

**Copper Conductor Replacement
CPCN
Workshop**

Doug Ruse
Director, Planning

August 12, 2008
Kelowna, BC

Agenda

- Project Need**
- Project Description**
- Project Benefits**
- Public Consultation**
- Project Cost**
- Project Schedule**
- Questions?**

Project Need

Project Description

Project Benefits

Public Consultation

Project Cost

Project Schedule

Questions?

3

Consequence of Failure

- Employee and Public Safety
- Environmental (Fire)
- Increased Customer Outages



4

Conductor Failure Experience

- Approximately 9300 km of Conductor in service
- Approximately 960 km of Legacy Copper in service
- Records show 350 incidents in past five years
- 200 of the 350 involved legacy copper
- 10 of Conductor involved in 55% of failures

5

Legacy Conductor: Type, Quantity and Age profile

Conductor type	Circuit Length	Conductor Length	Age Profile
	(km)		
No. 90 MCM	77	216	> 65 years
No. 8	109	167	> 50 years
No. 6	318	581	≥ 50 years
Subtotal	504	964	
85 percent of Subtotal	428	819	

6

Failures in Sensitive Areas

	Location	Conductor Type	Date	Remarks
1	Osoyoos	6C	29/10/2004	Commercial area
2	OK Falls	6C	25/01/2005	Residential area
3	Kelowna	4C	01/07/2005	Residential area
4	OK Falls	6C	25/01/2006	School zone and Public Park
5	Keremeos	4C	17/05/2006	School zone and High Density Commercial
6	Castlegar	8C	02/09/2006	Residential area
7	Fruitvale	8C	06/09/2006	Residential area
8	Castlegar	90C	04/07/2007	School zone
9	Creston	8C	24/08/2007	Public Park and High Density Residential
10	Castlegar	8C	04/03/2008	Residential area
11	Kelowna	3C	19/04/2008	Residential area
12	Castlegar	3C	22/04/2008	Residential area

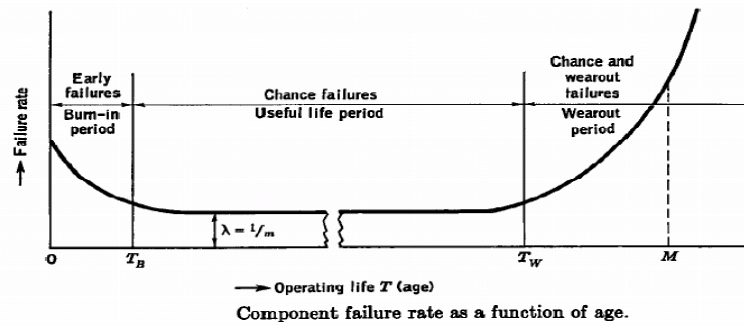
Extent of Legacy Conductor in Sensitive Areas

Sensitive Public Domain Type in FortisBC Inc. Service Area	No. 90 MCM Copper	No. 8 Copper	No. 6 Copper	Total
	Number of Locations			
School Zone	3	5	16	24
Public Parks	2	12	16	30
High Density Residential Zone	3	25	81	109
High Density Commercial Zone	0	4	20	24
TOTAL	8	46	133	187

Failure Probability

- Legacy Copper has exceeded its useful life

Classic Bath-Tub Curve / failure Rate Curve



Laboratory Analysis – PowerTech Labs

- Signs of annealing
- Given current age additional failures can be expected
- Samples tested showed mechanical properties below specified requirements

Actions to this Point

- **Issued Standard Operating Procedure (SOP) to minimize work related failures**
- **Initiated Infrared Scanning as part of Condition Assessment**
- **Annual Distribution Rebuild Program**
- **Ongoing Public Safety Education**

11

Summary

- **Project is driven by a number of factors**
- **Most important issues are Public and Employee Safety**

12

Project Need

Project Description

Project Benefits

Public Consultation

Project Cost

Project Schedule

Questions?

