Date: _____

ADCOMM Engineering Company

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Implementation Plan and Cost Estimate

Seattle City Light–Public Utilities District

Introduction

This document contains the implementation plan and cost estimates for the reconfiguration of 800 MHz radio equipment in accordance with FCC 04-168 "Improving Public Safety Communications in the 800 MHz Band."

The plans and estimates contained herein are specific to the system licensed by Seattle City Light a Public Utility District of Seattle, Washington.

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System Description

Created by the citizens to Seattle in 1902, Seattle City Light has served their customers with electricity and related services for more than a century. Over the years they have worked very hard to keep Seattle's electricity affordable, reliable, and environmentally sound. Today, Seattle City Light is a recognized national leader in energy efficiency and environmental stewardship.

Seattle City Light operates a large electrical generation and supply system including four major hydroelectric dams. They provide electrical service to a major portion of western Washington.

Seattle City Light–PUD is a Public Safety (PW) licensee operating a four-channel analog 800 MHz system using Motorola MFS5000 base station equipment in the Seattle area and a five-site two-channel system at the Skagit generation facility. Currently, Seattle City Light is in the process of transitioning to a five-site simulcast 800 MHz system manufactured by Motorola using Quantar repeaters. In addition, there are three standalone sites. The subscriber units are a mix of Motorola MAXTRAC, MCS2000, MTS200, SPECTRA, and ASTRO SPEATRA model radios.

The site list is as follows:

- French Creek Road, Snohomish County
- Gold Mountain, Kitsap County
- North Mountain Substation, Snohomish County
- Rattlesnake Mountain, King County
- Queen Anne Hill (1417 Warren North), King County
- Cougar Mountain (6501 173rd Street SE), King County
- Crista (19303 Fremont Avenue North), King County
- Bothell Substation, Snohomish County
- Diablo Powerhouse, Whatcom County
- Newhalem Communications Building, Whatcom County
- Gorge Dam, Whatcom County
- Newhalem (3 km SW), Whatcom County
- Ross Dam/Powerhouse

Planning Costs

Seattle City Light did not participate in the planning funding process. Throughout the planning phase, the project was managed by the Seattle City Light Engineering Department with the principal contact being Ashwani Sharma. To develop the implementation plan and cost estimates presented in this document, Seattle City Light contracted with ADCOMM Engineering to review various system components, facilitate planning meetings, and conduct site visits performing the following tasks:

- Field verified repeater make, model, location, and related equipment such as antenna and feedline.
- Field verified subscriber inventory by spot checking and examining variations in mounting, physical access, and connectors.
- Developed implementation strategy options (i.e., transition to the simulcast system, programming dual channels in subscribers units versus back-to-back repeater approach).
- Developed statement of work for reconfiguration process.
- Meetings with users to explain rebanding and suggested workflow.
- Developed reconfiguration work flow and schedules for the rebanding activities.
- Developed labor costs and expenses associated with rebanding implementation.

The planning work originally assumed the existing Seattle area radio system would be converted as the simulcast system was not operational. The existing radio system is a unique configuration using multiple DPL squelch codes and DTMF codes for repeater set up and knock down. This information was not readily available and required significant investigation. After it was determined the existing configuration was not suitable for back-to-back repeaters or similar approaches, ADCOMM reviewed the option to convert the simulcast system first and then cut over to that system as part of the rebanding project. However, SCL has determined they need to make the simulcast system operational prior to rebanding. So, the end result is the simulcast system will be retuned while operational as part of rebanding. This investigative and planning

process resulted in numerous technical meetings and data gathering related to the existing system prior to the decision being made to implement the simulcast system prior to rebanding.

While the final costs of the planning phase cannot be determined until after the FRA negotiations are completed and a final contract signed, the current planning estimates are as follows:

Seattle City Light staff time and expenses	$19,892.00
ADCOMM staff time and expenses	$69,125.00
Total Estimated Planning Costs	**$89,017.50**

Seattle City Light and ADCOMM will submit detailed copies of supporting documentation for the actual hours, tasks, and expenses associated with the above activities.

Interoperability

The requirement for interoperability is that there are operations issues that need to be carefully considered when rebanding the Seattle City Light system. There is control station equipment provided by the City of Seattle for their police and fire operations. This equipment will need to be included in the rebanding effort by either Seattle City Light or the King County rebanding FRA. Additional, there is a need for coordination and interaction with the Snohomish and Whatcom County systems.

Reconfiguration Milestones

Reconfiguration Task	Start Date	Days Elapsed Since Project Start	Estimated Duration
Project start	1/9/09	0	0
Reconfiguration planning	1/9/09	0	567
Reconfigure subscriber	7/22/10	567	79
Reconfigure infrastructure	9/9/10	646	17
System acceptance	9/26/10	663	50
Project closeout	11/15/10	713	

Total project time is estimated to be 346 days but could be delayed depending on clearing of the proposed frequencies and weather factors.

