflict is with the terms of an additional Addendum or amendment entered into after the date hereof, the terms of the later Addendum or amendment shall prevail.

2.3. In this Addendum, all references to the Request for Quotation and the Purchase Order shall be to the Request for Quotation and the Purchase Order, respectively, as amended by written Addendum issued prior to the date of this Addendum.

3. **ADDENDUM REQUEST FOR QUOTATION**

3.1. **PART 1, QUOTATION INSTRUCTIONS TO BIDDERS** shall be amended as follows:

(a) Section 8, Time Line, shall be deleted and replaced with the following:

"8. Timeline

The following table reflects the desired timing of the Field Workforce Mobile Solution for Distribution Project (the "Project") Quotation process.

Key Event	Deadline Date
RFP for solution short-list Issued (Complete)	November 2, 2006
Notice of Intent to Propose (Complete)	November 8, 2006
Close of Proposer Questions (Complete)	November 10, 2006 – 5:00 PM
Close of Proposals (Complete)	November 15, 2006 – 12:00 noon
RFQ for implementation quotation issued (to short-listed Bidders only)	November 24, 2006
Kick-off conference call with Bidders	November 27, 2006 – 10:00 to 11:00 AM
Notice of Intent to Bid	November 29, 2006 – 5:00 PM
Close of Bidder Questions	January 2, 2007 – 5:00 PM
Timeframe for requirements clarification conference call	November 28 to December 1, 2006
Close of Bids for implementation quotations	January 5, 2007 – 12:00 noon
Deadline for booking Presentation and Demonstration date and time	January 5, 2007 – 12:00 noon
Completion of Bidder Presentations	January 10 , 2007 – 12:00 noon

"

(b) Section 10, Presentation and Solution Demonstration, shall be deleted and replaced with the following:

"10. Presentation and Solution Demonstration

Each Bidder is asked to deliver a maximum 3 hour presentation and solution demonstration at Terasen's offices at 16705 Fraser Highway, Surrey, BC. While it Terasen's preference that the presentations be made in person by the Bidders, alternate arrangements, such as web-cast, can be made if necessary.

10.1 The presentations can be scheduled from 9:00 AM to 12:00 Noon, from Monday, January 8, 2007 to Wednesday, January 10, 2007.

10.2 The deadline for scheduling the presentations is Friday, January 5, 2007 at 12:00 Noon.

10.3 The solution demonstration must at a minimum cover the simple scenario outlined in Appendix C.

10.4 A minimum of one hour must be made available at the end of the presentation and demonstration for Terasen to ask questions of the presenters.

10.5 The presentation, at a minimum, must cover the following topics:

(a) overall solution fit;

(b) proposed technical set-up to accommodate the Telus Mobility 1X network;

(c) proposed support model;

(d) project approach;

(e) implementation plan; and

(f) technical and user documentation and training."

(c) Section 11, Delivery of Quotation, shall be deleted and replaced with the following:

"11. Delivery of Quotation

Three (3) paper sets of the Quotations, and one (1) electronic copy in MS Word 2002 and MS Excel 2002, shall be submitted in an envelope addressed to:

Hugh Smith
Business & Information Technology Services
Terasen Gas Inc.
c/o Mailroom
16705 Fraser Highway
Surrey, B.C.
V3S 2X7

indicating Terasen's reference number and delivered up to but not later than 12:00 noon Pacific Time on January 5, 2007.

Quotations delivered after the closing time will not be accepted.

Faxed Quotation will be accepted prior to closing time but must be followed by a written Quotation within two (2) working days. It is the sole responsibility of the Bidder to ensure that faxes have been received by Hugh Smith.

All Quotations including spreadsheets, must be provided in electronic form, as MS Word 2002 and MS Excel 2002."

3.2 Part 4, Form of Agreement

The Form of Agreement shall be issued by the way of a subsequent Addendum.

4. Acknowledgment of receipt of this Addendum in Section 6 of the Bidder's Quotation, Part 3 is mandatory and essential to completing the Bidder's Quotation in accordance with the Quotation Instructions to Bidders.

_____

Hugh Smith
Business & Information Technology Services
Terasen Gas Inc.

Addendum Number 2
Dated December 19, 2006
to
Terasen Gas Inc. Request for Quotation Field Workforce Mobile Solution for Distribution

---

This Addendum consists of one (1) page which revises, supersedes and/or clarifies the Request for Quotation as amended by way of Addendum number 1 dated December 1, 2006 (collectively, the "RFQ") noted above.

1. **INCORPORATION INTO REQUEST FOR QUOTATION AND PURCHASE ORDER**

1.1. The Addendum forms part of and shall henceforth be read together with the RFQ and the Purchase Order.

2. **DEFINITIONS AND INTERPRETATIONS**

2.1. All terms used in this Addendum which are defined in the RFQ shall have the meaning assigned by the RFQ unless the context otherwise requires.

2.2. In the event of any inconsistency between the terms of this Addendum and the RFQ or Purchase Order as supplemented or amended in writing from time to time prior to the date hereof, the terms of this Addendum shall prevail. Where the conflict is with the terms of an additional Addendum or amendment entered into after the date hereof, the terms of the later Addendum or amendment shall prevail.

2.3. In this Addendum, all references to the RFQ and the Purchase Order shall be to the RFQ and the Purchase Order, respectively, as amended by written Addendum issued prior to the date of this Addendum.

3. **ADDENDUM REQUEST FOR QUOTATION**

3.1. **PART 4, FORM OF AGREEMENT** shall be amended as follows:

Part 4, Form of Agreement is attached hereto as Appendix "1".

4. Acknowledgment of receipt of this Addendum in Section 6 of the Bidder's Quotation, Part 3 is mandatory and essential to completing the Bidder's Quotation in accordance with the Quotation Instructions to Bidders.

_____
Hugh Smith
Business & Information Technology Services
Terasen Gas Inc.

TABLE OF CONTENTS

Part 4
Form of Agreement

THIS AGREEMENT (the "Agreement") made as of the ____ day of _____, 2007,

BETWEEN:

TERASEN GAS INC.
16705 Fraser Highway
Surrey, British Columbia
V3S 2X7

(hereinafter referred to as "Terasen")

AND:

(hereinafter referred to as "Contractor")

WHEREAS:

A. Terasen issued a Request for Quotation ("RFQ") for Field Workforce Mobile Solution for Distribution dated November 2006 for the specific services ("Services") which are attached hereto as Schedule "A";

B. The Contractor submitted a quotation attached hereto as Schedule "B" to provide those Services;

NOW THEREFORE in consideration of the respective covenants, agreements, representations and warranties of the parties hereto hereinafter contained and other good and valuable consideration (the receipt and sufficiency or which are hereby authorized by each of the parties), the parties hereto hereby agree as follows:

1. INTERPRETATION

The definitions set out below will apply as relevant to the specific Project Phase.

1.1 Definitions

For the purposes of this Agreement and the Schedules, Attachments, and Appendices attached hereto:

(a) "**Agreement**" shall mean this agreement, attached schedules, appendices and annexes and any written amendments agreed to by the parties;

(b) "**Application**" shall mean a computer software program regardless of format or medium and related Documentation and specifications used to enable identified business processes;

(c) "**Business Day**" shall mean a day other than a Saturday, Sunday, or Terasen Observed Holidays as set out in Schedule "D";

(d) "**Business Hours"** shall mean the core hours of operation of Terasen specifically 8:00 am to 4:30 pm;

(e) "**Confidential Information**" shall mean information of a party which is not generally known other than to the party's employees, vendors and agents, or the disclosure of which would be detrimental to the party. Confidential Information includes, without limitation, (i) Data, (ii) work product owned by a party under this Agreement, (iii) a party's proprietary technology, (iv) a party's internal financial, marketing and other business information and (v) information about a party's employees, customers and suppliers;

(f) "**Contractor's Technology**" shall mean any concepts, inventions, systems, processes, techniques, methodologies, know-how, Data, tools, technology (including Applications in executable code and source code versions), Documentation or any other information or materials, and any expressions of the foregoing, (i) licensed to the Contractor by a third party, (ii) owned by the Contractor prior to the provision of the Services under this Agreement, and (iii) of a generic (non Terasen specific) in nature developed by the Contractor hereunder;

(g) "**Data**" shall mean all information in hard copy or in electronic form which is used in or relates to the performance of Services under this Agreement;

(h) "**Database**" shall mean a collection of electronic Data stored on a Server or Desktop;

(i) "**Documentation**" means operating manuals and other materials relating to any Software, Application(s), or Hardware which assist or supplement Terasen's understanding or use of the Software, Application(s), or Hardware;

(j) "**Effective Date**" shall mean _____;

(k) "**Expedited Arbitration**" shall mean the arbitration of a dispute which requires quick resolution under Clause 17 which shall be carried out in accordance with the following process:

Where a dispute is to be submitted to Expedited Arbitration, one or both of the parties shall, within two (2) Business Days of deciding to submit the dispute to expedited arbitration, appoint a Nominated Arbitrator who shall be assigned the task of finally resolving the dispute between the parties within thirty (30) days from the date of his or her appointment.

In the event the parties cannot agree on the Nominated Arbitrator within two (2) Business Days, the parties shall refer the matter to the National Arbitration Rules of the ADR Institute of Canada Inc., or such other mediation or arbitration centre as may be mutually agreed upon in accordance with the National Arbitration Rules of the ADR Institute of Canada Inc. The arbitration shall:

(i) to the extent possible, and with the necessary modifications as determined by the mediator, be administered in accordance with the the National Arbitration Rules of the ADR Institute of Canada Inc;

(ii) be conducted in Vancouver, British Columbia, Canada; and

(iii) be conducted in English.

(l) "**Fees**", **"Charges**" shall mean fixed prices would be charged by Contractor as set out in Schedule "*C*" attached hereto;

(m) "**Force Majeure**" shall mean acts of God or public enemy, wars (declared or undeclared), revolution, riots, insurrections, civil commotions, labour unrest, fires, floods, slides, epidemics, quarantine restrictions, freight embargoes or power failures, or any event or circumstance which reasonably constitutes a material disabling event or circumstance, which is beyond the reasonable control of a party, which does not arise from the neglect or default of a party and could not have been prevented by reasonable precautions (including, but not to limited to, back up systems) and cannot reasonably be circumvented by the non-performing party through the use of alternate sources, work-around plans or other commercially reasonable means and which results in material delay, interruption or failure by a party in carrying out its duties, covenants or obligations

under this Agreement, but which does not mean or include any delay caused by a party's lack of funds or financial condition;

(n) "**Hardware**" shall mean the physical equipment of computing and computing –directed activities or the physical components of a computer system;

(o) "**ITS**" shall mean the Information Technology Services department of Terasen;

(p) "**Intellectual Property Rights**" shall mean any and all source code, object code, methods, devices, designs, data, techniques, discoveries, inventions, know-how, ideas, processes, trade secrets and other proprietary information, including that which may be the subject of patent, copyright, industrial design, trade-mark or other form of protection;

(q) "**Nominated Arbitrator**" shall mean the arbitrator selected by the parties for the Expedited Arbitration;

(r) "**Observed Holidays**" shall mean the actual dates on which Terasen observes provincial statutory holidays. Statutory holidays observed by Terasen are listed in Schedule "D" attached hereto;

(s) "**Operating Specifications**" shall mean the specifications relating to the operation of an Application as defined in the System technical Documentation user guide, system administration procedures and Database definition Documentation;

(t) "**Scope Change Process**" means the process by which either party may notify the other party of its intention to change the scope of the Project as defined in this Agreement;

(u) "**Services**" shall mean all services to be rendered in accordance with this Agreement and Schedules, attached hereto, as amended from time to time;

(v) "**Software**" shall mean computer programs, regardless of format or medium, and related Terasen Documentation and specifications;

(w) "**System**" shall mean shall mean the collective Licensed Software, Applications and Hardware required to support Terasen's _____. The System must support the Requirements or amended Requirements as amended by Terasen or the Contractor through agreed to Scope Change requests

(x) "**Term**" shall have the meaning ascribed thereto in Clause 3;

1.2 **Headings and Table of Contents**

The division of this Agreement into Sections and Schedules and the insertion of headings and a table of contents are for convenience only and shall not affect the construction or interpretation of this Agreement.

1.3 **Section References**

Unless otherwise specified, references in this Agreement to "Clauses", "Schedules", "Appendices" and "Attachments" are to Clauses of, Schedules to, Appendices to, and Attachments to this Agreement.

1.4 **Statutory References**

Unless otherwise specified, each reference to a statute is deemed to be a reference to that statute and to the regulations made under that statute as amended or re-enacted from time to time.

1.5 **Number and Gender**

Unless otherwise specified, words importing the singular include the plural and vice versa and words importing gender include all genders.

1.6 **Time of Day**

Unless otherwise specified, references to time of day or date mean the local time of day or date in Vancouver, British Columbia.

1.7 **Business Day**

If under this Agreement any payment or calculation is to be made, or any other action is to be taken, on or as of a day which is not a Business Day, the payment or calculation is to be made, or that other action is to be taken, on or as of the next day that is a Business Day.

1.8 **Currency**

All references to amounts of money mean the lawful currency of Canada.

1.9 **Governing Law**

This Agreement and each of the documents contemplated by or delivered under or in connection with this Agreement are governed exclusively by, and are to be enforced, construed and interpreted exclusively in accordance with, the laws of the Province of British Columbia and the laws of Canada applicable in British Columbia which shall be deemed to be the proper law of this Agreement.

1.10 **Severability**

Each provision of this Agreement is severable. If any provision of this Agreement is or becomes illegal, invalid or unenforceable in any jurisdiction, the illegality, invalidity or unenforceability of that provision shall not affect:

(a) the legality, validity, or enforceability of the remaining provisions of this Agreement; or

(b) the legality, validity or enforceability of that provision in any other jurisdiction;

except that if:

(c) on the reasonable construction of this Agreement as a whole, the applicability of the other provisions presumes the validity and enforceability of the particular provision, the other provisions shall be deemed also to be invalid or unenforceable; and

(d) as a result of the determination by a court of competent jurisdiction that any part of this Agreement is unenforceable or invalid and, as a result of this Clause 1.10, the basic intentions of the parties to this Agreement are entirely frustrated the parties shall use all reasonable efforts to amend, supplement or otherwise vary this Agreement to confirm their mutual intention in entering into this Agreement.

1.11 **Schedules**

The following Schedules are annexed hereto and form part of this Agreement and all commitments made under the Agreement are commitments to perform obligations under the Agreement and the Schedules:

Schedule "A" - Statement of Work

Schedule "B" - Fees

Schedule "C" - Project Schedule

Schedule "D" - Terasen Observed Holidays

Schedule "E" - Confidentiality Agreement

Schedule "F" - Project Change Request

2. DRAFTING

Terasen and Contractor each have co-operated in the drafting and preparation of this Agreement. Any construction to be made of this Agreement will not be construed by one party against the other.

3. TERM OF AGREEMENT

The Term of this Agreement shall have retroactive effect to _____ and terminate on _____ unless terminated as set out below.

4. GENERAL PERFORMANCE STANDARDS FOR SERVICES

4.1 Contractor will perform the specific Services at such frequency and duration as described in the Schedules attached hereto to this Agreement in accordance with the standards and warranted performance criteria outlined herein.

4.2 Contractor will provide Services subject of this Agreement in a manner that will not inhibit or impinge on Terasen's ability to carry out its business.

4.3 Contractor will provide Terasen with reports describing the progress of all Services, as specified herein.

5. CONTRACTOR'S RESPONSIBILITIES

5.1 In the performance of Services, Contractor agrees to:

(a) perform all of the Services as defined below and in the Statement of Work attached hereto as Schedule "A";

(b) restrict Contractor's employees and agents from impeding Terasen's business operations to the least extent possible consistent with its obligations to perform the Services;

(c) invoice Terasen according to the terms herein and the specific pricing set out in Schedule "B";

(d) proceed according to Terasen's instructions for the disposition of Terasen's Data and supplies upon the termination of this Agreement;

(e) ensure that Contractor's personnel, agents and approved contractors will implement and run virus prevention and detection control procedures consistent with prudent practices followed by persons experienced in the business;

(f) read and become familiar with all pertinent policies, procedures and standards as set out in the IT Standards and Guidelines and the Maintenance Procedures Manual and agree to comply with same; and

(g) Contractor shall not, during the Term of this Agreement, solicit directly or indirectly, work related to or similar to the Services herein from other client departments of Terasen on behalf of itself or another party except with the prior written approval of the Terasen Manager, except that any such approval shall not be required for Contractor to submit a response to a request for proposal or a request for a quotation.

5.2 Contractor will cooperate with vendors and third party support organizations with whom Terasen has contracted to resolve issues related to the Services provided under this Agreement.

6. TERASEN'S RESPONSIBILITIES

6.1 Terasen agrees to provide a single point of contact for all communications and information relating to this Agreement.

6.2 Terasen agrees:

(a) to perform the identified Terasen obligations as set out herein;

(b) to provide to Contractor, in a timely fashion, all materials of Terasen which are reasonably required by Contractor to provide the Services;

(c) to provide information, management decisions, approvals and acceptances in addition to that specified herein, as Contractor may occasionally and reasonably require to perform the Services;

(d) not to provide administrative support except as may be required to prepare correspondence and/or arrange meetings on Terasen'ss behalf; and

(e) to provide a single point of contact for all communications and information relating to this Agreement. The Terasen manager ("Terasen Manager") will be _____.

7. PERSONNEL

7.1 If Terasen, acting reasonably, is not satisfied with the services of any person transferred to the Terasen account by Contractor, it should provide written reasons to Contractor for its dissatisfaction and request that the person be replaced within three (3) weeks.

7.2 Contractor has assigned certain of its personnel to perform the Services which personnel are identified in Schedule "A".

Notwithstanding any other clauses in this Agreement Contractor represents and warrants that it shall use commercially reasonable efforts to retain those persons assigned to positions described herein.

Except in situations outside Contractor's control, Contractor may remove these key personnel from the team providing the Services by providing Terasen four (4) weeks written notice prior to their removal. Replacements for key personnel must have similar skills and experience to key personnel being replaced. Contractor will ensure that any employee transitions are done at no cost to Terasen, in a way that minimize disruption to Terasen and that does not result in changes to the Project Schedule unless mutually agreed to in writing. Terasen reserves the right, acting reasonably, to reject any suggested replacement personnel.

Where Contractor is not able to provide the notice and "overlap" periods described above it will, at no additional charge to Terasen, use commercially reasonable efforts to provide as much notice and "overlap" time as possible.

7.3 Contractor may, by way of replacement or addition, make changes to the personnel assigned to perform and / or supervise any of the Services hereunder, for reasons including, but not limited to, illness, injury or other health-related incapacity, termination of employment, promotion, transfer to another project or hiring. Contractor will ensure that any employee transitions are done at no cost to Terasen, in a way to minimize disruption to Terasen, and that does not result in changes to the Project Schedule unless mutually agreed to in writing.

Where Contractor is not able to provide the "overlap" periods described above it will, at no additional cost to Terasen, use commercially reasonable efforts to provide as much "overlap" time as possible.