13

The project consists of:

- **Replacement of all No. 8, No. 6 and 90 MCM Copper with Aluminum Conductor Steel Reinforced (ACSR)**
- **Replacement of Poles subject to assessment and economics**
- **Standardization as per FortisBC existing standards**
- **Disposal of the replaced copper conductors through sale**

14

Year One (2009)

- All legacy copper conductors in the vicinity of School Zones will be eliminated
- No. 8 copper conductors in the vicinity of Parks will be eliminated

	Year One (2009)
Locations Rebuilt	36
Circuit Kilometres	22
Poles Replaced	200

15

Year Two (2010)

- All remaining No 6 and 90 MCM copper conductors in the vicinity of Parks will be eliminated
- No. 8 copper in the vicinity of High Density Residential areas will be eliminated

	Year Two (2010)
Locations Rebuilt	41
Circuit Kilometres	29
Poles Replaced	260

16

Two Year Summary (2009-2010)

- All legacy copper conductors in the vicinity of School Zones will be eliminated
- All No. 8 copper conductors in the vicinity of Parks and High Density Residential will be eliminated
- All No. 6 and 90 MCM copper conductors in the vicinity of Parks will be eliminated

	Two Year Summary
Locations Rebuilt	51
Circuit Kilometres	77
Poles Replaced	460
Expenditures	\$11.7 million

17

Year Three (2011)

- All remaining No. 6 and 90 MCM copper conductors in the vicinity of High Density Residential and High Density Commercial areas will be eliminated

	Year Three (2011)	Three Year Summary
Locations Rebuilt	110	187
Circuit Kilometres	66	117
Poles Replaced	590	1050

18

Years Four-Ten (2012-18)

- All remaining No. 8, No. 6 and 90 MCM copper conductors in the System will be removed
- Approximately 310 circuit kilometres of conductor will be replaced
- Approximately 2,850 poles will be replaced

19

Project Need**Project Description****Project Benefits****Public Consultation****Project Cost****Project Schedule****Questions?**

20

Improved Safety

- Reduction in incidents of live conductor on the ground



21

Improved Reliability

- SAIDI associated with Copper will decrease from 0.14 hrs per customer to 0.04 hrs per customer
- This compares to the 2008 SAIDI target of 2.51 hrs.
- Decrease from 5.5% to 1.5%

- SAIFI associated with Copper will decrease from 0.05 outages per customer to 0.01 outages per customer
- This compares to the 2008 SAIFI target of 3.08 outages
- Decrease from 1.6% to 0.03%

22

Reliability Impact due to Pre-Arranged Outages

Year	SAIDI (Hours)	SAIFI (Outages)
2009	0.11	0.03
2011	0.34	0.07
Future Years	0.19	0.04
2008 Target	2.51	3.08
2009-2011	4.5% - 13.5%	0.8% - 2.4%

Reduced Electrical Losses

- Estimated value \$6.3 million over 15 years



Increased Circuit Capacity

- Enhanced voltage levels

Capital Cost Reduction-Other Projects

- Distribution Urgent Repair - \$50,000 per year
- Distribution Rebuilds - \$1.0 million per year

25

Project Need**Project Description****Project Benefits****Public Consultation****Project Cost****Project Schedule****Questions?**

26

Local Governments and Key Stakeholders

- Bi-Annually
- Project Need, Scope, Execution Plan
- Long range power interruption possibilities

General Public

- Annually
- Areas where work scheduled
- Project Need, Specific Plans and Schedules

Specific Locations and Individuals

- Power Interruptions publicized
- Line relocations discussed

27

Project Need**Project Description****Project Benefits****Public Consultation****Project Cost****Project Schedule****Questions?**

28

Ten Year Project

Estimate based on Average Cost Per Kilometre

Planning Level estimate --- \$103 Million

NPV --- \$59 Million

Rate Impact --- 0.15%

29

2009 / 2010 Capital Expenditure Plan

Focus on Sensitive areas

2008 Expenditures ----- \$0.3 Million

2009 Expenditures ----- \$4.8 Million

2010 Expenditures ----- \$6.6 Million

Total Expenditures ----- \$11.7 Million

30

Future Cost

Included in Subsequent Capital Expenditure Plans (CEP)

Applications for CEP filed on a Biannual Basis

Estimates will be adjusted based on Experience

31

Project Need

Project Description

Project Benefits

Public Consultation

Project Cost

Project Schedule

Questions?

32

Ten Year Project

CPCN Approval	4th Quarter 2008
First Public Consultation prior to Project initiation	1st Quarter 2009
Project Initiation	1st Quarter 2009
Legacy Copper elimination in sensitive locations	4th Quarter 2011
Project Completion	4th Quarter 2018

33

Project Need**Project Description****Project Benefits****Public Consultation****Project Cost****Project Schedule****Questions?**

34



Copper CPCN

Questions / Comments