Reconfiguration Costs

Total project costs are estimated and outlined below:

Planning Costs	
Planning, engineering	$89,017.50
Total planning costs[1]	$89,017.50
Realignment Costs	

[1] Planning costs are included in the professional services category on the PRW spreadsheet.

Infrastructure reconfiguration	$43,445.50
Subscriber reconfiguration	$119,878.51
Professional services	$18,978.55
Contingency @ 5%	$7,857.25
Other costs	$0
Legal	$3,560.00
Total realignment costs	$193,719.81
Total Estimated Cost	$282,737.31

Implementation Plan

General Description

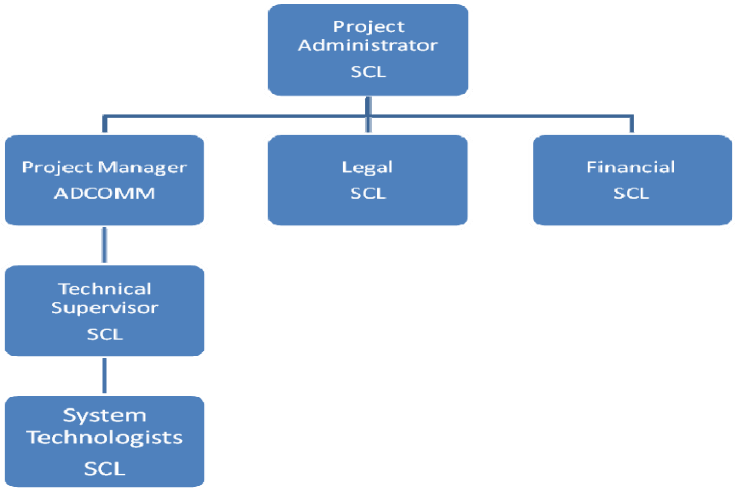
Because Seattle City Light elected to include the planning process in this funding request and not apply for a formal request for planning funds (RFPF), the following contains information regarding specific staff that have and/or will be involved in the rebanding effort. This includes individuals who participated in the planning activities that would not necessarily be involved in the implementation phase.

Reconfiguration will be accomplished by work effort from the following:

Seattle City Light-PUD	System owner and licensee providing all rebanding/realignment work, system management, subscriber unit scheduling and coordination, infrastructure realignment work, radio system support, financial management, legal, and other services during rebanding
ADCOMM Engineering Company	Providing consulting engineering services, primary project management, document review, and system technical support

Project Organizational Chart

For the purpose of identifying work flow and decision processing, the following organization chart has been developed. The project organization is not intended to replace established organizational structure within Seattle City Light.



Staff Job and Task Descriptions

Seattle City Light–PUD

Administrative Oversight: Ashwani Sharma, Principal System Engineer (10 percent)

Responsibilities

- Responsible for the system operation and technical staff management during the rebanding process
- System license responsibility for FCC compliance
- Responsible for overall rebanding financial reporting
- Responsible for advising and updating Seattle City Light staff and users on the status of the rebanding process

Tasks

- Will review project status on a weekly basis
- Will review all project billing before submission to Sprint Nextel for payment
- Will make final decisions regarding implementation policy with advice and consent of the Seattle City Light management
- Will manage the financial and clerical staff related to rebanding activities

Legal: Gary Maehara, Attorney/Legal Department (5 percent)

Responsibilities

- Responsible for review of all rebanding contracts and related legal documents before execution
- Assists with legal questions during rebanding

Tasks

- Will perform a review of all impacted rebanding documents prior to signing by Seattle City Light staff
- Will be available for consultation during rebanding

Financial/Accounting: Kyung Kim, Financial Accounting (10 percent)

Responsibilities

- Responsible for tracking Seattle City Light staff time and associated expenses related to rebanding

- Responsible for tracking costs and billing associated with rebanding
- Responsible for generating financial reports and project tracking against the rebanding approved FRA costs

Tasks

- Receive and analyze Seattle City Light staff timesheet and expense reports related to rebanding
- Develop financial reports and billing packages for submittal to Sprint Nextel for reimbursement
- Track payments made to Seattle City Light by Sprint Nextel

Project Supervision: Rob Collin, Technical Supervisor (20 percent)

Responsibilities

- Direct management over the technical staff performing the activities
- Responsible for scheduling rebanding activities
- Responsible for correct system operation after rebanding
- Responsible for minimizing down time and interruptions during rebanding
- Reporting work progress and schedule impacts