8. GRANT OF LICENSE

8.1 The Contractor shall provide Terasen with three (3) copies of the Object Code form of the Licensed Software for installation or the Designated Equipment at the Designated Sites. Upon final payment to the Contractor Terasen shall have a non-transferable, except as and to the extent set forth elsewhere in this Agreement, perpetual non exclusive license to use the Licensed Software and Documentation in accordance with this Agreement. **[NOTE: WILL CHANGE DEPENDING ON SOLUTION CHOSEN]**

8.2 RESTRICTIONS TO BE FILLED IN WHEN CONTRACTOR SELECTED.

8.3 Notwithstanding anything herein to the contrary, Terasen may authorize its third party consultants who are hired by Terasen under written agreement to use the Licensed Software in accordance with the terms of this Agreement.

9. APPLICATIONS IMPLEMENTATION

9.1 **Systems Development and Configuration**. Subject to the terms and conditions of this Agreement, and in consideration for the payments to be made and other obligations to be performed by the Contractor as specified in this Agreement, the Contractor agrees to customize, install and implement the Applications and Licensed Software as follows:

Category	Description
Project Management	Includes the overall management of the configuration, customization, installation, training material and implementation of the System
Application Implementation	Includes the implementation of the Applications and Licensed Software. Includes the development of training material and train-the-trainer for the Applications
Transition Specifications	Includes all plans, procedures, and mechanisms during the warranty

Category	Description
	period prior to hand-off to the maintenance provider

9.2 **Interpretation of the Specifications**. Terasen hereby acknowledges that the Requirements will provide the basis for the Applications implemented and customized.

In the event of a variance between the Quotation and the Requirements, the Requirements shall be determinative.

9.3 **Interpretive Differences**. Terasen acknowledges that any differences between the Contractor and Terasen in the interpretation of the Quotation or Requirements may arise. Any such differences will be referred to the Scope Change Process described in Clause 23 (Scope Change Process) of this Agreement.

9.4 **System Acceptance**. Within five (5) business days following Terasen's receipt of the System tested code and final version documented System, Terasen shall start conducting Acceptance Tests, at its premises, of the installed System in accordance with the specifications set out in the Requirements or, test plan mutually agreed to by the parties. The Acceptance Test period shall be up to thirty (30) business days. If the System performs in accordance with the specifications or, test plan, Terasen shall accept the System in writing within ten (10) business days of conclusion of the Acceptance Tests ; if the System fails to so perform, Terasen shall deliver to the Contractor within ten (10) business days a notice stating in reasonable detail the respects in which the System failed to conform and the Contractor shall exercise its best efforts to correct any reproducible system error within five (5) business days from receipt of notice. Upon receipt of the corrected System, Terasen shall promptly re-schedule Acceptance Tests, and the provisions of this Clause shall once again apply.

9.5 **Nonproductive Use**. Prior to acceptance of the System by Terasen, the System will be available to Terasen only for nonproductive use. If the System is used for productive purposes, then after a period of no more than thirty (30) days the System shall be deemed to have been accepted by Terasen.

10. DATA AND PROPRIETARY INTERESTS

10.1 All systems, Software, Hardware, operating instructions, and all other Documentation provided to Contractor for use in providing the Services or specifically developed for or specifically relating to Terasen's information processing, and all Terasen source documents, stored Data, and other information of any kind, and reports prepared by Contractor will be and will remain the property of Terasen. All tapes, disks, CD ROM's or other storage media, temporary or permanent, containing Terasen's programs, Data, or other information of any kind, will be available for inspection by Terasen's personnel or Terasen's designees upon reasonable notice, and all such information will belong to Terasen, and will be delivered to Terasen on Terasen's request within a reasonable period of time.

10.2 The ideas, concepts, know-how or techniques relating to the Services that may be developed during the course of, and solely as a consequence of the performance of this Agreement by Contractor personnel or jointly by Contractor and Terasen personnel, may be used by Terasen in any way it deems appropriate.

10.3 Notwithstanding the above, upon receipt of final payment for all Services rendered by Contractor under the Agreement at the end of the Term, all copyrights, patents, trademarks and any other intellectual property rights to any deliverables subject to this Agreement including, but not limited to, business plans, implementation plans, feasibility studies, Software, Applications, operating manuals, functional specifications and any related documentation developed by Contractor for Terasen (the "Developments") shall vest in and be the sole property of Terasen. In addition to the foregoing, upon completion of the Services, Contractor agrees to waive all moral rights in any copyrighted works associated with its Services.

10.4 Contractor shall retain title to and ownership of all Contractor Technology.

10.5 Upon receipt of payment for the Services at the end of the Project as the Applications are completed Contractor will convey to Terasen good and marketable title to the Applications and Software, free and clear of all liens, claims and encumbrances.

10.6 Subject to Clause 24 (Termination), Contractor will request instructions from Terasen regarding the disposition of Terasen's Documentation, Hardware, Software and/or Data. In the absence of instructions within sixty (60) days of the termination, Contractor will store Terasen's Software, Documentation and/or Data at Terasen's expense.

11. SOFTWARE

9.1 If in the performance of the Services, Terasen and Contractor provide software to each other, Contractor and Terasen agree to do the following with respect to the handling of the other's software:

(a) not modify or copy the software, except as permitted under the terms of this Agreement;

(b) restrict the use of the software of the providing party in accordance with the restrictions specified by the providing party as a result of its agreements with third party software providers;

(c) use the software only as required for the applicable Services;

(d) confine the use of the software to the employees or agents of either Terasen who require it to assist Contractor with the performance of the Services or those of Contractor who require it for the performance of the Services;

(e) maintain and disallow the removal of any proprietary or copyright notices; and

(f) return the software to the other party upon the termination of the applicable Services and warrant in writing that all copies have been returned and that no further use will be made of them.

11.2 Upon signing a confidentiality agreement in substantially the form attached hereto as Schedule "D" to this Agreement and subject to Terasen's applicable software licenses, Contractor may inspect any of Terasen's software, which requires access to system control program instructions, system libraries or other secure Data. Contractor will not modify Terasen's software except as required for the performance of the Services, without the express written consent of Terasen or its designate, which consent may not be unreasonably refused.

11.3 The parties warrant that, with respect to any software they provide to the other party under this Clause for the provision of the Services that:

(a) in utilizing the software as contemplated by this Agreement, the providing party will not be infringing the rights of any third parties; and

(b) the disclosure or use of the software will not involve a breach of any confidentiality agreement or of a contractual relationship.

11.4 The providing party agrees to defend the non-providing party and hold it harmless with respect to all costs, losses and damages arising from any breach of the warranties stated under Clause 11.3(a) and 11.3(b).

12. DELIVERY OF DOCUMENTATION

Documentation shall be delivered before Acceptance Testing commences. The Contractor shall provide Terasen with five (5) copies of the Documentation for the System, in both soft copy (in Terasen's then current office software standard) and hard copy. Upon final payment to the Contractor, Terasen will have a non-transferable, perpetual, non-exclusive license to use the Documentation including the right to reproduce and copy same.

13. TRAINING

The Contractor will prepare and deliver comprehensive training to Terasen trainers so that Terasen trainers can deliver the training to subsequent users of the System.

14. FEES AND INVOICING

14.1 Terasen shall pay Contractor in accordance with the manner specified herein and at the rates specified in Schedule "B".

14.2 The remuneration paid in accordance with this Agreement is the sole remuneration for the Services and Contractor, its agents, employees, contractors and subcontractors, shall not receive any benefits and are not members of any deferred compensation plan, pension plan or bonus plan of Terasen.

14.3 Contractor shall submit an invoice (the "Invoice") in a form which is mutually agreed upon by Contractor and Terasen, in accordance with the payment schedule set out in Schedule "B", which, at a minimum shall include:

(a) Fees as outlined in Schedule "B";

(b) a daily record of hours worked and duties performed, separately identifying for each of the duties and terms the names of the personnel who perform such duties;

(c) applicable British Columbia Social Services tax ("BCSST") and federal Goods and Services Tax ("GST");

(d) sufficient information to identify Contractor or Contractor's trading name;

(e) Contractor's GST registration number;

(f) sufficient information to identify the reporting period when the GST, in respect of the goods and Services being provided by Contractor, was paid or became payable and the amount of the GST paid or payable;

(g) sufficient information to identify the name or trading name of Terasen;

(h) sufficient information to specifically identify the nature of the goods and Services being provided and invoiced; and

(i) the applicable Purchase Order ("PO") number or other relevant order number issued by Terasen for the provision of the Services.

14.4 Terasen shall verify the Invoices and approve them for payment. Subject to Clauses 17, 23 and 25 below, payment shall be made by Terasen to Contractor within thirty (30) days from the date of invoice.

14.5 The Fees specified in Schedule "B" include everything necessary for the provision of the Services by Contractor.

15. TAXES

15.1 Terasen shall, in addition to the Fees payable to Contractor as set out in Clause 14, pay the applicable taxes payable on such Fees provided that Contractor provides Terasen with all information outlined in Clause 14.

15.2 Terasen shall have no liability or responsibility for the withholding, collection or payment of income taxes, unemployment insurance, statutory or other taxes or payments of any other nature on behalf of or in respect of or for the benefit of Contractor or any other person, other than withholding taxes, if any imposed by the Income Tax Act (Canada) with respect to payments to non-resident persons as defined therein. Contractor agrees to indemnify and hold Terasen harmless from and against any order, penalty, interest or tax that may be assessed or levied against Terasen as a result of the failure or delay of Contractor to file any return or information required to be filed by Contractor, by any law, ordinance or regulation relating to the Services performed by Contractor herein. Without limiting the generality of the foregoing, neither Terasen shall have liability or responsibility for the payment of any penalty or interest assessed or levied against Contractor as a

result of the failure of Contractor to charge or remit the GST as required under the Excise Tax Act of Canada.

16. REPRESENTATIONS, WARRANTIES AND PROFESSIONAL RESPONSIBILITIES

16.1 Contractor represents and warrants that it has the full right, power and authority to enter into and carry out this Agreement and has been, and is on the date of this Agreement, duly authorized by all necessary and appropriate corporate or other action to execute this Agreement.

16.2 Terasen represents and warrants that it has the full right, power and authority to enter into and carry out this Agreement and is duly authorized by all necessary and appropriate corporate or other action to be bound by this Agreement upon the date of execution.

16.3 Contractor represents and warrants that the employees it assigns to perform the Services possess the necessary skills, expertise and experience to perform the Services to a professional standard at least equal in quality to industry standards. Contractor shall at all times during the Term of this Agreement, perform the Services in a competent, workmanlike and professional manner and using due care.

16.4 Contractor represents and warrants that it shall be responsible, at no cost to Terasen, to provide additional Services as may be necessary to remedy any defects or deficiencies caused by its faulty workmanship, the negligent act or omission of Contractor or its employees or by the failure of Contractor or its employees to perform the Services in accordance with the provisions of this Agreement, that are brought to Contractor's attention in writing within ninety (90) days of UAT acceptance for deliverables by Terasen (the "Warranty Period").

16.5 Contractor warrants that if, Warranty Periods, Terasen informs Contractor of a non-conformity between the Services or deliverables and the functional requirements in the Statement of Work then Contractor will either correct the non-conformity at no additional charge or refund monies paid by Terasen for that portion of the Services or deliverables attributable to the non conformity.

16.6 Notwithstanding the above, Contractor will not be obligated to remedy defects or deficiencies at no additional charge to Terasen where those defects or deficiencies have been caused by the failure of Terasen to perform its obligations in accordance with the provisions of this Agreement. Such defects or deficiencies will be remedied in accordance with Clause 23.

16.7 Contractor warrants that it shall at all times prior to the completion of the warranty period:

(a) use appropriate materials of high quality;

(b) employ appropriate techniques and standards; and

(c) provide all Services with due care, skill and attention.

16.8 Contractor represents and warrants that all equipment it supplies and Software or Applications it provides or develops for Terasen shall be free of any patent or latent defect. Contractor further represents and warrants that all Software or Applications it installs, uses or develops for Terasen shall be free of any virus as at the time of installation and Contractor covenants to take such anti-virus measures as specified by Terasen.

16.9 Contractor agrees to assign all Contractor provided Software warranties in favour of Terasen to the extent it can do so. Contractor further represents and warrants that it will take steps consistent with prudent industry practices to protect Terasen from any computer virus resulting from any Contractor provided Software it installs or uses while providing Services to Terasen.

16.10 Contractor warrants that at all times during the Term and any renewal thereof, the Services will meet or exceed the performance standards set out in the Clause 4 of this Agreement.

16.11 Contractor, in performing the Services, shall comply with all applicable laws, orders, regulations, ordinances, standards, codes and other rules, licenses and permits of all lawful authorities.

16.12 Contractor, in performing the Services, shall not create any conflict of interest, either ethically, professionally or otherwise in relation to obligations to Terasen or to any services provided by Contractor to any other party during the Term of this Agreement.

16.13 Terasen, to the extent it can and to the best of its Contractor, warrants that it has all licenses and approvals required to enable Contractor to provide the Services, and that in providing the Services, Contractor will not infringe upon any patent, copyright or other proprietary right of any third party.

16.14 Contractor shall not, during the course of this Agreement, engage in any activity likely to compromise the ability of Contractor to perform its obligations under this Agreement fairly and independently. Contractor shall

immediately disclose to Terasen any activity which constitutes or may constitute a conflict of interest.

16.15 These warranties and covenants shall survive the expiration or termination of this Agreement as amended from time to time.

17. DELAY

17.1 To prevent failure to meet Services critical completion dates or dates upon which deliverables are due Contractor agrees that if slippage in those completion dates or deliverable, due dates occur as a direct result of Contractor's acts or omissions in delivering the Services in accordance with Schedule "A", not resulting from Terasen's delay or Force Majeure, it will immediately, at its own cost, mitigate the slippage.

17.2 In the event the parties cannot agree about the cause of the delay or the remedy required to right the slippage in schedule or any other issue related delay, the matter shall be escalated to and resolved by Expedited Arbitration.

18. INSURANCE

18.1 Prior to commencing the Services, Contractor shall obtain at its own expense, and provide Terasen, at its request, with a proof of the following insurance coverage:

(a) Workers' Compensation Insurance in accordance with the statutory requirements in British Columbia for all its employees engaged in performing the Services herein. Contractor's Workers' Compensation Board number is _____;

(b) Automobile Liability Insurance on all vehicles used by Contractor in connection with this Agreement in the minimum amount of $2 million per occurrence in respect of bodily injury, death and property damage;

(c) Commercial General Liability Insurance for bodily injury, death and property damage in the amount of $2 million per occurrence naming Terasen as an additional insured with respect to the Services. This policy shall also contain a cross liability provision; and

(d) Professional Liability Insurance in the amount of $1 million per occurrence. Coverage shall be maintained for a period ending no sooner than twelve months after the termination of this Agreement.

18.2 During the Term of this Agreement, Terasen may, by written notice, require Contractor to obtain additional insurance if obtainable or to alter or amend the insurance policies required under this Clause at Terasen's expense. Terasen shall be responsible for the full amount of all deductibles of any additional insurance obtained in accordance with Clause 18.2.

18.3 Contractor shall be responsible for the full amount of all deductibles of all insurance policies required under Clause 18.1. All insurance policies required herein shall provide that the insurance shall not be canceled without the insurer giving at least thirty (30) calendar days written notice to Terasen and shall be purchased from insurers registered in and licensed to underwrite insurance in British Columbia. Such policies shall contain a waiver of any right of subrogation or recourse by Contractor's insurer against Terasen or its employees, agents, subvendors and other subcontractors. Where Contractor fails to comply with the requirements of this Clause, Terasen may take all necessary steps to affect and maintain the required insurance coverage at Contractor's expense.

19. INDEMNIFICATION AND LIMITATION OF LIABILITY

19.1 Contractor releases, defends, and indemnifies Terasen, its parent company, their respective servants, directors, officers, agents, affiliates, parent company and other consultants (collectively the "Terasen Indemnities") against all actions, claims and demands (including the cost of defending or settling any action, claim or demand) which may be instituted either against any of the Terasen Indemnities arising out of or resulting from any breach of warranty, non-fulfillment by Contractor, its employees, agents, subcontractors of any covenant or obligation on the part of Contractor herein or the negligence of Contractor, its agents, employees or any sub-contractor or of any other person for whose acts or omissions Contractor is vicariously liable and also against any action, claim or demand by Contractor's servants, employees or agents or their personal representatives or dependents arising out of such negligence.

19.2 Contractor shall defend, indemnify and hold the Terasen Indemnities harmless from and against all claims, damages, losses and expenses (including, but not limited to, reasonable legal fees) arising by reason of or resulting from any bodily injury or death of any person or damage to real and/or tangible personal property suffered by Terasen, its personnel or permitted subcontractors, as a result of and to the extent proximally caused by any negligent or wrongful act or omission of Contractor, its personnel or permitted subcontractors in the performance of the Services, or arising from

claims against Terasen by third parties caused by the fault or negligence of Contractor, its employees, agents, subcontractors, and other subcontractors in the performance or non-performance of any of their obligations under this Agreement.

19.3 Terasen releases and indemnifies Contractor, its servants, directors, officers, agents and affiliates (collectively, the "Contractor Indemnities") against all actions, claims and demands (including the cost of defending or settling any action, claim or demand) which may be instituted against any of the Contractor Indemnities arising out of or resulting from any breach of warranty, non-fulfillment by Terasen, its employees, agents, and subcontractors of any covenant or obligation on the part of Terasen herein or the negligence of Terasen, its agents, employees or any sub-contractor or of any other person for whose acts or omissions Terasen is vicariously liable and also against any action, claim or demand by Terasen's servants, employees or agents or their respective personal representatives or dependents arising out of such negligence.

19.4 Terasen shall defend, indemnify and hold the Contractor Indemnities harmless from and against all claims, damages, losses and expenses (including, but not limited to, reasonable legal fees) arising by reason of or resulting from any bodily injury or death of any person or damage to real and/or tangible personal property suffered by any of the Contractor Indemnities incurred by Terasen, its personnel or permitted subcontractors, as a result of and to the extent proximally caused by any negligent or wrongful act or omission of Terasen, its personnel or permitted subcontractors in the performance of the Services, or arising from claims against Contractor by third parties caused by the fault or negligence of Terasen, its employees, agents or subcontractors, in the performance or non-performance of any of their obligations under this Agreement.

19.5 Each party seeking indemnification will promptly notify the party from whom indemnification is sought in writing of any claim or action arising as described in this Clause 19 and shall furnish the other party a copy thereof. Terasen shall have sole responsibility for defending any claim or action under Clauses 19.3 and 19.4. Contractor shall have sole responsibility for the defence of any claim or action under Clauses 19.1 and 19.2. Each party seeking indemnification shall provide reasonable cooperation, at its own expense, in any defence of any such claim or action by the other party.

19.6 Notwithstanding Clauses 19.1 - 19.4 and except as provided for in Clause 20, in no event shall any party be liable for any special, indirect, consequential or

incidental damages of the other or any third party even if such party has been advised of the possibility of such damages, including but not limited to lost profits, lost revenue, lost goodwill, cost of capital or failure to realize expected savings.

