

# Final Capital Investment Program Plan 2005-2014

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#### 1 INTRODUCTION

Western Area Power Administration (Western) is committed to maintaining and operating a reliable transmission system. The capital investment program plays an important role in Western's ability to provide cost effective, reliable power delivery to our customers.

The purpose of the Capital Investment Program Plan (Plan) is to present Western's Rocky Mountain Region capital investment plan, to provide a mechanism for customer collaboration, and to clearly describe challenges, goals, strategies, and measurements for the Plan.

The Plan contains general information on the creation and maintenance of the capital investment program, the current ten year plan, and goals, challenges, strategies and success indicators for the capital program.

The Plan will be revised annually in response to changes in funding levels, unforeseen problems with the transmission system, mandates or regulations, and new contractual obligations. When changes to the Plan are made to accommodate higher priority projects, existing projects are reduced in scope, delayed, or deleted. Each year this Plan will remain similar in format, with changes to individual projects and the overall plan identified.

The Plan is divided into the following six major program areas:

- Transmission Line Improvements and Replacements
- Substation Improvements and Replacements
- Communication System Improvements and Replacements
- Control, Protection and Metering Improvements and Replacements
- Mobile Equipment Replacements
- Programmatic Improvements and Replacement

#### 2 PROGRAM OVERVIEW

The majority of the expenditures identified in this Plan are related to rebuilding Western's aging wood pole transmission lines and replacing the obsolete analog microwave communications system with new digital equipment. The data has been broken out by project as well as major accomplishments of the prior fiscal year and significant changes to the plan.

Due to several earmarks in the FY05 Energy and Water Development Appropriation Act, RMR did not receive \$5.5 million dollars of requested funding for the Construction and Rehabilitation (C&R) program in FY05.

### 2.1 Colorado River Storage Project (CRSP) Facilities

Accomplishments in FY04 for the CRSP system include the successful conversion of the Shiprock-Four Corners transmission line to 345-kV operation, and continuing progress to replace the analog microwave system with a new digital system.

Western will continue to develop the project for the replacement of the two Flaming Gorge Transformers with larger units to address frequent overloading.

A major expenditure over the next several years will continue to be the replacement of the old analog microwave system with new digital technology. Due to the budget cuts to the C&R program in FY05, much of the planned work this year will be deferred to FY06 and the project extended another year in the Plan. A large part of this work has already been completed on the backbone microwave system in partnership with other utilities. Most of the remaining work consists of installing digital communications links from the backbone system to individual substations.

One of the earmarks to FY05 Energy and Water Development Appropriation Act was for the full funding of the facilities Western will construct as part of the Animas-La Plata Project.

The other items identified in the plan are routine maintenance activities such as replacing obsolete, and worn-out substation equipment, supplies to repair and replace damage to transmission lines, and equipment for the crews to accomplish maintenance of the system. Some of these items were deferred due to budget cuts to the FY05 C&R program.

# 2.2 Loveland Area Projects Facilities (LAP)

Accomplishments in FY04 for the LAP system included an emergency project to reconductor 19 miles of the Casper-Glendo 115-kV line, new control buildings at Cheyenne and Julesburg Substations, reconductor of 9 miles of the Beaver Creek-Ft Morgan 115-kV line, replacement of 10 miles of structures on the Lovell-Thermopolis 115-kV line, completion of substation modifications at Basin, Heart Mountain and Lovell, and continuing progress to replace the analog microwave system with a new digital system.

As a result of the age and condition of the system, there are three major replacement projects planned for the LAP system. These projects all involve rebuilding lines (potentially to higher voltage to increase load serving and transfer capabilities) and the associated terminal facilities. Figure 1 is a map that identifies a number of projects including the major projects described below.

Miracle Mile - Ault: The Cheyenne-Miracle Mile and Ault-Cheyenne 115-kV lines were constructed in the 1930's, utilize an obsolete hollow copper conductor, and at almost 65 years old, require replacement. Western proposes to replace these lines with a new 230-kV line from Miracle Mile to Ault; construct Snowy Range Substation, a new 115/230-kV sectionalizing substation in the Laramie area; and install a 30-Mvar capacitor bank at Cheyenne. Between Cheyenne and Ault, the existing 115-kV line will be replaced with a new 230-kV/115-kV double circuit line. These system improvements will increase the reliability in the Laramie area, increase the transfer capability across TOT3 by up to 75 MW, and increase the associated wheeling revenue from the system.