Tasks

- Will report project status on a weekly basis
- Will review upcoming rebanding activities to determine possible effects on the system
- Will schedule work activities for specific rebanding activities
- Will make decisions on work or schedules affecting rebanding activities

Technical Staff: System Technologist, Seattle City Light (100 percent)

Responsibilities

- Responsible for reprogramming all radio during rebanding
- Responsible for site access and maintenance during rebanding
- Responsible for assisting in the resolution of technical issues that arise during rebanding
- Responsible for documentation rebanding work and activities

Tasks

- Perform daily rebanding activities to meet established workload and schedules
- Perform approved equipment test and report results
- Complete all necessary documentation to support rebanding activities
- Develop all radio program templates to meet the needs of subscriber units

ADCOMM Staff

Project Oversight: Joe Blaschka, Jr., P.E.

Responsibilities

- Responsible for the overall management of the Seattle City Light rebanding process

Tasks

- Receives reports and updates on the status of the project

Project Manager: Gary M. Lancaster, Senior Consultant

Responsibilities

- Responsible for assisting and coordinating with Seattle City Light management in the operation of the onsite process relating to rebanding

- Responsible for advising ADCOMM and Seattle City Light staff about technical, procedural, equipment, or management issues related to rebanding during the project
- Responsible for providing "early warning" if problems are developing with the rebanding process
- Responsible for tracking the progress in the field against the project schedule
- Responsible for overseeing the documentation process in preparation for close-out/ true-up

Tasks

- Observe and obtain daily reports on the status and progress made by the Seattle City Light staff
- Assist with scheduling of rebanding activities where appropriate
- Monitors progress and reports problems
- Participates in project status update meetings
- Request resources required to assist in the resolution of problems that develop during the rebanding process
- Observe and spot check documentation to verify proper accounting for subscriber units

Frequency Review: Mike Norin, Consultant

Responsibilities

- Responsible for providing input to the rebanding process regarding technical issues
- Responsible for reviewing Seattle City Light rebanding implementation plans
- Responsible for assisting in the resolution of any technical or equipment issues that may arise related to the rebanding project

Tasks

- Assist in the resolution of any technical or equipment issues relating to rebanding
- Review the established FPR and analyze frequency modifications for potential problems or conflicts
- Review and make changes to the implementation plan where appropriate

Reconfiguration Scope of Work

Location

All subscriber radio equipment will be reconfigured at Seattle City Light facilities, following a schedule devised by project management. Because vehicles are continually in service during normal business hours, reconfiguration work will need to be done at night and on weekends. The majority of rebanding work will be done at one of four locations operated by Seattle City Light.

Control stations at remote sites, in dispatch, and individual offices will be reconfigured in place and will require travel to accomplish.

The repeater and related equipment will be reconfigured at each site.

Methodology

Based upon the overall complexity of the Seattle City Light radio system, the approach to the realignment process will rely on the total switch to the simulcast system prior to completion. To do so will require that all subscriber radios be touched twice in order to remain operational throughout the realignment process. The plan is based on the need to provide the capability for

each subscriber radio to fully operate on either system while changes are made during the realignment process. The scope of work will address this in three phases: subscriber equipment, simulcast system infrastructure, and analog voted repeated system infrastructure. It is important to remember that the operations of the Seattle City Light electrical delivery must not be impacted by the realignment of the radio system. Therefore, Seattle City Light has elected to perform the majority of work after normal business hours. The main focus will be to schedule as much work as possible during weekends.

Subscriber Units

Each of the 783 units will need to be scheduled into one of four depot facilities located throughout the three-county operational area. Because of the difficulty in gaining access to the vehicles during normal business hours, the rebanding activities will need to occur on weekends. Upon arrival, the radio will be realigned with the new frequencies as outlined in Table 1. Once completed the subscriber unit will be put back into service until after the completion of the realignment of the simulcast system infrastructure. The subscriber unit will then be rescheduled into a depot location where of old frequencies will be remove from the radio and the unit again returned to service. This "second touch" of the subscriber units will insure that all equipment is properly functioning on the realigned system.

TABLE 1
Subscriber Units[a]

Mobile Radio	**Time (Minutes)**
Remove radio from vehicle	5
Read and save template including document model and serial number	6
Functionality test	2
Install new template	2
Realign	7
Resave as new template	2
Functionality test and reinstall	6
Total	**30**
Portable Radio	**Time (Minutes)**
Read and save template including document model and serial number	6
Functionality test	2
Install new template	2
Realign	7
Resave as new template	1
Functionality test	2
Total	**20**

[a] Calculations are based on a one-touch approach.