19.7 With the exception of Clauses 19.2, 19.4 and 20, Contractor's liability to Terasen and Terasen'ss liability to Contractor for damages from any cause whatsoever including but not limited to a cause in the nature of a breach of condition, or a fundamental breach or breaches, and regardless of the form(s) of action, whether in contract or tort, including negligence or strict liability or otherwise, will be limited per Phase giving rise to liability to the total fees payable hereunder under which the breach occurred. The above limitation of liability will not apply to the payment of costs, damages, and lawyers' fees referred to in Clauses 19.2, 19.4 and 20.

20. PATENT AND COPYRIGHT INDEMNITY

20.1 If notified promptly in writing of any action (and all prior claims relating to such action) brought against either Terasen, based on a claim that the provision of the Services to Terasen, by Contractor infringes any Canadian or United States patent, copyright, trademark or other Intellectual Property Right infringement or constitutes any misappropriation of trade secrets, Contractor will be liable for damages, indemnify and hold harmless Terasen from any and all expenses or costs whatsoever suffered by Terasen as a result of such action or Terasen's inability to continue to obtain Services hereunder and Contractor will defend such action at its expense and pay all costs associated with and any damages awarded in any such action, provided that Contractor will have sole control of the defense of any such action and all negotiations for its settlement or compromise. This Clause 20.1 will not apply to infringement claims arising from or in connection with:

(a) Contractor using Software owned or licensed by Terasen;

(b) the use by Contractor of confidential Terasen Data;

(c) any equipment that may be supplied by Terasen;

(d) modifications made by Terasen to any work product of Contractor or product provided by Contractor or any portion thereof, where such claim would not arise but for such modifications;

(e) any materials provided by Terasen to Contractor regarding any work product of Contractor including any specifications or plans provided to Contractor for such work product; and

(f) Terasen's combination of any work product of Contractor or any product provided by Contractor or portion thereof with other products not supplied by Contractor, provided such claim would not have arisen but for such combination.

Terasen agree to indemnify Contractor against any claims against Contractor arising under the circumstances set forth in Clause 20.1 (d), (e) and (f) (and reasonable out-of-pocket associated costs resulting therefrom).

20.2 If notified promptly in writing of any action (and all prior claims relating to such action) brought against Contractor based on a claim that the use by Contractor of any of Terasen's Software, confidential Terasen Data or any equipment that may be supplied by Terasen in relation to the provision of the Services infringes any Canadian or United States patent or copyright, or constitutes any misappropriation of trade secrets, Terasen as appropriate will indemnify and hold harmless Contractor from any and all expenses or costs whatsoever suffered by Contractor as a result of such action or Contractor's inability to continue to provide Services hereunder and Terasen as appropriate will defend such action at its expense and pay all costs associated with and any damages awarded in any such action, provided that Terasen as appropriate will have sole control of the defense of any such action and all negotiations for its settlement or compromise.

20.3 In the event any Contractor provided Software is determined to infringe under Clause 20.1, by any independent tribunal of fact or law or if it is agreed between the parties to the dispute that an infringement of Intellectual Property rights for which Contractor is responsible has occurred, Contractor shall, at its option and expense:

(a) forthwith procure for Terasen as appropriate the right to continue the use of or possession of the infringing product;

(b) forthwith modify the product to make its use non-infringing; or

(c) forthwith replace the product with a product having equivalent functionality and which meets the acceptance criteria and standards set out herein; or

(d) if the solutions in any of the preceding paragraphs cannot be achieved, disassemble and remove the Software.

20.4 The operation of this Clause will survive the termination or expiration of this Agreement.

21. CONFIDENTIALITY

21.1 None of the parties will be required to keep confidential:

(a) any Data supplied from the other which is publicly available, is lawfully obtained by the receiving party from third parties or is required to be disclosed by legal requirement; and

(b) any ideas, concepts, know-how or techniques related to information processing which are developed in the performance of the Services, and which each party is hereby licensed to use such information in accordance with Clause 10 (Data and Proprietary Interests).

21.2 Contractor will keep confidential all other Data not described in the first paragraph of this Clause submitted by Terasen to Contractor for the provision of the Services to Terasen, and will only disclose this Data to:

(a) third parties authorized by Terasen to receive such Data; and

(b) Contractor's personnel with a need to use the Data in the performance of Services and who have signed an agreement of confidentiality with Contractor; and

(c) Contractor subcontractors with a need to use the Data in the performance of Services and who have either signed an agreement of confidentiality with Contractor having terms no less restrictive than the terms set out in the form in Schedule "E" or in the form substantially similar to the form attached hereto as Schedule "E".

21.3 Contractor will keep confidential all other Data not described in the first paragraph of this Clause submitted by Terasen to Contractor, and will only disclose this Data to:

(a) third parties authorized by Terasen to receive such Data; and

(b) Contractor's personnel with a need to use the Data in the performance of Services and who have signed an agreement of confidentiality with Contractor; and

(c) Contractor subcontractors with a need to use the Data in the performance of Services and who have either signed an agreement of confidentiality with Contractor having terms no less restrictive than the terms set out in the form in Schedule "E" or in the form substantially similar to the form attached hereto as Schedule "E".

21.4 Terasen will keep confidential all Data provided to Terasen by Contractor and marked as "Confidential", provided however that Contractor shall only mark as "Confidential" information that is proprietary to Contractor.

21.5 The terms of this Agreement shall be deemed to be Confidential Information and shall only be disclosed to the extent required by law or administrative process.

21.6 Notwithstanding any other provision to the contrary herein, Contractor shall not be required to disclose to Terasen any information which Contractor is under contractual obligation with other customers to keep confidential and not disclose to third parties, and provided further that Contractor shall not be required to disclose to Terasen any confidential corporate pricing information which Contractor has not disclosed to other customers and which, if disclosed, would materially prejudice the competitiveness of Contractor in the market place.

21.7 The operation of this Clause will survive the termination or expiration of this Agreement.

22. SECURITY

22.1 Contractor agrees that access to Terasen's premises for performance of the Services shall only be granted during normal Business Hours of Terasen unless otherwise authorized by Terasen in writing. Contractor also agrees that its personnel shall comply with all of Terasen's reasonable security requirements and measures in effect at the applicable Terasen's premises, provided that the same are made known to Contractor and its relevant personnel.

22.2 Contractor shall provide and enforce adequate security for any Services provided from remote sites. Contractor will adhere to all reasonable, applicable Terasen security policies and procedures (a copy of which will be provided to Contractor), including, but not limited to:

(a) enforcing security policies and procedures at remote sites within the control of Contractor which are at least as onerous as the applicable Terasen security policies that are made available to Contractor;

(b) providing, administering and being responsible for the necessary hardware, software, access devices and access keys to ensure the security of Contractor sites;

(c) securing all Terasen forms and any hard/soft copies containing sensitive information which are used or required to provide the Services and which are stored at Contractor's premises or are within the reasonable control of Contractor's personnel;

(d) maintaining logical and physical access controls to Terasen systems, including production and testing environments, Terasen operating and application software and all software libraries to the extent that they are within Contractor's reasonable control;

(e) protecting logon userid's, access token cards and access control ID's and passwords to the extent that they are within Contractor's control;

(f) requiring Contractor personnel to use an access control package, password protected screensaver or keyboard lock tool when the desktop is left unattended;

(g) dialing into the Terasen WAN from securely connected computer hardware; and

(h) complying with all software license agreements and/or copyright contracts relevant for the provision of Services and provided that Contractor is provided with a copy of such license agreements and/or copyright contracts.

22.3 Contractor is responsible for the security of all Terasen Software, Documentation and/or Data in its possession.

22.4 Terasen reserves the right to conduct security inspections upon reasonable notice of any remote site from which Services are delivered.

23. SCOPE CHANGE PROCESS

23.1 Need for a Scope Change

The parties hereto agree that there may be changes from time to time in the scope of Services to be provided or the price to be charged for Services hereunder (a "Scope Change") as a result of:

(a) an existing component of Terasen's IT Infrastructure having become inadequate;

(b) there being a requirement for increased functionality in a system that can best be met by changes to the deployed Hardware or Software configuration;

(c) the actions or omissions of third parties with whom Terasen has contracted;

(d) a failure on the part of any party to comply with the obligations set out in this Agreement;

(e) the assumptions set out in this Agreement prove to be inaccurate;

(f) a desired change in the scope of Services;

(g) the configuration and capacity specifications within Terasen's IT Infrastructure are insufficient to enable Contractor to meet its commitments to Terasen;

(h) changes in Terasen's IT Infrastructure; or

(i) other circumstances which reasonably require the parties to request a change in the scope of Services, or the price for the Services.

23.2 **Contractor Initiated Scope Changes**

In the event that Contractor wishes to invoke a Scope Change it shall notify Terasen using the Project Change Request attached hereto as Schedule "F" and provide an explanation for the requested Scope Change which will include, at a minimum:

(a) the reason for requesting the Scope Change;

(b) the impact of the Scope Change on the Project Fees, the Services; and

(c) a reasonable time frame within which the parties must respond.

Terasen shall notify Contractor if it cannot respond within the time frame specified on or before the date which falls midway between the date Terasen receives the requested Scope Change and the date by which it is to provide a response. Subject to the above, Terasen shall respond to Contractor by either accepting the Scope Change or rejecting the Scope Change and setting out the reason for rejecting such Scope Change and where possible, providing a suitable alternative acceptable to Terasen.

If Terasen rejects a Scope Change, Contractor shall within a period of time mutually agreed upon by the parties, either:

(a) accept such rejection;

(b) provide another alternative to the original Scope Change (which shall be treated by the parties as a new Scope Change and shall be subject to the procedure set out in this Clause); or

(c) submit the matter for dispute resolution in accordance with the provisions of Clause 25 of this Agreement.

23.3 **Terasen Initiated Scope Changes**

In the event that Terasen wishes to invoke a Scope Change it shall notify Contractor using the Project Change Request attached hereto as Schedule "F" and provide an explanation for the requested Scope Change which will include, at a minimum:

(a) the nature of the change requested;

(b) the reason for such requests; and

(c) provide a reasonable time frame within which the parties must respond.

Contractor shall notify Terasen if it cannot respond within the time frame specified on or before the date which falls midway between the date Terasen receives the requested Scope Change request and the date by which it is to provide a response. Subject to the above Contractor will indicate to Terasen whether it is prepared to proceed with the Scope Change, and if it is prepared to proceed with the Scope Change, what impact if any, the implementation of the Scope Change will have on the price, the Services.

Terasen shall consider the response provided by Contractor, and shall within a period of time mutually agreed upon by the parties either:

(a) accept Contractor's proposal (as set out in its response);

(b) provide another alternative to the original Scope Change (which shall be treated by the parties as a new Scope Change and shall be subject to the procedure set out in this Clause); or

(c) submit the matter for dispute resolution in accordance with the provisions of Clause 25 of this Agreement.

23.4 **Consequential Changes to the Agreement**

In the event that the parties proceed with the Scope Change (either through agreement or dispute resolution) they shall complete an amendment in writing.

24. TERMINATION

24.1 Termination of the Agreement Without Cause

(a) Either party may terminate this Agreement at any time without penalty or damages without prior notice if both parties give written consent.

(b) Upon receipt of such notice of termination, the parties shall meet and negotiate in good faith an orderly termination plan which will enable the parties to begin to mitigate the costs associated with such early termination without impacting the delivery of Services. Notwithstanding the foregoing, the parties may mutually agree to take such steps which may impact the delivery of Services in order to mitigate the costs associated with such early termination.

24.2 Termination of the Agreement With Cause

Terasen may terminate this Agreement at its sole option immediately upon providing notice in writing to Contractor:

(a) if Contractor is in breach of the Agreement and such breach is not remedied to the reasonable satisfaction of Terasen within thirty (30) days from the date of written notice by Terasen;

(b) if Contractor becomes, or threatens to become subject to any insolvency administration and such insolvency administration is not remedied within thirty (30) days from the date of the written notice by Terasen; or

(c) if any Contractor provided Software is lost, repossessed, destroyed or damaged beyond reasonable repair due to Contractor 's fault and such breach is not remedied to the reasonable satisfaction of Terasen within thirty (30) days from the date of written notice by Terasen.

Clauses 10.3, 24.4 and 24.5 will apply.

24.3 **Terasen's Rights Upon Termination**

If notice is given to Contractor to terminate this Agreement, by Terasen in accordance with Clause 24.2, in addition to terminating this Agreement, Terasen:

(a) may recover from Contractor the amount of any direct loss or damage sustained as a result of the termination;

(b) subject to Clauses 16, 19, 20, 21, 22 and 24.3, may be regarded as discharged from any further obligations under this Agreement;

(c) may pursue any additional or alternative remedies provided by law; and

(d) shall not be responsible to Contractor for any losses, lost profits, failure to realize income, indirect or consequential damages or costs, and any amounts in excess of the payments previously received by Contractor to the date of termination.

24.4 **Upon Termination/Expiration**

Upon termination of this Agreement, all accrued obligations or liabilities to pay for Services provided prior to termination will remain in effect.

Upon termination or expiration of this Agreement, Contractor will, without additional cost to Terasen, provide all reasonable assistance and devote its commercially reasonable efforts to returning to Terasen, or its designates, in an orderly and expeditious manner all of Terasen's property, as determined under Clause 10 (Data and Proprietary Interests), and in accordance with Clause 24.5.

24.5 **Return of Terasen Programs and Data**

Upon termination of this Agreement, howsoever occasioned, Terasen will have the right to require Contractor to do any one or more of the following:

(a) to deliver to Terasen all copies of Terasen's Software, Documentation and/or Data then in Contractor's possession or control; and

(b) to erase or destroy all or any of Terasen's Software, Documentation and/or Data then in Contractor's possession from the magnetic media on which they are stored.

If upon termination of this Agreement, howsoever occasioned, Terasen requires Contractor to deliver up any of Terasen's Software, Documentation and/or Data on magnetic media, Contractor will:

(c) deliver up such Software, Documentation and/or Data on industry compatible magnetic media at Terasen's cost; and,

(d) supply to Terasen free of charge all information necessary to enable such magnetic media to be utilized by Terasen.

Except where this Agreement is terminated by Terasen as a result of any breach by Contractor of its obligations under this Agreement, Contractor's obligations under Clauses 24.5 and 24.8 will be conditional upon Terasen having paid all Fees then due to Contractor under the terms of this Agreement.

24.6 In the event of termination, in accordance with Clause 24.1 Terasen shall pay Contractor for all Services performed and expenses directly incurred in accordance with this Agreement to the date of Termination.

24.7 If Terasen fails to make payment to Contractor when due under this Agreement, other than in cases where Terasen disputes the amount or entitlements of Contractor to some or all of a payment and such breach is not remedied within (ten) 10 days from the date payment is due, Contractor, may without prejudice to other rights or remedies it has, terminate this Agreement by giving Terasen thirty (30) days written notice.

24.8 **Express Rights of Termination Only**

The sole rights of the parties to terminate this Agreement are as set out above.

25. DISPUTE RESOLUTION

If a dispute arises out of, or in connection with, this Agreement, the disputing parties will, unless otherwise set out in this Agreement follow the following step-by-step correction and resolution procedure to the extent necessary to resolve the dispute:

Step 1

The party raising the dispute (the "Originating Party") will advise the other party (the "Other Party") in writing of the dispute.

Step 2

The Other Party will investigate the allegation and provide a written report to the Originating Party within thirty (30) days of receiving the notice alleging breach given under Step 1 to the effect that:

(a) the investigation reveals that the dispute was not substantiated;

(b) the basis for the dispute has been cured; or,

(c) the basis for the dispute has not been cured.

Step 3

If the Originating Party

(a) is not satisfied that the Other Party has not adequately investigated the dispute; or

(b) wishes to pursue the dispute,

(c) then the Originating Party will, within thirty (30) days, advise the Other Party in writing that it wishes to escalate the dispute to Step 4.

Step 4

Each of the Originating Party and the Other Party, within thirty (30) days of receipt of notice under Step 3, submit to the following people, or their successors or delegates, a written report on the facts of the dispute, any relevant provisions of this Agreement, and any other relevant information:

If to Contractor:

Facsimile:

and

Legal Representative

Facsimile: (604)

If to Terasen:

TERASEN GAS INC.

Attention: Hugh Smith

Business & Information Technology Services

16705 Fraser Highway

Surrey, B.C. V3S 2X7

Facsimile: (604) 592-7661

and

Legal Services

3700 2nd Avenue

Burnaby, B.C. VC 6S4

Facsimile: (604) 293-8640

(collectively, the "Executive Council")

Step 5

Upon receiving the reports generated under Step 4, the Executive Council will jointly resolve the dispute, calling on the parties for more information if necessary, within thirty (30) days of receipt of the reports.

Step 6

If the Executive Council fails to resolve the dispute within the thirty (30) day period allotted under Step 5, then the Originating Party may elect to:

(a) abandon the dispute; or,

(b) submit the dispute to arbitration in accordance with Clause 26 (Arbitration).

26. ARBITRATION

26.1 Arbitration

Except for applications for injunctions or restraining orders required to protect proprietary information and/or interests of a confidential nature, any dispute arises out of or in connection with this Agreement, or in respect of any defined legal relationship associated therewith or derived therefrom, including any failure of the disputing parties to reach agreement hereunder after exhaustion of the dispute resolution process set out above, the dispute shall be settled by binding arbitration before a single arbitrator and except where inconsistent with this Clause, the arbitration shall be held in Vancouver, British Columbia.

26.2 Award

The arbitrator shall issue a written award that sets forth the essential findings and conclusions on which the award is based. The arbitrator will allow discovery as required by law in arbitration proceedings.

26.3 Application to Court

If the arbitrator fails to render a decision within thirty (30) days following the final hearing of the arbitration, any party to the arbitration may terminate the appointment of the arbitrator and a new arbitrator shall be appointed in accordance with these provisions. If the parties are unable to agree on an arbitrator or if the appointment of an arbitrator is terminated in the manner provided for above, then any party to this Agreement shall be entitled to apply to a judge of the British Columbia Supreme Court to appoint an arbitrator and the arbitrator so appointed shall proceed to determine the matter mutatis mutandis in accordance with the provisions of this Clause.

26.4 Authority

The arbitrator shall have the authority to award:

(a) money damages;

(b) interest on unpaid amounts from the date due;

(c) specific performance; and

(d) permanent relief.

26.5 **Costs**

The costs and expenses of the arbitration, but not those incurred by the parties, shall be shared equally, unless the arbitrator determines that a specific party prevailed. In such a case, the non-prevailing party shall pay all costs and expenses of the arbitration, but not those of the prevailing party.

26.6 **Continuation**

The parties will continue to fulfill their respective obligations pursuant to this Agreement during the resolution of any Dispute in accordance with this Clause 26.