Due to budget cuts and constraints in FY05, Western obtained advanced customer funding for the 115-kV portion of Snowy Range Substation and deferred the 230-kV portion until 2008. Planned Activities in FY05 are the completion of the Environmental Assessment and the beginning of design and specification development. Also planned is the procurement of substation equipment for Snowy Range Substation.

Front-Range T-Line Improvements: A second area of concern is the 115-kV loop from Beaver Creek to Weld, from there to Flatiron, through Longmont, and then back to Beaver Creek. New generation additions along the Front-Range corridor have resulted in overloading on sections of this line in the Beaver Creek area. In FY03, Western reconductored an 0.8 mile portion of the line to avoid a reduction in TOT3 capacity. In FY04, Western reconductored another 9 miles of the line, again to prevent a reduction in TOT3 capacity. In addition to the overloading, significant growth is occurring in this area and once developed, it will be extremely difficult to improve the lines. These line sections vary in age from 50-60 years old and will require increased maintenance and potentially significant replacement over the next 10-15 years. Several of the line sections have already been identified by Maintenance as candidates for rebuilding. Western proposes to rebuild the lines in a double circuit 230-kV configuration and operate one side at 115-kV, the other at 230-kV, and transition the 115-kV circuit over time to a 230-kV operation. This will provide for load growth while allowing existing load serving facilities that utilize 115-kV transformation to continue operation.

Due to budget constraints and cuts in FY05, Western obtained advanced customer funding for the rebuild of the Hoyt-Wiggins 115-kV line and also a portion of the Beaver Creek-Hoyt 115-kV rebuild. Western also deferred the planned construction of the 230-kV additions needed at Beaver Creek, Hoyt, Erie, Kiowa Creek and Weld until completion of all planned transmission line rebuilds. Planned Activities in FY05 include the completion of the

Environmental Assessment for Hoyt-Wiggins, Beaver Creek-Hoyt and Hoyt-Erie lines and the beginning of design and specification development. Also planned is the procurement of all materials for the Hoyt-Wiggins rebuild.

Platte Valley Voltage Conversion: The line in this area was rebuilt from 34.5-kV construction to 69-kV construction in the early 1990s. Construction of Whiterock Substation and installation of shunt capacitor banks at Lyman and McGrew provides increased support and reduces the impacts of the conversion, but starting in the 2007 timeframe additional work will be required to convert the substations between Lingle and Gering to 69-kV operation to address voltage problems on the system.

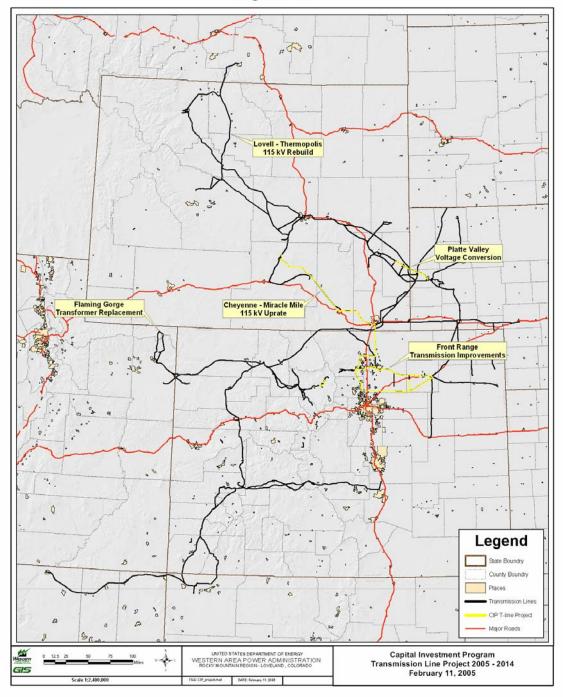
The planned rebuild of the Lovell-Thermopolis 115-kV line was cancelled due to budget cuts in FY05 with the remainder of the project deferred at least 10 years. Also delayed was the planned rebuild to the Gering-Gering Valley 34.5-kV line.