Simulcast System Infrastructure

The five-site four-channel simulcast system in the Seattle area will be realigned one site at a time as outlined Table 2. The system at the Skagit generation facility will be realigned as outlined in Table 3. The standalone sites will be modified as shown in Table 4. Technical staff from Seattle City Light along with a representative from ADCOMM will perform the rebanding work. Once the realignment is completed, the system will be optimized to the standards established by Seattle City Light technical staff prior to any rebanding activities. These standards are documented and the information can be provided if needed.

TABLE 2
Five-Site Four-Channel Simulcast Upgrade Tasks List

Short Task Description	Time (Minutes)	Per	Total (Minutes)
Set up tools and test equipment; coordinate with affected users	30	Site	30
Verify operation of channels at the site prior to programming; record levels	10	Station	50
Pre Rebanding Testing measure signal strength	5	Station	10
Pre Rebanding Testing measure receiver sensitivity and note readings	5	Station	10
Power down channel and reprogram frequency; retune combiner	60	Station	240
After the simulcast RF sites have been upgraded and reprogrammed, coordinate channel switch with affected users and switch controllers	5	Station	25
Verify operations of retuned station	10	Station	50
Perform quick single channel simulcast alignment	10	Station	50
Post Rebanding Testing measure signal strength	5	Station	10
Post Rebanding Testing measure receiver sensitivity and note readings	5	Station	10
Verify simulcast alignment, document work, and level settings	30	Station	150
Break down tools and test equipment and secure the site	30	Site	30
Total			**625**

TABLE 3
Five-Site Two-Channel Simulcast Upgrade Tasks List

Short Task Description	Time (Minutes)	Per	Total (Minutes)
Set up tools and test equipment; coordinate with affected users	30	Site	30

Verify operation of channels at the site prior to programming; record levels	10	Station	20
Pre Rebanding Testing measure signal strength	5	Station	10
Pre Rebanding Testing measure receiver sensitivity and note readings	5	Station	10
Power down channel and reprogram frequency; retune combiner	60	Station	120
After the simulcast RF sites have been upgraded and reprogrammed, coordinate channel switch with affected users and switch controllers	5	Station	10
Verify operations of retuned station	10	Station	20
Perform quick single channel simulcast alignment	10	Station	20
Post Rebanding Testing measure signal strength	5	Station	10
Post Rebanding Testing measure receiver sensitivity and note readings	5	Station	10
Verify simulcast alignment, document work, and level settings	30	Station	60
Break down tools and test equipment and secure the site	30	Site	30
Total			**350**

TABLE 4
Three-Site One-Channel Simulcast Upgrade Task List

Short Task Description	Time (Minutes)	Per	Total (Minutes)
Set up tools and test equipment; coordinate with affected users	30	Site	30
Verify operation of channels at the site prior to programming; record levels	10	Station	10
Pre Rebanding Testing measure signal strength	5	Station	10
Pre Rebanding Testing measure receiver sensitivity and note readings	5	Station	10
Power down channel and reprogram frequency; retune combiner	60	Station	60
Verify simulcast alignment, document work, and level settings	10	Station	10
Reprogram associated control stations	20	Station	20
Post Rebanding Testing measure signal strength	5	Station	10
Post Rebanding Testing measure receiver sensitivity and note readings	5	Station	10
Break down tools and test equipment and secure the site	30	Site	30
Total			**170**

Analog Voted Repeater System

Upon the completion of the rebanding/realignment process and full system acceptance is established for the simulcast system, portions of the existing analog voted repeater system will be decommissioned and no longer used by Seattle City Light. To ensure that the equipment is not placed back into service, the old frequencies and system profiles will be removed before completion of the realignment process.

Problem Resolution

Problems encountered during any of the above steps are to be reported to the onsite supervisor immediately. Potential problems include, among others:

- Broken connectors, mounts, cabling
- Improper installation
- Damage during installation or removal
- Programming not accepted by radio
- Programming computer failure

The onsite supervisor will coordinate with Seattle City Light to resolve any problem quickly to minimize system impacts or the loss of service whenever possible. Sprint Nextel will not pay for repairs of existing problems. However, problems or failures that occur during the realignment process will be addressed as outlined under the "change request" provision listed in the FRA document.

System Testing and Acceptance

Prior to final system acceptance Seattle City Light will conduct site specific testing of modified equipment to ensure that operational levels are consistent with pre rebanding documentation. To complete this, the following tasks will be performed in conjunction with a "drive test" as outlined under Method 3 of the "800 MHz Reconfiguration Program: Coverage Testing" guide March 8, 2006-v1.0.

Short Task Description	Time (Minutes)	Per	Total (Minutes)
Set up tools and test equipment;	30	Station	30
Measure signal strength	5	Station	5
Measure receiver sensitivity and note readings	5	Station	5
Break down tools and test equipment and secure the site	30	Station	30
Total			**70**

It is anticipated that the testing will be conducted during the 50 days prior identified in the schedule for final acceptance.