26.7 **Courts**

Notwithstanding the foregoing provisions of this Clause 26, the parties acknowledge that any misuse by one party of the other party's confidential information may cause immediate irreparable harm for which there may be no adequate remedy at law. Accordingly, the parties agree that the non-breaching party shall be entitled to seek or apply for immediate and permanent injunctive relief from a court of competent jurisdiction in the event of any such breach or threatened breach. Nothing contained herein shall limit the parties' right to any remedies at law, including the recovery of damages for breach of this Agreement.

27. GENERAL MATTERS

27.1 **Time of the Essence**

Time shall be of the essence in relation to the Services herein.

Contractor understands that the Project is vital to the competitive position of Terasen and Contractor's failure to complete the Services in accordance with Schedule "A" and will cause Terasen expense and injury.

27.2 **Notices**

Any notices or communications to be given or made hereunder will be deemed to be properly given or made:

(a) upon receipt, if hand delivered to the intended recipient to its last known address and marked for the attention of the following persons or offices; or

(b) on the day of transmission of a facsimile message embodying such notice or communication will be acknowledged by the recipient.

Such notice will be made to the following persons and addresses:

Contractor:

Facsimile:

Attention:

TERASEN GAS INC.:

16705 Fraser Highway

Surrey, B.C. V3S 2X7

Facsimile: (604) 592-7661

Attention: Hugh Smith

and,

Legal Services

3700 2nd Avenue

Burnaby, B.C. VC 6S4

Facsimile: (604) 293-8640

Either party may change its address for notice by providing notice of such change by any of the methods provided in this Clause. Delivery of a facsimile notice will be deemed to be delivery of the original notice.

27.3 **Force Majeure**

If by reason of Force Majeure, either Contractor or Terasen is unable to perform a significant portion of its obligations under this Agreement, it shall be relieved of those obligations to the extent, and for the period, that it is affected by Force Majeure, provided that the affected party (a) gives the other parties who will be impacted prompt notice of such inability and the nature, cause and expected duration of the Force Majeure; (b) escalates the

matter to the relevant Executive Council for the determination of an action plan; (c) uses all commercially reasonable efforts to implement the action plan mutually agreed upon by the affected party and the party or parties who are impacted; and (d) uses all commercially reasonable efforts to remedy the situation and remove, so far as possible and with reasonable dispatch, the cause of its inability to perform, provided that there shall be no obligation on a party so affected to settle labor disputes or to test or to refrain from testing the validity of any order, regulation or law in any court having jurisdiction. The parties affected by Force Majeure shall give prompt notice of the cessation of the cause thereof to the impacted parties. If by reason of Force Majeure, a party is unable to perform a significant portion of its obligations and the lack of significant performance has lasted longer than fifteen (15) Business Days, or if Contractor and Terasen acknowledge that such lack of significant performance shall last longer than fifteen (15) Business Days, the impacted parties not affected by Force Majeure may terminate the Agreement effective immediately upon giving written notice to the other parties.

27.4 **Assigns and Successors**

Clauses 1 to 27 of this Agreement (define and change to definitional form) will enure to the benefit of and be binding on the respective successors and permitted assigns of Terasen and Contractor. Clauses 1 to 27 of this Agreement will enure to the benefit and be binding on the successors and permitted assigns of Terasen. The Agreement is not assignable by Contractor without the previous written consent of Terasen. Such consent may be refused by Terasen in its sole discretion. Provided that Terasen is not in default under this Agreement and that the assignee specifically assumes all of Terasen's obligations hereunder, Terasen may assign its interest in this Agreement without the prior written consent of Contractor.

27.5 **Subcontracting**

The Services to be performed herein shall not be subcontracted by Contractor, without the express written consent of Terasen, which consent may be unreasonably withheld by Terasen.

Contractor shall only use subcontractors approved by Terasen to install, or configure any Software or Application.

27.6 **Precedence of Interpretation**

If there is any conflict between the terms of the Agreement and those specified in the Schedules, the terms as stated in the Agreement will prevail.

27.7 **Amendments**

No amendment, modification, supplement, or other purported alteration of this Agreement will be binding upon Terasen and Contractor unless it is in writing and is signed on behalf of Terasen and Contractor by their duly authorized representatives and unless such amendment, modification, supplement or alteration expressly references this Agreement. Notwithstanding the foregoing, Contractor and Terasen may amend, modify, supplement or alter this Agreement and such amendment, modification, supplement or alteration shall be binding on all of the parties to this Agreement provided that such amendment, modification, supplement or alteration is in writing and is signed on behalf of Terasen and Contractor by their duly authorized representatives and expressly references this Agreement.

27.8 **No Waiver**

Any waiver by Terasen or Contractor of any obligation under this Agreement will not be effective unless made in writing and will not be considered to be a waiver of any other breach of the same obligation.

27.9 **Entire Agreement**

This Agreement, as amended from time to time, together with any annexes, Schedules, addenda and writings expressly referred to, constitutes the entire agreement between Terasen and Contractor, and supersedes all prior agreements, proposals, or other communications between them, relative to the subject matter of this Agreement. There are no terms, conditions or warranties express or implied other than those contained in this Agreement.

27.10 **Counterparts/Facsimile**

(a) This Agreement may be executed in any number of counterparts with the same effect as if all parties had all signed the same document. All counterparts will be construed together and will constitute one and the same agreement.

(b) This Agreement may be executed by the parties and transmitted by facsimile transmission and if so executed and transmitted this

Agreement will be for all purposes as effective as if the parties had delivered an executed original Agreement.

28. RIGHTS CUMULATIVE

Any express statement of a right of Terasen or Contractor under this Agreement is without prejudice to any other right of Terasen or Contractor expressly stated in this Agreement or arising at law.

IN WITNESS WHEREOF THIS AGREEMENT has been executed by the duly authorized representatives of the respective parties.

ACCEPTED BY:	ACCEPTED BY:
Contractor	**Terasen Gas Inc.**
Authorized Representative	Authorized Representative
Authorized Representative	Authorized Representative
Date	Date

Attachment 21.3

Terasen Gas

BUSINESS CASE

Distribution Mobile Solution Project

February 2007

1.0 Executive Summary

1.1 Project Title

Distribution Mobile Solution Project

1.2 Background

Distribution first developed its Integrated Resource Management (IRM) Strategy in 1999 to describe its ideal state for efficiently managing all work and resources through a centralized functional group. While it was originally envisioned that the IRM Strategy would be implemented in three waves, only the initial Customer Service project was completed. Due to challenges with the selected software, Mobile UP, and its vendor, Utility Partners, dispatching of Preventive Maintenance and Construction work has never been integrated with Customer Service work.

In 2005, the Service Delivery Enhancement Project (SDE) was undertaken to provide improved scheduling and dispatching for Construction work using Click Software's ClickSchedule and SAP's Mobile Asset Management applications. It was intended that when it came time to retire Mobile UP, Customer Service and Preventive Maintenance work would be migrated to this new platform to complete the original vision of managing all resources and work types through common processes. Technical issues with SAP's Mobile Asset Management application, however, have led to the recommendation that it be replaced with Syclo's mobile workforce management system in the final solution.

Today, Distribution has three separate processes and technologies for managing resources and dispatching work, resulting in complexity, errors, and inefficiencies. Furthermore, the current Mobile UP application is obsolete and in need of replacement. This Business Case represents the completion of the Integrated Resource Management vision, and recommends the replacement of Mobile Up with a solution that supports the management of all field work and resources through a common set of processes and technologies.

While significant productivity gains have been realized with change programs such as IRM, SDE, Order Fulfilment, Preventive Maintenance and TGVI Integration, Distribution today operates in a state where the people and processes are over stressed as a result of the current disparate, complex, and fragile technologies.

1.3 Strategic Drivers

Implementation of the Distribution Mobile Solution Project is a key component in allowing Distribution to execute on its business strategies. A key goal of Distribution is to continually strive for Operational Excellence to excel at Distribution Asset Management and Service Delivery; however, inefficiencies and limitations imposed by the current set of technologies are a major barrier to continuous improvement. This represents a significant risk to the business given the corporate plans for increasing customer attachment rates, maintaining customer satisfaction levels and improving compliance with critical asset integrity programs.

Another key strategy impacted by this project is Distribution's move to a more multi-tasking workforce. To take advantage of attrition amongst its aging workers and further optimize worker efficiency, Distribution is moving to a less specialized workforce. The ability to do this, however, is severely limited by the current disparate dispatching technologies.

Other strategies impacted by the current environment that would be addressed by the proposed solution include:

- compliance with the new Integrity Management Plan
- improved compliance with working alone regulations
- improved decision making
- improved employee engagement
- implementation of new inspection based work types
- delivery of work for 3rd parties through Terasen Energy Services (TES)
- the ability to manage field devices other than meters (such as PFM regulators), and
- the ability to outsource appointment booking to Accenture Business Services (ABSU) if required in the future

1.4 Operational Drivers

The primary operational driver for this project is the obsolescence of Mobile UP. The current application is supported on a "best efforts" basis, its database and operating system are unsupported and at a minimum it must be upgraded to a stable and supportable system. Mobile UP currently suffers from numerous production problems that can severely impact Distribution's ability to execute work.

Other current operational inefficiencies that will be addressed by this project include:

- limitations with the current Mobile UP functionality
- manual dispatching and data capture processes for Asset Integrity work
- lack of visibility and accurate completion tracking of Asset Integrity work
- undue complexity of the current processes
- duplicated resource management procedures
- multiple technologies for field workers to process work

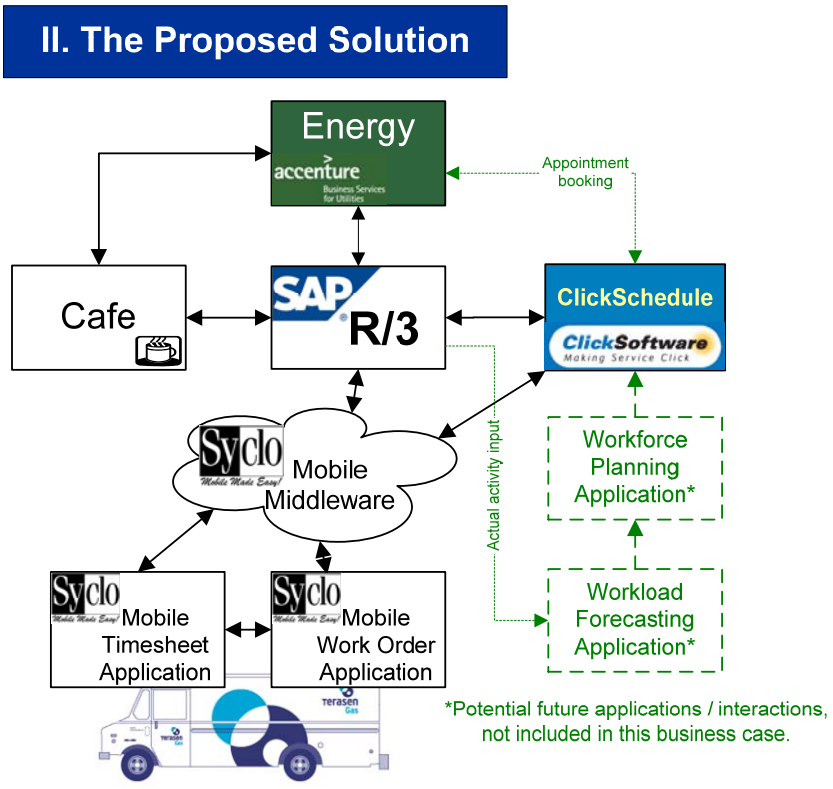
- manual data entry, data validation, and error handling procedures
- lack of standardized performance reporting
- lack of information provided to field workers
- discrepancies between timesheet and mobile time costing data
- duplicated and complex system support requirements
- use of a stand alone “working alone” application

1.5 Project Goals

The goal of this project is to enable Distribution to execute on its key business strategies by providing a common, stable, and supportable set of processes and technologies for managing all field work and resources in a consistent and efficient manner, thereby eliminating numerous redundant, error prone, and manually intensive processes.

1.6 Technical Solution

The proposed solution is outlined in the following figure.



The key elements of the solution include:

- Consolidation of all work types to a single suite of technology, using SAP R/3 as the work management system, ClickSchedule as the scheduling tool, and Syclo's Field Services as the mobile application.

- Use of Syclo's mobile work order and mobile timesheet applications by all Distribution field resources.

1.7 Benefits

The project has numerous strategic and operational benefits and will enable efficiencies in the magnitude of $576,000 per year.

The key benefit of the project is that it will allow Distribution to execute on its key business strategies as previously outlined in section 1.3.

The improved functionality delivered by the solution, the consolidation to a single solution, and the elimination of numerous manual, complex, and error prone processes will also result in numerous operational benefits. These benefits will primarily come from improved resource efficiency in the field, elimination of redundant and error-prone processes in the office, reduction in manual data processing tasks, and stabilization of the technical environment.

1.8 Costs

1.8.1 Capital Cost

	2007			2008			Totals		
	TGI	**TGVI**	**Total**	**TGI**	**TGVI**	**Total**	**TGI**	**TGVI**	**Total**
Internal Labour	$303,596	$33,733	**$337,329**	$341,863	$37,985	**$379,848**	$645,459	$71,718	**$717,176**
Consulting	$1,210,320	$134,480	**$1,344,800**	$1,434,003	$159,334	**$1,593,337**	$2,644,323	$293,814	**$2,938,137**
Hardware	$135,000	$15,000	**$150,000**	$145,800	$16,200	**$162,000**	$280,800	$31,200	**$312,000**
Software	$511,593	$56,844	**$568,436**	$20,801	$2,311	**$23,112**	$532,393	$59,155	**$591,548**
Expenses	$188,567	$20,952	**$209,519**	$203,650	$22,628	**$226,278**	$392,217	$43,580	**$435,797**
Contingency	$71,076	$7,897	**$78,974**	$284,306	$31,590	**$315,896**	$355,382	$39,487	**$394,869**
Total	**$2,420,152**	**$268,906**	**$2,689,058**	**$2,430,423**	**$270,047**	**$2,700,470**	**$4,850,575**	**$538,953**	**$5,389,528**
2006 Spend									$256,000
Total									**$5,645,528**

1.8.2 Operating Costs

As outlined in the following table, there will be no incremental increase in Operating costs. To ensure the overall Operating costs did not increase, a 50% reduction in both the capital and ongoing costs for licenses was negotiated with the software vendors.

New Ongoing Operating Costs:	
ClickSchedule Licensing	$40,485.00
Syclo Licensing	$68,705.00
Netmotion Licensing	$4,160.00
Server Maintenance	$47,700.00
Wireless Network Usage for Leak Survey	$7,680.00
Incremental support & potential network cost increase*	$49,270.00
Total:	**$218,000.00**
Existing Operating Costs:	
Mobile Up Licensing	$123,000.00
Mobile UP Server Maintenance	$95,000.00
Total:	**$**218,000**.00**
Incremental Operating Costs:	**$000.00**

*Assumes monthly network data transfer of 5MB or less per user. Actual data estimate cannot be determined until mobile system is designed. Current usage is approximately 1.5MB.

1.8.3 Key Financial Analysis

(in thousands C$)	2007	2008	2009	2010	2011
Capital Expenditure	$2,945	$2,700	-	-	-
AFUDC	$60	$268	-	-	-
Capital Expen incl AFUDC	**$3,005**	**$2,968**	**-**	**-**	**-**
					$5,973
After Tax Cash Flow impact	**($2,024)**	**($1,966)**	**$486**	**$604**	**$590**
					($2,310)
ROE	**8.37%**				
IRR (after tax)	**2.90%**				
IRR (pre tax)	**4.26%**				
NPV (10yr @ 5.8%)	**($652)**				
EBITDA	$29	($1,198)	$86	$1,491	$1,419
					$1,827
Net Income	$28	$78	($32)	$142	$120
Rate Base Impact	-	-	**$5,600**	$4,853	$4,107

1.9 Risks

The overall project risk is assessed as being low. This assessment is based on the extensive work done to date to ensure the business requirements are clearly understood, the project scope is fully defined, and the major cost components are fixed.

1.10 Sponsorship

This project is sponsored by the Vice President, Distribution.

2.0 Background

2.1 History

In the wake of organizational changes in 1999, including the closure of the Interior offices and the move to operating and field centres, Distribution conceived the Integrated Resource Management (IRM) Strategy to describe its goal of integrating and centralizing the management all field resources. The IRM Strategy described how all fieldwork, including Customer Service, Construction & Preventive Maintenance, should be coordinated through one functional area and allocated optimally to available resources based on skill-set, proficiency, and proximity. The IRM Strategy also included that a Mobile Data Dispatch (MDD) application be used to manage work assignments and provide wireless communication of work orders to and from the field. Mobile UP from Utility Partners was selected as the supporting technology. Three waves of implementations were planned to achieve the full IRM Strategy: the initial implementation to cover Customer Service work, the second to cover Preventive Maintenance work, and the third to cover Construction work. It was intended that the second and third waves would be implemented in conjunction with the PM Project and with the WMS Replacement Project (later referred to as the Order Fulfilment Project) respectively, as each of the work types was migrated to SAP R/3.

The initial IRM Project for Customer Service Work was substantially completed in July 2001, and allowed for the completion of the centralization of work and resource management to Surrey Operations in 2002. In the IRM Project post implementation audit, however, it was noted that the project encountered a variety of challenges throughout its implementation phase. The most significant of these occurred when the Mobile UP software vendor declared Chapter 11 bankruptcy protection in October of 2001, after months of failing to deliver the full scope of functionality under the terms of the contract with BC Gas Utility Ltd.

Due to the Mobile UP vendor not delivering the full scope of functionality, integration of SAP R/3 and Mobile UP to support dispatching of Preventive Maintenance work was eventually removed from the scope of the 2002 Preventive Maintenance (PM) Project. Instead, a largely manual dispatching process for Preventive Maintenance work was implemented, and continues to be used today.

In 2003, the Order Fulfilment (OF) Project migrated Construction work from the legacy Work Management System (WMS) to SAP R/3, and again, due to missing Mobile UP functionality, was implemented with a manual “paper-based” dispatching process. In 2005, the Service Delivery Enhancement (SDE) Project was completed to enhance the Construction process to include improved scheduling using ClickSchedule, improved order processing with the development of the Customer Attachment Front-End (Café) application, and wireless field communication using SAP Mobile Asset Management. While this solution has provided similar base functionality as Mobile UP, it also provides additional capabilities, such as: appointment booking, management of complex work with dependencies, schedule optimization, street-level routing, and visibility of future work. The SAP/ClickSchedule architecture has proven to have far more robust functionality and adaptability than Mobile UP with respect to the optimization and

management of resources, and has much greater potential for improved collection of field data and field timesheets.