A new project to the Plan is the project of the Granby Pumping Plant-Windy Gap 69-kV line to a 138-kV double circuit. This will be a joint project with Tri-State Generation and Transmission and Northern Colorado Water Conservancy District. Long term transmission needs in the Granby area will be addressed by this project.

The replacement the old analog microwave system with new digital technology will continue. Do to the budget cuts to the C&R program in FY05, much of the work planned this year will be deferred to FY06 and the project extended another year in the plan.

The other items identified in the plan are routine maintenance activities such as replacing obsolete, and worn-out substation equipment, supplies to repair and replace damage to transmission lines, and equipment for the crews to accomplish maintenance of the system. Projects include the Wood Pole Testing & Treatment Program; and other programmatic replacements such as Supervisory Control and Data Acquisition (SCADA) and Information Technology (IT) program support. Some of these items were deferred due to budget cuts to the FY05 C&R program including the Wood Pole Test & Treatment Program and the Alliance Control Building replacement.

Figure 1



# 3 PROGRAM SUMMARY BUDGET

The following spreadsheet summarizes Western's capital program budget estimates by major program area.

#### Rocky Mountain Region Capital Projects Ten Year Plan

Total Costs (x1000)

	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014
Pick Sloan											
T-Line Improvements and Replacements		6,950	30,615	20,301	13,530	11,880	7,550	20,000	15,730	23,230	16,280
Substation Improvements and Replacements		6,936	5,408	6,455	7,402	3,347	4,507	8,922	2,992	2,935	4,494
Communication System Improvements and Replacements		2,136	1,814	764	751	600	600	100	100	100	100
Substation Control, Protection, and Metering		1,300	1,135	1,145	990	790	740	740	740	740	740
Mobile and Heavy Equipment Replacements	FY2004	502	580	1,350	845	600	600	600	600	600	600
Buildings and Programmatic Investments	Actuals	1,186	1,799	1,366	1,718	773	843	738	1,288	775	766
Total	14,711	19,010	41,351	31,381	25,236	17,990	14,840	31,100	21,450	28,380	22,980
FY2004 CIP Plan Totals	17,832	29,148	25,997	25,918	26,241	25,574	27,264	28,109	26,685	26,091	-
CRSP											
T-Line Improvements and Replacements		439	3,502	1,746	325	450	1 520	1 210	130	50	50
Substation Improvements and Replacements		1,355	3,908	1,746	325 1,525	450 1,780	1,530 1,456	1,210 1,530	1,230	1,490	1,440
·		,	•	•	250	1,780	1,436	1,530	1,230	1,490	1,440
Communication System Improvements and Replacements Substation Control, Protection, and Metering		1,641 799	2,548 885	2,000 945	250 840	790	790	790	790	790	790
Mobile and Heavy Equipment Replacements	FY2004	799 550	000	945 350	650	790 500	790 500	790 500	790 500	790 500	790 500
Buildings and Programmatic Investments	Actuals	530 521	1,237	974	1,430	946	1,017	888	1,525	948	915
Total	5,281	5,305	12,080	7,470	5,020	4,566	5,393	5,018	4,275	3,878	3,795
FY2004 CIP Plan Totals	8,028	9,779	8,539	4,572	3,491	3,771	4,525	3,996	2,887	2,497	-
		Wes	tern-only Cos	ets (x1000)							
Pick Sloan		Wes	stern-only Cos	sts (x1000)							
Pick Sloan T-Line Improvements and Replacements			-	. ,	13.530	11.880	7.550	20.000	15.730	23.230	16.280
T-Line Improvements and Replacements		6,500	23,565	19,280	13,530 7.387	11,880 3.347	7,550 4,402	20,000 7.022	15,730 2,692	23,230 2.935	16,280 4.494
T-Line Improvements and Replacements Substation Improvements and Replacements		6,500 6,406	23,565 3,265	19,280 6,212	7,387	3,347	4,402	7,022	2,692	2,935	4,494