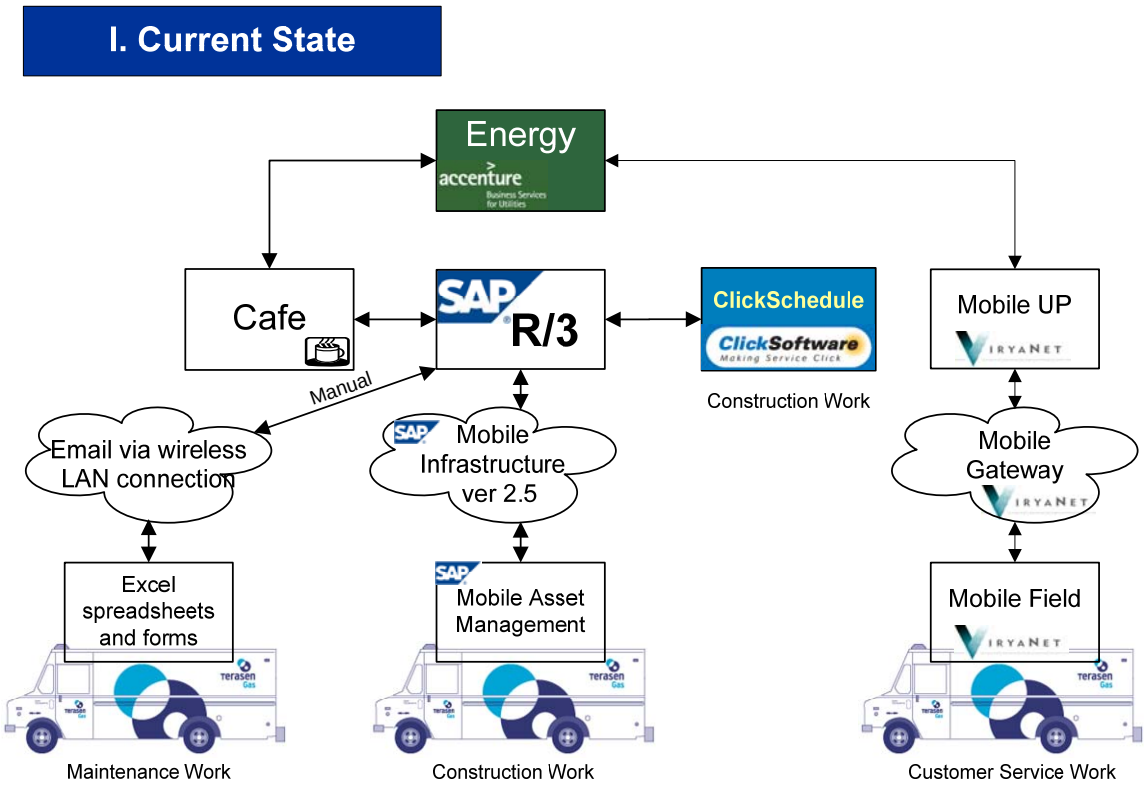
In May of 2006, in preparation for the replacement of the obsolete Mobile UP system, the Field Mobile Workforce Strategy Project was initiated. The goal of the project was to develop the "end-state" vision for how Distribution should most effectively manage its field workforce, to ensure the proposed technical solutions were the best fit for achieving this vision, and to develop a business case for the solution's implementation. The initial phase of the project was completed in July of 2006 and delivered a Workforce Strategy for Distribution and a comprehensive set of business requirements for managing the field workforce. However, technical issues with SAP's Mobile Infrastructure component of the current Construction solution led to questions regarding the overall stability of the SAP solution and SAP's ability to fully support it in a production environment. [redacted] SAP, having already recognized the need to upgrade it's mobile offering, announced that it was re-architecting it's mobile solution and the initial version would be available in the first half of 2007. As a result, a selection process was launched in late September 2006 to determine if a preferred alternative to SAP's Mobile Asset Management could be found. The outcome of this selection process is the recommended solution based on ClickSchedule, SAP R/3, and Syclo's mobile workforce solution found in this business case.

2.2 Current Situation

As a result of Distribution's lengthy and convoluted history with Resource Management, there are currently three distinct processes and technologies for managing resources and dispatching work, and three distinct mechanisms for receiving work in the field. In the past, when field resources were specialized and largely aligned with one of the three work types, this situation may have functioned reasonably well (albeit sub-optimally). However, as Distribution moves to a more generic, less specialized, model - where workers frequently move between the work streams - the situation is becoming increasingly less tenable. This situation was highlighted with the completion of the Business Integration Program in early 2006, due to the increased complexity of managing Vancouver Island resources, who are far more likely to support all three work types than their mainland counterparts.

Of the current dispatching solutions, both Mobile SAP and Mobile UP suffer from support and stability issues. Furthermore, because of its obsolescence, Mobile UP represents a significant and increasing risk to the stability of Distribution's field operations.

The Current State environment for managing field resources and scheduling and dispatching work is outlined in the following figure, "1 Current State".



Customer Service Work is initiated in the Customer Information System, "Energy", either through a customer call to the call centre or through the recognition of a metering irregularity. Approximately 115,000 work orders per year are sent via a periodic batch interface to the Mobile Data Dispatching application, Mobile UP, where they are assigned to qualified and available technicians. Jobs are wirelessly communicated to the field technicians, who status the jobs as they work them. Upon job completion, completion information is filled out by the technician in the field application, which updates Mobile UP. Completion information is then interfaced back to Energy for job closing. The status updates recorded by each technician through the day are stored in Mobile UP, and a daily interface converts the data to timesheet information and exports it to SAP's costing system. In a separate process, Technician's also fill out paper timesheets for input into the payroll process, leading to discrepancies between the costing and payroll data in SAP R/3.

When Mobile UP was implemented, the Customer Care processes and the supporting Energy technology were managed within the gas utility. In 2002, they were outsourced to Accenture Business Services for Utilities (ABSU) resulting in increased complexity and cost in enacting any process or technology improvements to the Customer Service process. Customer Appointment Setting was removed from the scope of the Customer Care outsourcing due to Mobile UP's failure to deliver promised functionality, and the utility was required to absorb the cost of adding this function to its operations support group.

Maintenance Work is initiated directly in SAP R/3's Plant Maintenance (PM) module. Preventive maintenance work orders are created automatically by SAP based on

maintenance plans, and corrective work orders are created manually by Maintenance Analysts based on condition reports provided by the field technicians. Approximately 55,000 maintenance work orders per year are dispatched by exporting lists of work orders into Excel spreadsheets, manually assigning the work to technicians, and emailing the lists to the technicians. System Operations technicians use wireless "air-cards" to periodically connect to the LAN and retrieve the emailed work lists. The technicians then process the supplied work in whichever sequence they prefer, without providing either status or progress updates to the office. Completion information is recorded by the field technicians in a series of MS Word and Excel forms, which are returned to the office by email. An OSR then converts these electronic forms to input files and uses a custom program to load them into SAP PM.

Construction Work is initiated in the Café application, usually as the result of a customer request for a new service attachment to the gas distribution network. Job planning and pricing information is gathered from the customer, and an interface is executed to ClickSchedule to check for crew availability. Once the customer agrees to the pricing and scheduling appointment, the quotation is accepted which triggers its automatic submission to SAP R/3. Each field activity within a job creates an SAP work order, which in turn creates an equivalent ClickSchedule task. ClickSchedule then works to optimize the task timing and assignment to produce an effective work schedule, accounting for scheduling rules, geography, dependent jobs, and customer appointments. When the work is ready to go to the field, a status change in ClickSchedule triggers SAP R/3 to download the work orders to SAP's Mobile Asset Management. As the field crews process the work, status updates are sent to SAP R/3 which in turn updates ClickSchedule as the crews go "en route", arrive, and complete the work. Since the construction process still requires paper drawings, field sketches, and permit documents, it is not yet a paperless process. Job completion information is recorded via paper documents which are returned to the office for clerical processing in SAP and AMFM. Approximately 30,000 construction work orders are completed annually.

There are 230 discreet work order types as defined in the Distribution product model associated with the 3 streams of work described above.

The Distribution Field Workforce is comprised of approximately 440 individuals, designated by 15 Job descriptions. Currently approximately 50% of the workforce has the skill set to perform only construction related work, 20% only customer service related work with 30% having the skills to perform varying degrees of all work types. There is currently no functionality that allows work to move between the systems. Work types that cross the three models, such as emergency response and complex multi-family construction, require complex manual coordination, resulting in duplicate processing and errors. This also limits the use of maintenance technicians from responding to emergencies and performing routine Customer Service tasks.

Lack of a single repository of resource data means that schedules are maintained in a set of Excel spreadsheets which are manually kept in sync with the other dispatching applications.

3.0 Strategic Alignment

3.1 Strategic Divers

Achieving a common Distribution Field Mobile Solution is central to enabling Distribution to execute on essentially all of its key strategies. The specific strategic drivers which this project will address are:

3.1.1 Operational Excellence

Distribution's ability to further optimize its field resources is restricted by the lack of functionality and disparate nature of the current technologies. Also, current processes are overly complex, error prone, and involve significant manual intervention. The proposed solution would allow Distribution to continue its strategy to become more Operationally Excellent by allowing for improved optimization of the field resources and eliminating many complex, redundant and error prone processes.

3.1.2 Sustainable Growth

To balance its goal of being Operationally Excellent while delivering to Customer Service standards, Distribution has invested heavily in process standardization, centralization, and technology. However, due to the limitations and inefficiencies imposed by the current suite of technologies, Distribution is operating very close to its maximum capacity for processing work. To support the Corporate Strategic plan of sustainable business growth, with a particular focus increasing the addition of multi-family units, Distribution cannot continue to operate on the current technology at the current staffing levels. The current process for multi-family unit construction is very complex and error prone, requiring manual coordination of tasks between Mobile UP and SAP / ClickSchedule.

3.1.3 Customer Satisfaction

While recent Customer Satisfaction Survey results have been positive (77.9% as of the December 2006 Scorecard, with a target range of 76% to 80%), this is a potentially fragile situation given how close to full capacity Distribution is currently operating, the plans to increase customer attachment rates, and the increasing risk of failures of the current Mobile UP system. The proposed solution would position Distribution to maintain its current service levels in a growth environment.

3.1.4 Multi-tasking Workforce

One of Distribution's key goals is to establish a flexible, multi-tasking and less specialized resource pool by taking advantage of current high levels of attrition in the current aging IBEW workforce. The intent is to align field resources to a better fit against internally delivered priority work. Flexible options to train and assign field resources as work-type and workload requires without contractual job role constraints will facilitate further optimization of this workforce and allow Distribution to operate at a lower overall cost The current technologies, however, severely limit achieving this goal as workers who support more than one type or work are required to utilize multiple technologies to receive and process their work. With the current technology, there is no way to have a Service Technician (who uses Mobile UP) perform what was previously a Maintenance

Technician task (which are processed in SAP). Implementation of this project will remove all technology and process barriers that limit who can perform which work.

3.1.5 Improved Compliance with Asset Integrity Programs

Given the manual processes for managing PM work and the resulting lack of visibility of job status, there is limited ability to determine if PM work is being completed in compliance with asset integrity programs. As a result, programs are not always completed as required. Also, manual data capture processes and the lack of asset information visibility in the field directly limits the effectiveness of these programs. This project will improve the management, execution, and audit ability of asset integrity programs.

3.1.6 Improved Decision Making

Current reporting is spread across several disparate systems limiting the ability to make informed decisions. Also, manual data collection processes results in a wide variety in the quality and completeness of data captured further hampering decision making. This project addresses both of these issues.

3.1.7 Improved Employee Engagement

Terasen has set a key corporate goal of improving its Employee Engagement. During the Mobile Field Workforce Strategy Project workshops, it was repeatedly noted that the current low levels of engagement with field staff is in part due to the isolation from management and co-workers that the field workers feel as a result of the current limited communication provided by Mobile UP. This project will begin to address this issue by providing field workers with access to additional valuable information in the field, and providing a platform for the potential addition of access to knowledge base, standards information, and messaging capabilities.

3.1.8 Support for Inspections Work Type

From the Distribution Workforce Strategy, undertaken as part of this analysis, it was noted that as Distribution moves more of its non-core work to contractors, it is likely that additional work types will be introduced for field workers to provide inspection services of this contracted work. For this to be effective, it is envisioned that inspections would be performed by any qualified field worker rather than by a dedicated specialized workforce. This project supports this strategy.

3.1.9 Management of Work for 3rd Parties

The current processes for managing work performed by Terasen resources for 3rd party organizations (through Terasen Energy Services) are complex and are not integrated with the existing systems, resulting to numerous time consuming and error prone workarounds. This project supports the goal to deliver more of this work and to be able to do so cost effectively and within defined service level agreements.

3.1.10 Device Management other than Meters

Due to the tight integration with CIS Energy for the Device Management / Meter Exchange process, there is no current means to support the field management of devices other than meters with the current Mobile UP solution without extensive

modifications to the Energy application (which would likely not be supported by ABSU). This represents a substantial risk as there have been ongoing discussions with Measurement Canada to require the management of Pressure Factor Measurement (PFM) regulators.

3.1.11 Potential Outsourcing of Appointment Booking to ABSU

Although originally in-scope for Program Mercury, the Customer Care functions outsourced to ABSU did not include Appointment Booking. Any advancement in this area after January 1, 2002 have been provided and funded by the Utility. This project will provide the technology to position Terasen for the future potential of outsourcing of Appointment Booking to ABSU which would be achieved through a billable scope change.

3.2 Strategies Not Impacted

The following strategies are not impacted by the execution of this project:

3.2.1 Potential Changes in Metering Technology

There are some discussions that Terasen may move away from the use of the current diaphragm style residential meters in favour of new “self diagnosing” meter technology, potentially eliminating a large portion of the current Distribution field work load. It is Distribution’s current understanding, however, that if this change does occur that it will not materially impact the field work load within at least the next five years, and so is not considered to impact upon the more immediate need for this project.

3.2.2 Residential Unbundling

While Terasen is currently executing on its strategy to unbundle the commodity and delivery components of natural gas for residential customers, analysis has determined that this will not have any impact on the field work delivered by Distribution.

3.3 Operational Drivers

At an operational level, the processes and tools in place today for allocating resources, scheduling, assigning and dispatching work, and communicating with the field are disparate for Customer Service, Construction and Preventive Maintenance work. As a result, many processes are overly complex, require duplicated efforts, and are error prone. The key operational issues which this project will address include:

3.3.1 The Obsolescence of Mobile UP

The current Mobile UP application is obsolete and poses a significant and increasing risk to Distribution’s ongoing operations. The version of Mobile UP used at Terasen Gas is at least 2 versions behind what is currently supported by ViryaNet, and Terasen is the only customer still using this version in a production environment. The current implementation is approximately 7 years old and is becoming increasingly unstable. It must either be replaced or upgraded. The age and fragility of the current system preclude the ability to make even minor enhancements to it because of the risk that the system would not be able to be brought back up after changes were made.

Mobile UP suffers approximately 2 system outage-hours a month during the most critical dispatching period, leaving technicians waiting for work. During a system outage, the process for dispatchers is manual and work orders have to be physically printed and faxed to all technicians. (Note: Mobile UP outage hours for 2006 was 76 hours, and 56 hours for the 2005 year.

Other technical issues with the current Mobile UP system include:

- The current Oracle Database version 8 in use for Mobile UP is no longer supported by Oracle. The most current Oracle Database version in the marketplace is 10g.

- The existing Mobile UP Unix hardware and the Disk Array are both 7 years old and require replacement, since they are past the current 4 year Terasen hardware refresh.

- The AIX Operating System is obsolete.

Further reliance on outdated, poorly supported systems could potentially cripple Operations and greatly affect Terasen Gas' ability in meeting our integrity management goals and objectives.

3.3.2 Limitations with current Mobile UP Functionality

There are gaps with Mobile UP's current functionality that limit Distribution's ability to operate effectively. These include:

- Scheduling – Mobile UP only processes "today's work" (i.e. provides no forward view) and does not provide any scheduling, forcing processes to be reactive as work cannot be optimized over several days

- Optimization – The lack of scheduling eliminates the ability to optimize resources. Also, since Mobile UP has no street routing capability, it does not include travel time considerations when assigning work

- Appointment Booking – Currently the meter exchange appointment process is manual and performed at Terasen (appointments are not booked for other customer work types). This work was originally intended to be performed by Accenture Business Services for Utilities but the Utility Partner's Customer Appointment Setting (CAS) tool was not sufficient

- Validation of field data captured – Field data entry errors lead to approximately 1,500 duplicated site visits per year because meter data is not validated in the field and errors require a repeat site visit

- Dependencies between tasks – Management of dependent jobs requires manual co-ordination

- Access to historical information – Technicians are unable to see other work done or other problems identified at a site. This leads to the creation of duplicate

orders and duplicate site visits (technicians are unaware of other work that can be done while on site)

- Premise data – Technicians are unable to access information about premises, which impairs them in preparing for site visits and dealing with antagonistic customers

3.3.3 Manual Dispatching and Data Capture Processes for PM Work

Dispatch, resource management and field administration of Preventive Maintenance work is a manual labour intensive process. Automation of PM work and visibility of all available resources will aid in ensuring timely completion of asset related work assignments that are aligned in support of risk prioritized integrity management plans for the utility. Key issues identified are:

- Lack of Technician and Job Status visibility - There is currently no visibility of technician or job status for PM work. With the current manual process there is no ability to optimize work across the field (i.e. technicians are not always utilized for emergencies). Lack of real time tracking throughout the year, leads to "campaigns" to complete outstanding work which ultimately impacts budgets.

- Manual assignment of work – The current process of assigning work is via spreadsheet rules of "who can do what, where". There is no real time capability to track, transmit, or fully assess, competing priorities or emergencies.

- Validation of field data captured – Field data entry errors lead to numerous duplicated site visits

- Access to historical information – The technician is unable to see other work done or other problems identified at a site. This leads to creation of duplicate orders and duplicate site visits (technician is unaware of other work that can be done while on site).

- No real time connectivity – Technicians are unable to transmit completed documentation to the office in real time since they are capturing data on stand alone spreadsheets/documents that are only sent back when they are reconnected to the network.

Automation of PM work and visibility of all available resources will aid in ensuring timely completion of asset related work assignments that are aligned in support of risk prioritized integrity management plans for the utility.

3.3.4 Complexity of Current Processes

Having multiple systems has increased complexity in procedures for getting work to the field based on "who has what technology". Processes often require duplicate orders be raised to enable dispatching and require manual coordination of work across the systems. This is the case with the more complex multi-family unit construction work, which is the focus area for growth. This complexity results in numerous processing errors which consume considerable effort to rectify.

3.3.5 Duplicated Resource Management Procedures

Using multiple systems for managing resources has also resulted in duplicated effort to maintain resource attributes and schedules in the multiple applications. Manual procedures are also required to coordinate which resources are being managed through which technology at any given point in time as workers move between work types.

3.3.6 Multiple Technologies for Field Workers

Field workers must know up to three different technologies in order to receive and process work leading to training and support issues. This is a particular concern due to the increase in retirements and Distribution's plans to introduce approximately 25 new field workers this year and 25 next year, and the burden this will place on training efforts and the time required for the new workers to become fully effective.

3.3.7 Manual Data Entry, Data Validation and Error Handling Procedures

Current manual field data capture processes not only result in clerical time to perform the data entry, but also result in considerable time being spent in data validation and correction by the Closing and Timesheet administration groups. Data reported from the field is frequently incomplete or inaccurate, requiring correction prior to being entered. This can cause particular issues if timesheet data is not corrected in time to meet cut-off deadlines for payroll execution, resulting in time consuming workarounds.

3.3.8 Lack of Standardized Performance Reporting

Performance reporting is currently split across the disparate systems, complicating analysis and decision making. This causes particular challenges in performance reporting for field technicians as data from each system only provides a partial view of the technicians' performance. There is currently no mechanism to combine or reconcile the reporting from the various systems other than manual.

3.3.9 Lack of Information Provided to Field Workers

The current applications provide field works with "task" information only – a description of what to do and where to do it. They do not provide any information about the work site or assets, any history of work performed there, or any information on other work that could be performed there. This leads to the creation of duplicate hazard notifications – and subsequent processes to identify and eliminate these duplicates – and reduces the effectiveness of the field workers.

3.3.10 Timesheet and Mobile Time Costing Discrepancies

Time data captured in Mobile UP is currently used to feed technician cost data into SAP, but is not used for payroll time sheeting. This results in constant discrepancies between the Mobile UP time data and the manual timesheet data submitted by the technicians creating time and cost reconciliation problems. Significant data entry and follow-up/chasing of paperwork by the time sheet processing and financial analyst groups is required to enter adjustments into the appropriate costing and payroll systems each payroll cycle.

3.3.11 Duplicated and Complex System Support Requirements

The multiple technologies used by field workers each require support processes and procedures. Standardization would result in a much simpler support environment. Furthermore, the current Mobile SAP application requires additional support due to its ongoing synchronization issues and its inability to allow users to share devices (complicating the management of spare devices).

4.0 Goals and Objectives

The goal of this project is to enable Distribution to execute on its key business strategies by providing a common, stable, and supportable set of processes and technologies for managing all field work and resources in a consistent and efficient manner, thereby eliminating numerous redundant, error prone, and manually intensive processes.

The specific objectives of this project are as follows:

1. To provide a single set of processes and technologies to:

    - manage all field work and resources:
    - eliminate the current overly complex and redundant work procedures:
    - support the ability to further optimize field resources:
    - support Distribution's strategy of moving to a more multi-skilled field workforce:
    - allow Distribution to maintain Customer Satisfaction levels in the face of increasing customer attachment rates.

2. To support the further optimization of the field workforce and to free dispatchers from performing routine tasks, allowing them to focus on handling exceptions, by automating the scheduling and optimization of all work through the expanded use of ClickSchedule to include Customer Service and Preventive Maintenance work.

3. To reduce the work effort involved in data entry, data validation, error handling, and duplicated site visits by moving the collection and validation of field and timesheet data to the field, and by automating the capturing of this data.

4. To provide a stable and supportable technical solution by replacing the current obsolete Mobile UP system and the support-intensive Mobile SAP system.

5. To eliminate the business risk that Measurement Canada may require Terasen to begin managing its fleet of PFM regulators as measurement devices by replacing the current Energy / Mobile UP based process which does not support this without considerable expense.

6. To support the efficient management of work performed for 3rd parties through Terasen Energy Services by integrating this work into the standard work processes and eliminating the current technology imposed workarounds.

7. To support the improved management, execution and audit ability of Asset Integrity Programs by providing real-time status tracking and consistent reporting of PM work and by providing access to valuable asset and work history data to the technicians in the field.

8. To support improved decision making by eliminating the current disparate reporting systems and by improving the completeness and quality of data being gathered in the field.

9. To allow Distribution to begin addressing issues with Employee Engagement by allowing field technicians access to information stored in back-end systems and by providing a platform for the potential future implementation of web-based virtual-community functionality.

10. To support Distribution's plans to utilize the current field work force to provide inspection services as increasing levels of work are delivered by contractors.

11. Eliminate the current manual scheduling, dispatching, and resource management processes for Preventive Maintenance work and technicians.

12. Reduce the training and support effort required for field technicians who must currently learn up to three different methods for receiving and processing work by standardizing on a single technology to be used for all work by all field resources.

13. Eliminate the current effort required to reconcile issues between the Mobile UP time tracking for costing process and the manual timesheet process.

14. Eliminate the current stand-alone cell phone based "working alone" monitoring for Mobile Laptop users by integrating this functionality within the proposed solution.

15. To provide the potential to improve Customer Satisfaction levels by supporting appointment booking for all Customer Service work as well as the capability to outsource this function to ABSU in the future.

5.0 Recommendation

Given the operational risk represented by continuing to operate the obsolete Mobile UP application, there are essentially only two options available to the business: upgrade Mobile UP to a supported version but maintain the status quo architecture and processes, or replace Mobile UP with the proposed solution and incorporate the additional capabilities of the scheduling tool. Only one technical solution has been included for consideration in replacing Mobile UP as extensive analysis has been completed to confirm the proposed solution most effectively supports Terasen's requirements.

5.1 Recommended Solution: Replace Mobile Up with the SAP R/3, Syclo and ClickSchedule Solution, and Include Other Beneficial Scope Items

Total Capital Investment (not including AFUDC) $ **$5,645,528**

Implementing SAP R/3, Syclo, and ClickSchedule for all work types, and including the automation of field and timesheet data capture in scope is the recommended solution as

it best aligns with the organization's strategic objectives and delivers substantial benefits to the business. This solution supports the migration of Customer Service work (from Mobile UP) and Preventive Maintenance work (manual process) to a single resource management and schedule optimization tool in ClickSchedule, and supports the use of a common mobile solution by all Distribution field resources. Implementation of the Field Mobile Solution will substantially improve operational processes associated with allocating, scheduling, assigning, dispatching and tracking resources and work. The automation of field and timesheet data capture will improve data quality and eliminate manual data checking, error handling, and data entry processes.

Alternative 1 Key Financials (2007-2011)

(in thousands C$)	2007	2008	2009	2010	2011
Capital Expenditure	$2,945	$2,700	-	-	-
AFUDC	$60	$268	-	-	-
Capital Expen incl AFUDC	**$3,005**	**$2,968**	**-**	**-**	**-**
					$5,973
After Tax Cash Flow impact	**($2,024)**	**($1,966)**	**$486**	**$604**	**$590**
					($2,310)
ROE	**8.37%**				
IRR (after tax)	**2.90%**				
IRR (pre tax)	**4.26%**				
NPV (10yr @ 5.8%)	**($652)**				
EBITDA	$29	($1,198)	$86	$1,491	$1,419
					$1,827
Net Income	$28	$78	($32)	$142	$120
Rate Base Impact	-	-	**$5,600**	$4,853	$4,107

5.2 Rejected Course of Action: Pure Replacement of Mobile UP with the SAP, Syclo, and ClickSchedule Solution

Total Capital Investment (not including AFUDC) $ 4,000,000

While Mobile UP needs to be retired, simply replacing it with the proposed solution will not deliver any benefit to the business. Efficiency gains from managing Preventative Maintenance, Customer Service and Construction work on a common platform, reducing manual data entry, eliminating duplicate processes, optimizing of work schedules and other benefits will only be realized with the recommended solution.

The capital investment of this option results in a significant outlay for capital investment and will not achieve any of Terasen's strategic objectives or business benefits.

Alternative 2 Key Financials (2007-2011)

(in thousands C$)	2007	2008	2009	2010	2011
Capital Expenditure	$1,822	$2,016	-	-	-
AFUDC	$40	$176	-	-	-
Capital Expen incl AFUDC	**$1,862**	**$2,192**	**-**	**-**	**-**
					$4,054
After Tax Cash Flow impact	**($1,253)**	**($1,437)**	**$407**	**$410**	**$400**
					($1,473)
ROE	**8.37%**				
IRR (after tax)	**2.91%**				
IRR (pre tax)	**4.28%**				
NPV (10yr @ 5.8%)	**($436)**				
EBITDA	$20	($802)	$161	$1,018	$966
					$1,362
Net Income	$19	$78	$91	$96	$82
Rate Base Impact	-	-	**$3,800**	$3,294	$2,787

The variance between the two alternatives is shown in the following table:

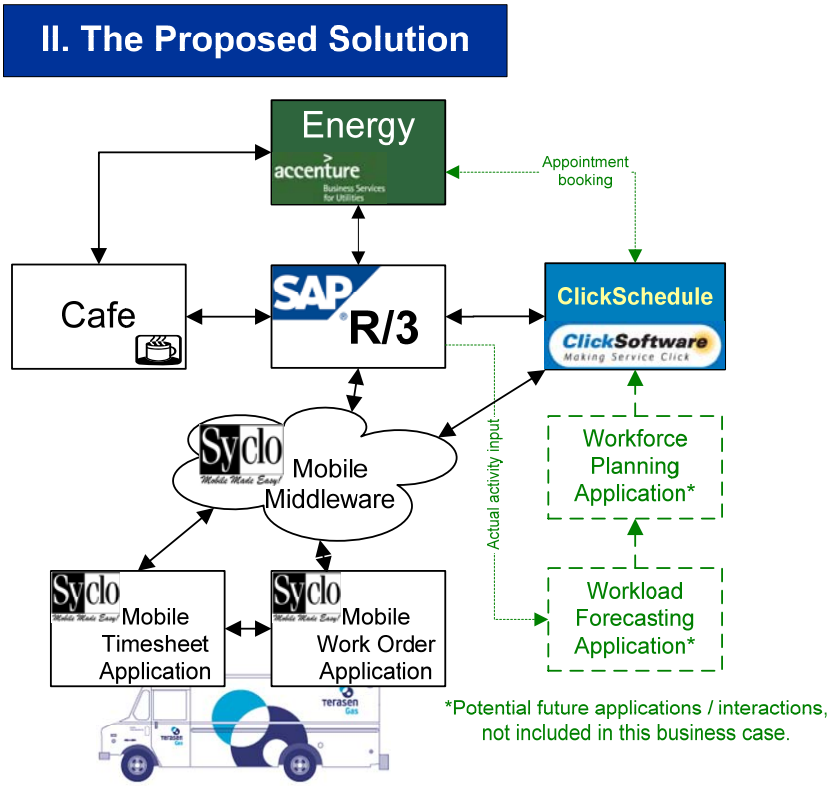
VARIANCE IN ALTERNATIVES Key Financials (2007-2011)

(in thousands C$)	2007	2008	2009	2010	2011
Capital Expenditure	$1,123	$685	-	-	-
AFUDC	$20	$91	-	-	-
Capital Expen incl AFUDC	**$1,143**	**$776**	**-**	**-**	**-**
					$1,920
After Tax Cash Flow impact	**($771)**	**($528)**	**$79**	**$194**	**$189**
					($836)
ROE	**0.00%**				
IRR (after tax)	**-0.01%**				
IRR (pre tax)	**-0.02%**				
NPV (10yr @5.8%)	**($216)**				
EBITDA	$10	($396)	($74)	$474	$453
					-
Net Income	$9	($1)	($123)	$46	$39
Rate Base Impact	-	-	**$1,800**	$1,560	$1,320

5.4 Technical Solution

5.4.1 Solution Description

The proposed solution is outlined in the Figure II below.



The key elements of the solution include:

- Moving Customer Service work from Mobile UP to SAP R/3 by redirecting the existing Energy / Mobile UP interface to SAP. In this way, all work orders will be managed, costed, and reported in the same way since Construction and Maintenance work are already managed in SAP R/3.

- Expanding the use of ClickSchedule and the existing SAP / ClickSchedule interface to include Preventive Maintenance and Customer Service Work, and to cover all field resources. This will provide automation of scheduling, coordination of complex tasks, optimization of the entire workforce, and booking of appointments for customer jobs.

- Implementing Syclo's mobile work order and mobile timesheet applications for all Distribution field resources, and using Syclo's mobile middleware to interact directly with SAP R/3 to automate field data capture processes, and with ClickSchedule to automate real-time updating of technician and job statuses.

While not included in the scope of the currently proposed project, the solution is designed to allow for the future addition of components to provide work load forecasting,

workforce planning, and outsourcing of appointment booking to ABSU. These items have not been included in the current scope because there was no clear business value to justify the additional cost. The business initiated a process to improve work load forecasting and workforce planning at the beginning of this year, and until this process has stabilized there is no means to determine whether purchasing new applications will deliver enough additional value to justify their cost.

5.4.2 Solution Selection Approach

In May of 2006, the Field Mobile Workforce Strategy Project was initiated to develop an end-state vision for the management of Distribution's field workforce and to develop implementation plans and an associated business case for the delivery of the first stage of this vision, including the replacement of the existing Mobile UP system. Numerous workshops were completed to confirm Distribution's workforce strategy and to ensure the full range of business requirements were captured. These requirements were used to develop conceptual designs for the future state processes and technical architecture, which were vetted with key business process owners and subject matter experts.

[redacted] Field Service software market in the past was dominated by single-purpose mobile data dispatching (MDD) applications such as MDSI and Mobile UP, that because of their lack of compatibility with large ERP systems, the market has now shifted to a more component based model where best-of-breed applications such as ClickSchedule work in concert with existing work order systems like SAP. In the past, mobile communication provided by these MDD systems was proprietary and provided access to only the vendor's own back-end system. This model is giving way to a more general set of mobile applications (generically referred to as Multichannel Access Gateways or MAGS) that provide broad based mobile access to back-end corporate applications and deliver robust tools for managing mobile workers. This is the same architecture proposed by the Field Mobile Workforce Strategy Project as it provides the best combination of functionality for meeting the business requirements, but also best supports potentially adding other applications and capabilities in the future.

While it was the original intent of the Field Mobile Workforce Strategy Project to simply confirm that the solution previously implemented for Construction would support the full set of Distribution's requirements, as has been discussed elsewhere in this document, support issues with the existing Mobile SAP implementation led to questions as to SAP's ability to support their product. SAP also announced plans to fully re-architect its mobile solution set, leading to further concerns over how mature a product Terasen would be left with. [redacted]. As a result, an exercise was initiated to select a best fit Multichannel Access Gateway solution. [redacted] Through an extensive request-for-proposal and request-for-quotation process to ensure the requirements were fully understood, Syclo was selected as the most appropriate fit for Terasen. Syclo also has a demonstrated compatibility with ClickSchedule. A simpler version of ClickSchedule is incorporated into the Syclo product. While not robust enough

to replace ClickSoftware for Terasen, it confirms the compatibility of the integration of the various technologies.

[redacted]. Since the application is already used to support construction work, no other scheduling applications were considered for the proposed solution. ClickSchedule was originally selected through the Service Delivery Enhancement Project due to its strong functionality and tight integration with SAP. SAP recommended that Terasen use Click as the scheduling application of choice.

5.4.3 Project Timeline:

February 15	2007	Submission of Business Case
February 28	2007	Business Case Review and Approvals
March 1	2007	Project Preparation Phase begins Preparation of CPCN Submission begins
April 1	2007	Requirements Definition Phase begins
March 31	2007	Submission of CPCN to the BCUC
June 30	2007	CPCN Approval received
September 1	2007	Detailed Design Phase begins
October 1	2007	Development and Testing Phase begins
March 1	2008	Final Preparation for Go-Live Phase begins
May 31	2008	Solution goes live
August 31	2008	Stabilization Period and Project Complete

The timeline allows for a break for the project team through July and August 2007. This will allow team members to take vacations. During this time period, the external solution providers, Syclo and ClickSoftware, will continue to work on refining their solutions, substantially reducing the project risk. This approach also allows the capital expenditure to be spread across 2007 and 2008.

6.0 Project Costs and Financial Analysis

6.1 Project Implementation Costs

The project capital cost is outlined in the following table:

	2007	2008	Totals						
	TGI	**TGVI**	**Total**	**TGI**	**TGVI**	**Total**	**TGI**	**TGVI**	**Total**
Internal Labour	$303,596	$33,733	**$337,329**	$341,863	$37,985	**$379,848**	$645,459	$71,718	**$717,176**
Consulting	$1,210,320	$134,480	**$1,344,800**	$1,434,003	$159,334	**$1,593,337**	$2,644,323	$293,814	**$2,938,137**
Hardware	$135,000	$15,000	**$150,000**	$145,800	$16,200	**$162,000**	$280,800	$31,200	**$312,000**
Software	$511,593	$56,844	**$568,436**	$20,801	$2,311	**$23,112**	$532,393	$59,155	**$591,548**
Expenses	$188,567	$20,952	**$209,519**	$203,650	$22,628	**$226,278**	$392,217	$43,580	**$435,797**
Contingency	$71,076	$7,897	**$78,974**	$284,306	$31,590	**$315,896**	$355,382	$39,487	**$394,869**
Total	**$2,420,152**	**$268,906**	**$2,689,058**	**$2,430,423**	**$270,047**	**$2,700,470**	**$4,850,575**	**$538,953**	**$5,389,528**
2006 Spend									$256,000
Total									**$5,645,528**

6.2 Operating Costs

As outlined in the following table, there will be no incremental increase in Operating costs. To ensure the overall Operating costs did not increase, a 50% reduction in both the capital and ongoing costs for licenses was negotiated with the software vendors.

New Ongoing Operating Costs:	
ClickSchedule Licensing	$40,485.00
Syclo Licensing	$68,705.00
Netmotion Licensing	$4,160.00
Server Maintenance	$47,700.00
Wireless Network Usage for Leak Survey	$7,680.00
Incremental support & potential network cost increase	*$49,270.00
Total:	**$218,000.00**
Existing Operating Costs:	
Mobile Up Licensing	$123,000.00
Mobile UP Server Maintenance	$95,000.00
Total:	**$218,000.00**
Incremental Operating Costs:	**$000.00**

*Assumes monthly network data transfer of 5MB or less per user. Actual data estimate cannot be determined until mobile system is designed. Current usage is approximately 1.5MB.

6.2 Financial Return and Cash Flow

(in thousands C$)	2007	2008	2009	2010	2011
Capital Expenditure	$2,945	$2,700	-	-	-
AFUDC	$60	$268	-	-	-
Capital Expen incl AFUDC	**$3,005**	**$2,968**	**-**	**-**	**-**
					$5,973
After Tax Cash Flow impact	**($2,024)**	**($1,966)**	**$486**	**$604**	**$590**
					($2,310)
ROE	**8.37%**				
IRR (after tax)	**2.90%**				
IRR (pre tax)	**4.26%**				
NPV (10yr @ 5.8%)	**($652)**				
EBITDA	$29	($1,198)	$86	$1,491	$1,419
					$1,827
Net Income	$28	$78	($32)	$142	$120
Rate Base Impact	-	-	**$5,600**	$4,853	$4,107

7.0 Benefits

The proposed Distribution Mobile Solution will position Distribution to realize both the strategic and operational benefits associated with the efficient and effective management of resources and work via one common supportable technology platform in the magnitude of $576,000 per year.

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7.1 Strategic Benefits

7.1.1 Increased Operational Excellence through continued IRM Enablement

In 2000, when Integrated Resource Management (IRM) department was created, it was positioned as a fundamental building block to enable Distribution to meet its strategic goal of “Operational Excellence”. While Distribution has achieved some of the goals set out in the original IRM project - most notably the centralization of resource management functions (including the integration of Terasen Gas Vancouver Island) - the envisioned optimization of the field workforce has not been achieved. While there have been considerable operational improvements across the individual processes, because the processes are not consistent or integrated, further optimization of the workforce is impossible with the current technology. Implementation of this solution will enable the optimizing capability of ClickSchedule to be applied to all work types for the entire Distribution field workforce.