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements		6,500 6,406 1,549	23,565 3,265 1,572	19,280 6,212 675	7,387 676	3,347 600	4,402 600	•	2,692 100	•	4,494 100
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering	FY2004	6,500 6,406 1,549 1,300	23,565 3,265 1,572 1,135	19,280 6,212 675 1,145	7,387 676 990	3,347 600 790	4,402 600 740	7,022 100 740	2,692 100 740	2,935 100 740	4,494 100 740
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements	FY2004 Actuals	6,500 6,406 1,549	23,565 3,265 1,572	19,280 6,212 675	7,387 676	3,347 600	4,402 600	7,022 100	2,692 100 740 600	2,935 100	4,494 100
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering		6,500 6,406 1,549 1,300 502	23,565 3,265 1,572 1,135 580	19,280 6,212 675 1,145 1,350	7,387 676 990 845	3,347 600 790 600	4,402 600 740 600	7,022 100 740 600	2,692 100 740	2,935 100 740 600	4,494 100 740 600
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments	Actuals	6,500 6,406 1,549 1,300 502 1,186	23,565 3,265 1,572 1,135 580 1,822	19,280 6,212 675 1,145 1,350 1,366	7,387 676 990 845 1,718	3,347 600 790 600 773	4,402 600 740 600 843	7,022 100 740 600 738	2,692 100 740 600 1,288	2,935 100 740 600 775	4,494 100 740 600 766
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments  Total  FY2004 CIP Plan Totals	Actuals 13,629	6,500 6,406 1,549 1,300 502 1,186	23,565 3,265 1,572 1,135 580 1,822 31,939	19,280 6,212 675 1,145 1,350 1,366	7,387 676 990 845 1,718 25,146	3,347 600 790 600 773 17,990	4,402 600 740 600 843 14,735	7,022 100 740 600 738 29,200	2,692 100 740 600 1,288 21,150	2,935 100 740 600 775 28,380	4,494 100 740 600 766
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments Total  FY2004 CIP Plan Totals  CRSP	Actuals 13,629	6,500 6,406 1,549 1,300 502 1,186 17,443 24,873	23,565 3,265 1,572 1,135 580 1,822 31,939 25,865	19,280 6,212 675 1,145 1,350 1,366 30,028 25,745	7,387 676 990 845 1,718 25,146 26,151	3,347 600 790 600 773 17,990 25,574	4,402 600 740 600 843 14,735 27,159	7,022 100 740 600 738 29,200 26,209	2,692 100 740 600 1,288 21,150 26,385	2,935 100 740 600 775 28,380 26,091	4,494 100 740 600 766 22,980
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments  Total  FY2004 CIP Plan Totals  CRSP T-Line Improvements and Replacements	Actuals 13,629	6,500 6,406 1,549 1,300 502 1,186 17,443 24,873	23,565 3,265 1,572 1,135 580 1,822 31,939 25,865	19,280 6,212 675 1,145 1,350 1,366 30,028 25,745	7,387 676 990 845 1,718 25,146 26,151	3,347 600 790 600 773 17,990 25,574	4,402 600 740 600 843 14,735 27,159	7,022 100 740 600 738 29,200 26,209	2,692 100 740 600 1,288 21,150 26,385	2,935 100 740 600 775 28,380 26,091	4,494 100 740 600 766 22,980
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments  Total  FY2004 CIP Plan Totals  CRSP T-Line Improvements and Replacements Substation Improvements and Replacements	Actuals 13,629	6,500 6,406 1,549 1,300 502 1,186 17,443 24,873	23,565 3,265 1,572 1,135 580 1,822 31,939 25,865	19,280 6,212 675 1,145 1,350 1,366 30,028 25,745	7,387 676 990 845 1,718 25,146 26,151 325 1,115	3,347 600 790 600 773 17,990 25,574	4,402 600 740 600 843 14,735 27,159	7,022 100 740 600 738 29,200 26,209	2,692 100 740 600 1,288 21,150 26,385	2,935 100 740 600 775 28,380 26,091	4,494 100 740 600 766 22,980 - 50 1,440
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments  Total  FY2004 CIP Plan Totals  CRSP  T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements	Actuals 13,629	6,500 6,406 1,549 1,300 502 1,186 17,443 24,873 439 1,060 1,641	23,565 3,265 1,572 1,135 580 1,822 31,939 25,865 3,502 3,881 2,548	19,280 6,212 675 1,145 1,350 1,366 30,028 25,745	7,387 676 990 845 1,718 25,146 26,151 325 1,115 250	3,347 600 790 600 773 17,990 25,574 450 1,698 100	4,402 600 740 600 843 14,735 27,159 1,530 1,456 100	7,022 100 740 600 738 29,200 26,209 1,210 1,530 100	2,692 100 740 600 1,288 21,150 26,385	2,935 100 740 600 775 28,380 26,091 50 1,490 100	4,494 100 740 600 766 22,980 - 50 1,440 100
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments  Total  FY2004 CIP Plan Totals  CRSP  T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering	Actuals 13,629 14,088	6,500 6,406 1,549 1,300 502 1,186 17,443 24,873 439 1,060 1,641 799	23,565 3,265 1,572 1,135 580 1,822 31,939 25,865	19,280 6,212 675 1,145 1,350 1,366 30,028 25,745	7,387 676 990 845 1,718 25,146 26,151 325 1,115 250 840	3,347 600 790 600 773 17,990 25,574 450 1,698 100 790	4,402 600 740 600 843 14,735 27,159 1,530 1,456 100 790	7,022 100 740 600 738 29,200 26,209 1,210 1,530 100 790	2,692 100 740 600 1,288 21,150 26,385 130 1,230 100 790	2,935 100 740 600 775 28,380 26,091 50 1,490 100 790	4,494 100 740 600 766 22,980 - 50 1,440 100 790
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments  Total  FY2004 CIP Plan Totals  CRSP  T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements	Actuals 13,629 14,088	6,500 6,406 1,549 1,300 502 1,186 17,443 24,873 439 1,060 1,641 799 550	23,565 3,265 1,572 1,135 580 1,822 31,939 25,865 3,502 3,881 2,548 885	19,280 6,212 675 1,145 1,350 1,366 30,028 25,745 1,746 1,455 2,000 945 350	7,387 676 990 845 1,718 25,146 26,151 325 1,115 250 840 650	3,347 600 790 600 773 17,990 25,574 450 1,698 100 790 500	4,402 600 740 600 843 14,735 27,159 1,530 1,456 100 790 500	7,022 100 740 600 738 29,200 26,209 1,210 1,530 100 790 500	2,692 100 740 600 1,288 21,150 26,385 130 1,230 100 790 500	2,935 100 740 600 775 28,380 26,091 50 1,490 100 790 500	4,494 100 740 600 766 22,980 - 50 1,440 100 790 500
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments  Total  FY2004 CIP Plan Totals  CRSP  T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments	13,629 14,088 FY2004 Actuals	6,500 6,406 1,549 1,300 502 1,186 17,443 24,873 439 1,060 1,641 799 550 521	23,565 3,265 1,572 1,135 580 1,822 31,939 25,865 3,502 3,881 2,548 885 - 1,237	19,280 6,212 675 1,145 1,350 1,366 30,028 25,745 1,746 1,455 2,000 945 350 974	7,387 676 990 845 1,718 25,146 26,151 325 1,115 250 840 650 1,430	3,347 600 790 600 773 17,990 25,574 450 1,698 100 790 500 946	4,402 600 740 600 843 14,735 27,159 1,530 1,456 100 790 500 1,017	7,022 100 740 600 738 29,200 26,209 1,210 1,530 100 790 500 888	2,692 100 740 600 1,288 21,150 26,385 130 1,230 100 790 500 1,525	2,935 100 740 600 775 28,380 26,091 50 1,490 100 790 500 948	4,494 100 740 600 766 22,980 - 50 1,440 100 790 500 915
T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements Buildings and Programmatic Investments  Total  FY2004 CIP Plan Totals  CRSP  T-Line Improvements and Replacements Substation Improvements and Replacements Communication System Improvements and Replacements Substation Control, Protection, and Metering Mobile and Heavy Equipment Replacements	Actuals 13,629 14,088	6,500 6,406 1,549 1,300 502 1,186 17,443 24,873 439 1,060 1,641 799 550	23,565 3,265 1,572 1,135 580 1,822 31,939 25,865 3,502 3,881 2,548 885	19,280 6,212 675 1,145 1,350 1,366 30,028 25,745 1,746 1,455 2,000 945 350	7,387 676 990 845 1,718 25,146 26,151 325 1,115 250 840 650	3,347 600 790 600 773 17,990 25,574 450 1,698 100 790 500	4,402 600 740 600 843 14,735 27,159 1,530 1,456 100 790 500	7,022 100 740 600 738 29,200 26,209 1,210 1,530 100 790 500	2,692 100 740 600 1,288 21,150 26,385 130 1,230 100 790 500	2,935 100 740 600 775 28,380 26,091 50 1,490 100 790 500	4,494 100 740 600 766 22,980 - 50 1,440 100 790 500