7.1.2 Support of Corporate Growth Strategy

Terasen Gas’ goal is to service one million customers by 2010. To support this initiative, Distribution must position itself to handle the anticipated increase in activities – particularly for multi-family dwellings which are expected to generate the majority of the new attachments. The proposed solution will provide the tools to support achieving this goal. Current work management processes are operating very close to their full capacity and are unlikely to be able to support the additional work load at current cost and customer satisfaction levels – particularly given the complexity of the current multi-family dwelling construction process which requires manual coordination of Construction and Mobile UP tasks.

In addition, in order to support Terasen’s goal of one significant acquisition by 2010, a robust and stable system will be essential to enabling effective integration of Resource Management operations.

7.1.3 Maintained or Improved Customer Satisfaction Levels

As noted above, without enhancing the current processes as proposed, customer satisfaction levels may be negatively impacted if customer attachment rates increase as planned. The proposed solution will enhance our ability to maintain customer satisfaction levels despite increasing attachment rates.

In addition, the ability to outsource appointment booking to Accenture Business Services in the future will be provided.

7.1.4 Enablement of Plans for a Multi-tasking Workforce

Distribution's strategy to move towards a more multi-skilled workforce is severely limited by the current disparate dispatching technologies. In order to support all three work types, technicians need to use three different field technologies. Since a technician can only utilize a single technology at a time, this requires the Resource Management group to manually coordinate which resources are available for receiving which type of work at any given point in time. This manual juggling of who is available for which work types severely restricts the benefits of having a more flexible workforce. With the removal of these constraints with the proposed solution, there will be no limitations on who can perform what type of work other than the skills and availability of the individual technicians.

7.1.5 Improved Compliance with Asset Integrity Programs

As set out in the November 2005 Distribution Strategic Plan, Distribution is to strive towards increasing the visibility of delivery asset performance through the development, implementation and management of performance measures and reporting. The proposed solution will provide greater visibility of preventive and corrective maintenance work activities and available resources. Scheduling optimization will allow for an incremental increase is activities performed by technicians ensuring timely completion of work plans. Asset performance field data quality will be improved by reducing duplicate manual data entry and providing validation checks on the mobile terminal. Improved closing processes for field work tasks will facilitate timely and more accurate activity status reporting.

With greater visibility and timely activity status reporting, Distribution will be able to better manage asset related work activities and resources to better achieve asset integrity management goals and objectives.

7.1.6 Improved Decision Making

Current decision making processes are impaired both by the fact that reporting is spread across numerous unrelated systems and by the lack of quality and completeness of data reported from the field. This project will address both of these issues by consolidating reporting to a single consistent set of data and by automating the field capturing and validation of reported data. Consistent reporting and improved data quality will allow the business to make better decisions.

7.1.7 Improved Employee Engagement

Terasen has a stated strategy to focus on improving its employee engagement. Through the numerous workshops held as part of this analysis, it was made clear that for Distribution's field workforce, much of the disengagement they currently feel is a result of the limited capabilities and poor access to data provided by the current mobile applications. This project addresses specific items highlighted by the field that they feel will help improve employee engagement, such as access to historical work information and premise data.

Also, while not in scope to be delivered as part of this implementation, the proposed solution has been architected to allow for future field access to other corporate applications such as knowledge bases and standards. Access to these applications

would further improve employee engagement. Neither Mobile UP nor SAP's Mobile Asset Management provide this capability.

7.1.8 Support for Inspection Work Type

Distribution also has a strategy to move more of its non-core workload to contractors and use Terasen employees to perform inspection services of the contracted services. With the current applications, this would require a manual coordination process and would only allow a segment of the workforce to perform these inspections. The proposed solution supports automated coordination of these activities and allows dispatching of them to any field resource.

7.1.9 Management of Work for 3rd Parties

Terasen's Marketing group has stated a goal to increase the amount of work performed for 3rd parties through Terasen Energy Services. This goal is based on the assumption that Distribution will be able to deliver these services as efficiently as possible. Currently, however, the processes for delivering work for third parties are not completely integrated with other work processes and require numerous inefficient workarounds. This project supports the integration of work for 3rd parties into the standard work processes, allowing this work to be delivered and accounted for efficiently and consistently.

7.1.10 Support for Device Management Processes

Terasen faces a risk that the current practice of periodically recalling and testing meters as mandated by Measurement Canada may be extended to include other measurement devices such as PFM regulators. With the current Mobile UP solution, there is no method to manage devices other than meters since they are not recognized in the Energy CIS. The proposed solution allows for the management of all measurement devices, despite the limitations in Energy.

7.1.11 Outsourcing of Appointment Booking to ABSU

Although originally in-scope for Program Mercury, the Customer Care functions outsourced to ABSU did not include Appointment Booking. Any advancement in this area after January 1, 2002 have been provided and funded by the Utility. This project will provide the technology to position Terasen for the future potential of outsourcing of Appointment Booking to ABSU which would be achieved through a billable scope change.

7.2 Operational Benefits

There are also numerous operational benefits that will be achieved by this project relating to improved optimization of field resources, simplification and error reduction in the currently complex processes, automation of various manual processes, and improved stability of the technical solution. The quantified savings the project will deliver are outlined in section 7.3, and the areas which are anticipated will deliver the benefits are described in the following list:

7.2.1 Improved Optimization of Field Resources

By eliminating the constraints caused by the current disparate dispatching systems, by introducing new schedule and street-level routing optimization functionality, and by eliminating erroneous and duplicated site visits, it will be possible to reduce travel time and improve the efficiency with which field resources process work. Capacity created by this optimization will be filled by increasing the amount of planned Capital work assigned to technicians resulting in O&M savings. In some cases this would reduce the work that typically would go to a contract crew.

Today, the Distribution resource "footprint" is staffed at a level to ensure that Service Quality Indicators for emergency response are met, and that mandatory maintenance and improvement activities are completed. While this means it is challenging to further realize hard benefits through staff reductions in some areas, there is residual idle time capacity associated with the standby component of Emergency Response. Distribution has pursued initiatives to optimize this residual capacity, but these efforts have been challenged by our current technology's deficiencies. Tapping into this capacity will also allow an O&M benefit to be delivered by assigning Capital work.

7.2.2 Stable and Supportable Systems

The efficiency of field resources will further be improved by reducing the current system outages incurred by both Mobile UP and Mobile SAP. Reduction of current Mobile UP outage hours of 2 a month will both improve the efficiency of field resources and reduce the manual workarounds for dispatchers during these periods. (Note: Mobile UP outage hours for 2006 was 76 hours, compared to a total of 56 hours for the 2005 year.)

Replacing Mobile UP with the proposed solution also means Terasen would no longer be reliant on ViryaNet's support of a product that they are no longer selling nor keen on supporting or developing further. It would also avoid the costs to keep the Mobile UP environment operational, including upgrades of the Oracle Database version, the Mobile UP UNIX hardware, the AIX Operating System, and the Disk Arrays.

Replacing Mobile SAP with the proposed solution will also eliminate current support issues and the risk of having ongoing support challenges in light of SAP's plans to fully re-architect their current solution.

7.2.3 Automation of Preventive Maintenance Processes

Replacing the current dispatching method for Preventive Maintenance work with the proposed solution will eliminate the manual processing involved in the current process described in section 2.2.

7.2.4 Elimination of Complex, Duplicated, and Error Prone Resource Management Processes

Implementation of the proposed solution will eliminate numerous redundant, error prone, and overly complex processes that exist today in the resource management group in order to coordinate work and resources across the three dispatching streams. Use of ClickSchedule will also automate routine dispatching tasks, enabling dispatchers to focus more on handling exceptions and providing value-added planning support. Specifically, the proposed solution will eliminate the need to: raise duplicate work orders

for many work types, maintain resource skills and availabilities in multiple systems, manually coordinate which resources are supporting which work types, and manually maintain the excel based “work and time-off schedules”.

7.2.5 Field Resources Using a Single System

Replacing the current three methods for field technicians to receive and process work with a single consistent system will reduce errors, reduce support requirements, and simplify the movement of technicians between job roles. This is particularly important given Distribution’s high level of retiring field resources resulting in 25 new employees this year and 25 next year. A single system will significantly reduce the learning curve required to bring these new resources up to speed with processing work.

7.2.6 Elimination of Manual Data Validation and Entry

Elimination of the manual entry, validation, and error handling of data for job closing, time collection, and payroll will reduce effort in the Closing and Time Administration groups. Not only is considerable effort required to simply process the current manually collected field data, but because much of this data is incomplete and contains errors, a extra effort is involved in tracking down technicians to provide corrected data. By moving data validation to the field and automating the capture of much of the field data, a portion of the current clerical effort can be saved.

7.2.7 Simplification of Reporting

Providing simplified and consistent reporting will provide managers with the ability to better measure technician performance and utilization. With the current disparate reporting, it is very difficult to get a comprehensive and consistent view of technician performance and as a result, technicians often receive limited feedback on performance from their managers.

7.2.8 Access to Additional Data in the Field

Providing technicians with access to additional data in the field – particularly history of work performed and problems previously reported at a site – will reduce the number of duplicate problems reported (and hence reduce the back-end processes currently in place to identify and eliminate these duplicates) and reduce the number of site visits by providing technicians with a view of other work that can be completed while at a site. Access to this data will also reduce the number of calls made to dispatch and the time required for the dispatchers to look-up the data and respond.

7.2.9 Elimination of Time and Costing Data Reconciliation

While the collection and posting of time data for costing for Mobile UP work has been automated via a periodic interface from Mobile UP to SAP, the timesheet process for payroll is still a manual paper-based process. As a result, significant discrepancies appear each month between the data captured from Mobile UP and what is reported on technicians’ timesheets that must be reconciled for consistent month-end reporting to occur. Because the proposed solution would automate both the time for costing and payroll processes, the effort involved in this reconciliation would be eliminated.

7.2.10 Improved Communication between Dispatch and the Field

The ability to see the status of all field resources and their work in real-time will improve the communication between the dispatchers and the field. This coupled with the improved access to data being provided to the field will reduce the number of cell phone calls made to the office. Potential elimination of the existing Working Alone application – which is cell phone based – would further reduce the amount of cell phone charges.

7.3 Quantified Benefits

The quantified benefits that the project will deliver are outlined in the following table:

Area of Benefit	Department	Annual Saving
Reduction in manual effort for job closing will eliminate one full-time position in this group and reduce unbudgeted overtime.	Distribution	$58,000
Reduction in manual effort for timesheet entry and error handling will eliminate one full-time position in the time administration group.	HR	$57,500
Optimization of field resources through reduction in O&M to create capacity and assign Integrity Management and Install Capital work.	Distribution	$350,000
Working alone and cell benefits	Distribution	$27,500
Resource Scheduling and Dispatch efficiencies resulting in reduction of .75 FTE	Distribution	$41,000
System Survey work processing efficiencies resulting in reduction one FTE	**Distribution**	**$42,000**
Total		**$576,000**

8.0 Risk Appraisal

As outlined previously in this document, the obsolescence of the current Mobile UP application represents a considerably higher risk to the ongoing operation of the business than does the introduction of the new technology recommended in this business case.

While all projects include some risk, considerable work has been done through the Field Workforce Mobile Strategy Project to ensure the project risks have been mitigated as much as possible. This work includes ensuring that:

- The proposed solution supports Distribution's overall workforce strategy and aligns with Terasen's overall strategies,
- The business requirements for managing all types of field work are fully understood and well documented,
- The proposed solution is the best fit to meet the immediate business requirements and enable future growth,
- The selected solution vendors fully understand the requirements and project scope, and have provided fixed-price bids for their implementation efforts.

The specific areas of risk are outlined below.

8.1 Organizational Risk:

The organizational risks are low.

The organizational impacts of having a common solution are minimal. Technician schedules and work allocation will continue to be managed centrally and no field reorganization is required. While there will be some minor realignment of resources within the Operations Centre to accommodate the integrated work and resource model and streamlined processes and technology, the elimination of complex, redundant, and error prone processes will be regarded as a positive change.

8.2 People & Process Risk:

The people and process risks are low.

It is expected that there will be significant process changes that will affect the resourcing and dispatching group. Dispatchers specifically will be responsible for dispatching and balancing work for 3 product groups. Although the technology implemented will provide them the capability to do this efficiently, training and change management efforts need to be directed to dispatchers to embrace the new processes and tools.

The impact on the technician workforce is expected to be low. Technicians will continue to perform their work as they currently do. The tools in which they communicate with the office will however change. All technicians and crews will need to be trained on using

the new mobile application. Providing technicians with the tools to make their jobs more efficient will enhance their ability to exceed delivery standards. Resistance to the adoption of new technology and data capture processes should be minimal with appropriate training and change management.

Potential to achieve operational benefits through attrition is high and there should be a minimal impact on the overall morale of the respective departments. Open communication and inclusion of staff members on the strategy and goals of the departments should mitigate this risk.

8.3 Project Risk:

The risks associated with the project implementation are low.

8.3.1 Budget

While extensive work has been done to confirm the scope of the project and to have the key vendors fix-price their components, no project can be 100% certain that additional funding will not be required. To mitigate this risk, extensive work has been done over the past 9 months to confirm that the business requirements are fully understood and documented, that the vendors clearly understand the scope (Syclo was required to respond to an 78 page requirements document as part of the RFQ process, and Click has completed two sets of on-site requirements workshops), and to have the vendors provide fixed price bids for their work and expenses.

8.3.3 Impact of Delay

The prices provided by the key vendors are predicated on the assumption purchase orders will be issued before the end of February. The vendors have worked hard with us to refine their estimates and line up resources to be ready to begin the project as soon as approval is received. Any delay jeopardizes the negotiated prices and the vendors' ability to execute.

Delaying the project will not improve the quality of the product delivered.

It must also be kept in mind that delaying the project would expose the business to the ongoing risk posed by the fragile Mobile UP application. This is of particular concern as Distribution is facing a significant increase in the amount of meter exchange work to be completed in 2008, and adding more work to fragile processes that are already operating close to full capacity will add further risk to the business. For the past 2 years, Distribution has reduced meter exchange activity by 30%, and must make up for this in 2008 by completing an additional 23,000 meter exchanges.

8.3.4 Internal Resourcing

Critical to the project's success is the availability of a few key IT resources who also provide support for the current production environments. If major production issues occur through the course of the project, these resources will be drawn away from the project to respond to these urgent issues. This is partially a budget issue, as limited budget is available to provide backfill for these individuals, although some individuals cannot be effectively backfilled due to their unique skill sets.

This risk is mitigated by the strength of the business team available to work on the project, and by the project approach of allowing a break for the team over the summer months of 2007. The Distribution Process Management team members are all experienced with application implementations and will be able to provide project support in areas normally delivered by the functional IT personnel.

As with any major project, there will also be a draw on operational resources to provide subject matter expertise, testing support, documentation development, and training delivery. Resource plans have been developed and reviewed with the impacted parties to ensure the project can manage this risk. If the identified resources are not available during the required timeframes, the quality of the delivered product will suffer.

8.3.5 Ability to Deliver Other Projects

As a result of the resource constraints, IT will have very limited ability to support any other initiatives for the year. The priority items from the business units have been reviewed and planned for, however, IT will not have the capacity to deliver any additional projects that have not already been identified.

8.3.6 COPE Contract Negotiations

The COPE contract is scheduled to be renegotiated in 2007. Any work stoppage would impact the project's ability to execute.

8.3.7 Energy Upgrade Project Timing

The planned upgrade for Energy is schedule to be completed around March 1, 2008, which means the testing cycles for that project and this should align unless changes to either project plan occur. The project teams will have to coordinate testing cycles for the interactions with Energy. This risk has been mitigated by simplifying the interactions with Energy such that the testing requirements will not be complex.

9.0 Structure and/or Ownership

This project is sponsored by the Vice President, Distribution.

11.0 Approvals

This project has been endorsed and recommended for approval by:

Project Executive Sponsor:	Dwain Bell, VP Distribution
Program Owner:	David Legge, BAITs
Business Sponsor:	Brent MacPherson, Distribution
Capital Management Office:	Shane Hiebert, Finance

Approval to proceed is requested from:

Capital & Process Steering Committee	2007.XX.XX

Authorized for Expenditure:	Endorsed:	Approved:
Dwain Bell 2007.0X.XX	PWG/CMO 2007.0X.XX	C&P St. Comm. 2007.0X.XX
1. Vice President/Authorizing Manager (Name)	2. Capital Committee VP/PWG/CMO	3. Capital & Process Steering Committee/UMT

Project Charter

Document Information

Author:	*Hugh Smith*
Version:	*0.2*
Status:	*Draft for review*
Date:	*March 23, 2007*
COMPANY	

1 Document control

1.1 Version History

Version	Issue Date	Author	Description of Change
0.1	*March 14, 2007*	*Hugh Smith*	*First Draft*
0.2	*March 23, 2007*	*Hugh Smith*	*Draft for review*

1.2 Distribution List

Name	Role
David Legge	*Program Manager*
Brent MacPherson	*Project Sponsor*
Dwain Bell	*Executive Sponsor*

1.3 Other Reference Documents

Version	Document
	Project Business Case: ..\..\..\3 Executing\3.11 MUP Replacement
	CPCN Submission Document:
	Preliminary Scope Statement: ..\D.1.3 WBS\2007 03 22 Preliminary Scope
	Project WBS: ..\D.1.3 WBS\2007 03 22 Project Preliminary WBS.xls
	Baseline project plan: ..\..\D.2 Planning\D.2.3 Workplan (Baseline)\2007 03
	HR Plan:
	Communications Plan.

1.4 Document Purpose

The purpose of this document is to define the project, forming the basis for its management and the assessment of overall success. It should represent the consolidated views of the sponsoring executive, project leader and business stakeholders prior to the initiation of the project.

2 Table of contents

3 Project Background

3.1 Project Description

Background

Distribution first developed its Integrated Resource Management (IRM) Strategy in 1999 to describe its ideal state for efficiently managing all work and resources through a centralized functional group. While it was originally envisioned that the IRM Strategy would be implemented in three waves, only the initial Customer Service project was completed. Due to challenges with the selected software, Mobile UP, and its vendor, Utility Partners, dispatching of Preventive Maintenance and Construction work has never been integrated with Customer Service work into a single technology platform or business process.

In 2005, the Service Delivery Enhancement Project (SDE) was undertaken to provide improved scheduling and dispatching for Construction work using Click Software's ClickSchedule and SAP's Mobile Asset Management applications. It was intended that when it came time to retire Mobile UP, Customer Service and Preventive Maintenance work would be migrated to this new platform to complete the original vision of managing all resources and work types through common processes. Technical issues with SAP's Mobile Asset Management application, however, have led to the recommendation that it be replaced with Syclo's mobile workforce management system in the final solution.

3.2 Business and Market Drivers

Implementation of the Distribution Mobile Solution Project is a key component in allowing Distribution to execute on its business strategies. A key goal of Distribution is to continually strive for Operational Excellence to excel at Distribution Asset Management and Service Delivery; however, inefficiencies and limitations imposed by the current set of technologies are a major barrier to continuous improvement. This represents a significant risk to the business given the corporate plans for increasing customer attachment rates, maintaining customer satisfaction levels and improving compliance with critical asset integrity programs.

Another key strategy impacted by this project is Distribution's move to a more multi-tasking workforce. To take advantage of attrition amongst its aging workers and further optimize worker efficiency, Distribution is moving to a less specialized workforce. The ability to do this, however, is severely limited by the current disparate dispatching technologies.

Other strategies impacted by the current environment that would be addressed by the proposed solution include:

- compliance with the new Integrity Management Plan
- improved compliance with working alone regulations
- improved decision making
- improved employee engagement
- implementation of new inspection based work types

- delivery of work for 3rd parties through Terasen Energy Services (TES)
- the ability to manage field devices other than meters (such as PFM regulators), and
- the ability to outsource appointment booking to Accenture Business Services (ABSU) if required in the future

3.3 Operational Drivers

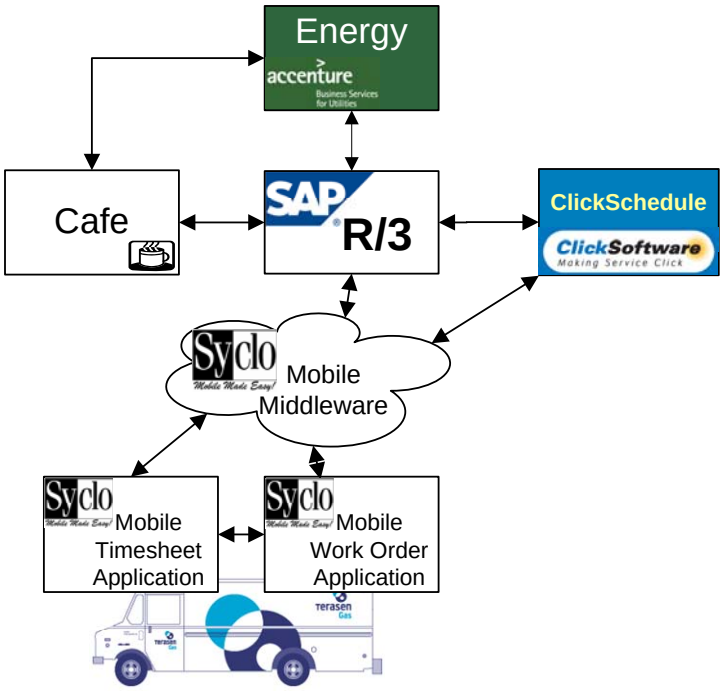
The primary operational driver for this project is the obsolescence of Mobile UP. The current application is supported on a "best efforts" basis, its database and operating system are unsupported and at a minimum it must be upgraded to a stable and supportable system. Mobile UP currently suffers from numerous production problems that can severely impact Distribution's ability to execute work.

Other current operational inefficiencies that will be addressed by this project include:

- limitations with the current Mobile UP functionality
- manual dispatching and data capture processes for Asset Integrity work
- lack of visibility and accurate completion tracking of Asset Integrity work
- undue complexity of the current processes
- duplicated resource management procedures
- multiple technologies for field workers to process work
- manual data entry, data validation, and error handling procedures
- lack of standardized performance reporting
- lack of information provided to field workers
- discrepancies between timesheet and mobile time costing data
- duplicated and complex system support requirements
- use of a stand alone "working alone" application

4 Solution Overview

The solution upon which the project scope is based is outlined in the Figure below.



The key elements of the solution include:

- Moving Customer Service work from Mobile UP to SAP R/3 by redirecting the existing Energy / Mobile UP interface to SAP. In this way, all work orders will be managed, costed, and reported in the same way since Construction and Maintenance work are already managed in SAP R/3.

- Expanding the use of ClickSchedule and the existing SAP / ClickSchedule interface to include Preventive Maintenance and Customer Service Work, and to cover all Distribution field resources. This will provide automation of scheduling, coordination of complex tasks, optimization of the entire workforce, and booking of appointments from SAP R3 for customer jobs.

- Implementing Syclo's mobile work order and mobile timesheet applications for all Distribution field resources, and using Syclo's mobile middleware to interact directly with SAP R/3 to automate field data capture processes and updating of job statuses, and with ClickSchedule to automate real-time updating of technician statuses.

While not included in the scope of the current project, the solution is designed to allow for the future addition of components to provide work load forecasting, workforce planning, and outsourcing of appointment booking to ABSU. These items have not been included in the current scope because there was no clear business value to justify the additional cost. The business initiated a process to improve work load forecasting and workforce planning at the beginning of this year, and until this process has stabilized there is no means to determine

whether purchasing new applications will deliver enough additional value to justify their cost.

5 Project Objectives

The goal of this project is to enable Distribution to execute on its key business strategies by providing a common, stable, and supportable set of processes and technologies for managing all field work and resources in a consistent and efficient manner, thereby eliminating numerous redundant, error prone, and manually intensive processes.

The specific objectives of this project are as follows:

1. To provide a single set of processes and technologies to:
   - manage all field work and resources:
   - eliminate the current overly complex and redundant work procedures:
   - support the ability to further optimize field resources:
   - support Distribution's strategy of moving to a more multi-skilled field workforce:
   - allow Distribution to maintain Customer Satisfaction levels in the face of increasing customer attachment rates.
2. To support the further optimization of the field workforce and to free dispatchers from performing routine tasks, allowing them to focus on handling exceptions, by automating the scheduling and optimization of all work through the expanded use of ClickSchedule to include Customer Service and Preventive Maintenance work.
3. To reduce the work effort involved in data entry, data validation, error handling, and duplicated site visits by moving the collection and validation of field and timesheet data to the field, and by automating the capturing of this data.
4. To provide a stable and supportable technical solution by replacing the current obsolete Mobile UP system and the support-intensive Mobile SAP system.
5. To eliminate the business risk that Measurement Canada may require Terasen to begin managing its fleet of PFM regulators as measurement devices by replacing the current Energy / Mobile UP based process which does not support this without considerable expense.
6. To support the efficient management of work performed for 3rd parties through Terasen Energy Services by integrating this work into the standard work processes and eliminating the current technology imposed workarounds.
7. To support the improved management, execution and audit ability of Asset Integrity Programs by providing real-time status tracking and consistent reporting of PM work and by providing access to valuable asset and work history data to the technicians in the field.

8. To support improved decision making by eliminating the current disparate reporting systems and by improving the completeness and quality of data being gathered in the field.

9. To allow Distribution to begin addressing issues with Employee Engagement by allowing field technicians access to information stored in back-end systems and by providing a platform for the potential future implementation of web-based virtual-community functionality.

10. To support Distribution's plans to utilize the current field work force to provide inspection services as increasing levels of work are delivered by contractors.

11. Eliminate the current manual scheduling, dispatching, and resource management processes for Preventive Maintenance work and technicians.

12. Reduce the training and support effort required for field technicians who must currently learn up to three different methods for receiving and processing work by standardizing on a single technology to be used for all work by all field resources.

13. Eliminate the current effort required to reconcile issues between the Mobile UP time tracking for costing process and the manual timesheet process.

14. Eliminate the current stand-alone cell phone based "working alone" monitoring for Mobile Laptop users by integrating this functionality within the proposed solution.

15. To provide the potential to improve Customer Satisfaction levels by supporting appointment booking for all Customer Service work as well as the capability to outsource this function to ABSU in the future.

6 Project scope

The project scope is outlined in the Preliminary Scope Statement Document (deliverable D.1.3), which includes the proposals for both ClickSoftware's implementation of ClickSchedule and Syclo's implementation of their Agentry system.

6.1 Project Deliverables and Work Break Down

The project work breakdown structure and list of deliverables is outlined in the Project Preliminary WBS document (deliverable D.1.3).

7 Scope Exclusions

The following items are not in scope for the project:

- Implementation of the ClickForecast and ClickPlan applications
- Integration of the Mobile Application with AM/FM

- Appointment booking in ClickSchedule from Energy or by ABSU personnel
- Development of processes or technology to support the new work planning spreadsheet system being put in place by the Resource Management group.

8 Project Plans

8.1 Planning assumptions

- The project will be timed such that expenditures will be allocated between 2007 and 2008 in order to minimize the capital budget impact in any given year.
- To accommodate the external vendors desire to start the project promptly, yet support balanced expenditures, the project will essentially shut down through July and August of 2007.
- This timing also supports the schedule for submitting and receiving approval for the CPCN submission.
- Team vacations will be scheduled as much as possible during the shut down period in July, August, and Christmas 2007.
- Due to the large number of end users requiring training on the new solution, an extended 3 month period has been allowed for from the completion of integration testing to go live.
- This 3 month period will also be used to further test and fine tune the schedule optimization of ClickSchedule.

8.2 Project Plan

The baseline project plan is detailed in 2007 03 13 Delivery Workplan (deliverable D.2.3). The key project milestone dates are outlined in the following table:

Phase	Activity	Milestone Dates
1 Initiating	Project start	March 1, 2007
	Submit CPCN for approval	May 1, 2007
	Receive CPCN approval	June 30, 2007
2 Planning	Prepare project plans	March 1 – March 31, 2007
3 Executing		
3.1 Project Preparation	Establish project team and facilities	March 1 – April 30, 2007
3.2 Blueprint	Gather design requirements	April 1 – June 30, 2007
Project Shutdown Period		July – August, 2007
3.3 Realization	Build and test solution	Sept 1, 2007 – Jan 31, 2008
	Integration Testing	Feb 1 – Feb 28, 2008
3.4 Final Preparation	End User Training	March 1 – May 31, 2008
	ClickSchedule optimization tuning	March 1 – May 31, 2008
3.5 Stabilization	Go live	May 31, 2008
	Stabilization period complete	August 31, 2008
4 Controlling	Managing to the project	Through-out the project

Phase	Activity	Milestone Dates
	plans	lifecycle
5 Closing	Project complete	August 31, 2008

8.3 Dependencies

The project is dependent on the following items:

1. Distribution is currently completing an exercise to identify all the skills held by each of the field technicians. This data will be needed for loading into ClickSchedule. This exercise is schedule to be completed in mid to late May 2007.
2. The Resource Management group is currently implementing new resource planning processes based on the planning spreadsheets developed in late 2006, which will have interactions with the processes being designed by this project. Delays in developing the resource planning processes or issues with the stability of the new processes will impact this projects ability to execute.
3. ABSU is planning to upgrade the Energy system during the same timeframe as this project. Currently, the Energy upgrade project is schedule to be testing in the October 2007 to the end of February 2008, with a targeted go live of the end of March 2008. The testing windows will need to be coordinated between the two projects in order to support the testing requirements of both. If the Energy upgrade project timing changes, this coordination will be more complex.
4. The Squamish Consolidation project is schedule to run from mid-March to the end of June 2007 and will draw resources away from this project. The resource plan will be coordinated between the two projects. Delays or increased work effort on the Squamish Consolidation project would impact this project's ability to execute.
5. Conversion of middleware from current Mercator solution to BizTalk.

9 Project Budget Summary

The project budget is outlined in the following table (not including AFUDC):

Cost Category	2007	2008	Total
Internal Labour	$327,287	$379,848	$707,135
Consulting	$1,202,076	$1,718,476	$2,920,552
Hardware	$150,000	$162,000	$312,000
Software	$570,944	$23,112	$594,056
Expenses	$142,360	$291,560	$434,010
Contingency	$78,471	$313,884	$392,355
Sub-total	**$2,471,138**	**$2,888,970**	**$5,360,108**
2006 spend			$285,420
Total			**$5,645,528**

10 Project Risks

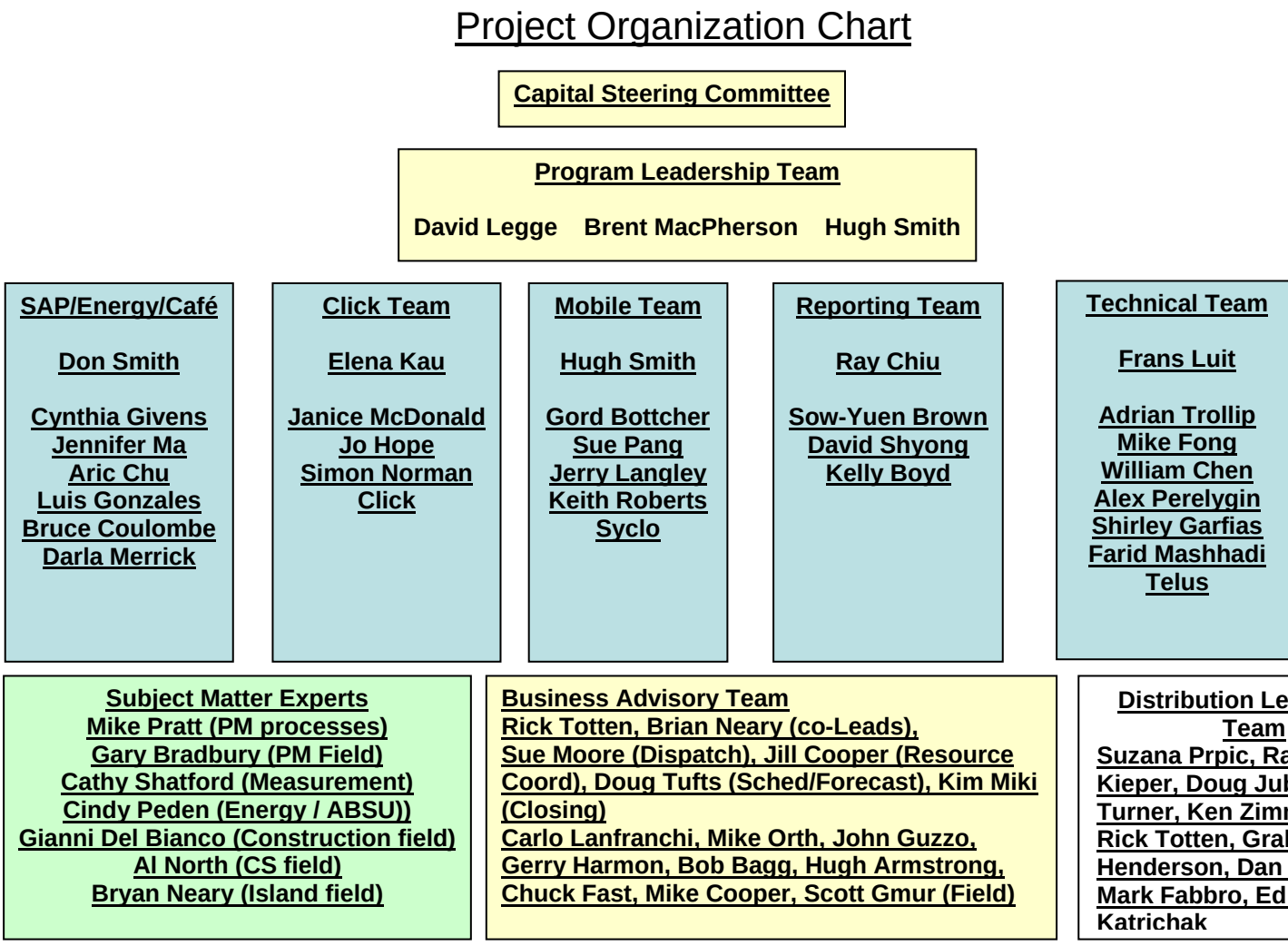
I	Description	Impact	Mitigation Type	Mitigation actions
Low	The project exceeds budget	Cost Quality	Prevention	Considerable work has been done to ensure major project costs are fixed, and that the scope is clearly defined and understood. Project costs and design quality will be tracked carefully to limit the likelihood of cost overruns from occurring.
Low	Availability of internal resources	Resources Time Quality	Prevention	Detailed resource plans will be carefully managed to quickly identify and resolve any resourcing conflicts.
Low	Ability to deliver other projects	Resources	Prevention	IT will have limited ability to to implement other projects that utilize the SAP or Click platforms other than this one in 2007 to mid-2008. Business requirements have been prioritized, and other than the Squamish Consolidation and minor application releases, no projects are planned at this time.
Low	COPE Contract negotiations	Resources	Acceptance	If the COPE Contract negotiations result in work disruptions, the project's ability to execute would be severely impacted. Negotiations have commenced and both parties are targeting completion by mid 2007. Product development risk is mitigated as most vendor development work will be performed off site during the last four months of 2007.
Low	Energy Upgrade Project Timing	Time	Acceptance	This risk has been mitigated by simplifying the interactions with Energy such that the testing requirements will not be complex. If the Energy upgrade project timing changes, additional effort will be required to coordinate testing windows between the two projects.

11 Resources

The project resource plan will be outlined in deliverable D.2.6 HR Plan.

12 Project Organization

The Project Organization is outlined in the following figure. This structure will be utilized for the initial phases of the project to the completion of the Blueprint phase. After this point, the project will be reorganized to better support the delivery of the solution.



13 Dependencies and critical success factors

- Availability of part time business resources for advisory, testing, documentation and training
- Adherence to training schedules

- Timely decision and issues resolution
- Change management – acceptance of new system and processes

14 Project Success measures

Distribution Mobile Solution Project is a key component in allowing Distribution to execute on its business strategy; to continually strive for Operational Excellence and to excel at Distribution Asset Management and Service Delivery.

The following measures will be established to monitor project execution success as well as business improvement outcomes expected.

Measure	Metric	Date
Project meets planned milestones		Measured each month in the Project Status Report
Actual Project Cost vs. plan	$ do not exceed plan	Measured each month in the Project Status Report
Improvement to completeness and quality of data being gathered in the field as measured by existing Closing Completion and Jobs not TECO exception reports	% improvement	4th Q 2008 vs. 2nd Q 2008 2009 vs. 2008
Asset Integrity Program work completion by due date	95%	For work assigned commencing June 2008
Total internal W/F hours charged out to non core tasks per month		
Total hours of core tasks not completed per month		
Annual O&M savings realized through efficiencies	$288,000	Dec 31, 2008
Sustainable Annual O&M savings realized through efficiencies	$576,000	2008 and beyond

15 Project communications

The Project Communications Plan will be documented in a separate document, deliverable D.2.7 Communications Plan.

TGI
Maintenance and Reinforcement

Distribution Mobile Solution CPCN

- What:
  - Replacement of Mobile Data Dispatch system with SAP Mobile Asset Management
  - Implementation of Click scheduling tool for Customer Service activities
- Why:
  - Project is final piece of automation strategy and is required to retain synergies
- Current Status:
  - Business case developed in late 2006 / early 2007, CPCN filed in May 2007 and forecast project completion in 2008
  - Figures below represent total project costs. 90% of costs will be allocated to TGI and 10% of costs will be allocated to TGVI

2006 Actuals	$	256
2007 Budget	$	3,600
2007 Forecast	$	2,499
2008 Forecast	$	2,891
	$	**5,646**