#### 4 PROGRAM SUMMARIES

The following sections summarize the goals, priorities, and significant near-term projects for Western's six major capital program areas. The investment costs shown are Western's projected estimates within the 3-year budget window for the more significant projects. It should also be noted that some of these projects have additional costs that occur either before or after the 3-year budget window.

#### 4.1 Transmission Line Improvements and Replacements

The goal of the Transmission Line Facilities program is to develop a practical plan based on available resources that will satisfy system-operating criteria, extend service life of existing facilities and rehabilitate an aging infrastructure with nominal rate impact.

- Use results of long-range system operations planning studies to identify strategic replacement or uprate projects. Incorporate into the Plan in order of merit, value, and priority.
- Continue existing wood pole testing, treatment, and replacement program.
- Evaluate all wood structure transmission line segments relative to age, historical maintenance concerns, and pole test program results to identify rebuild projects.

Major Projects	Investr	nent (\$ thou	ısands)
	FY05	FY06	FY07
Beaver Creek-Hoyt 230kV Upgrade	3,270	9,500	4,800
Granby Pumping Plant-Windy Gap Rebuild <sup>1</sup>	150	1,300	200
Cheyenne-Miracle Mile 230kV Upgrade	250	10,500	12,600
Hoyt-Wiggins 115kV Uprate	1,700	900	
Gering/Gering Valley 34.5-kV T-Line		100	225
Animas-LaPlata Project <sup>2</sup>	243	3,397	1,746
Shiprock-Four Corners 345-kV Conversion	170		
Wood Pole Testing and Treatment	30	815	480
Cheyenne-Ault 230-kV Upgrade			475
Erie-Hoyt 230-kV Upgrade	300		

<sup>&</sup>lt;sup>1</sup> Joint project; Western cost shown.

<sup>&</sup>lt;sup>2.</sup> Non-reimbursable funding will be used.

## 4.2 Substation Improvements and Replacements

The Substation Equipment Improvement and Replacements program seeks to assure the highest possible reliability of substation equipment and to adequately meet the needs of a changing power system while minimizing lifecycle costs, environmental risks, and personnel hazards.

- Extend the service lives of major substation equipment without compromising reliability.
- Replace major substation equipment when justified by increased maintenance costs, lack of spare parts, personnel hazards, or environmental risks.
- Replace oil breakers with SF-6 or vacuum breakers to reduce environmental risk.

Major Projects	Investm	ent (\$ thou	usands)
	FY05	FY06	FY07
Whitney Switchyard	400		
Willoby Substation <sup>1</sup>	40	950	50
Snowy Range Substation	4,350	450	
Wray Substation Modifications <sup>1</sup>	200		
Whiterock Substation	245		
Yellowtail 2 <sup>nd</sup> Transformer Addition	468		
Lusk Rural and Podolak Substation Improvements			120
Limestone Substation 34.5-kV Additions		75	425
Miracle Mile Substation 230-kV Additions		600	3,700
Ault Substation 230-kV Additions			350
Cheyenne 115-kV Substation Shunt Capacitors			50
Power Transformer Replacements			
Granby PP KY1A <sup>1</sup>	85	10	
Granby PP KY2A <sup>1</sup>		78	13
Granby PP KY3A <sup>1</sup>			97
Sidney KY1A		50	646
Glendale Regulators	91		
Garland KZ1A <sup>1</sup>		70	22
Flaming Gorge KY2A & KY2B	100	3,000	125

<sup>&</sup>lt;sup>1</sup> Joint project; Western cost shown.

Major Projects	Investm	nent (\$ tha	ousands)
	FY05	FY06	FY07
Circuit Breaker and Switch Replacements			
Midway 1886, 1562, 1662,		65	90
Blue Mesa 1066, 1162, 1362, 1462		65	90
Limestone Control Upgrades			224
Archer 2224	29		
Gering 162, 462, 966		292	
Glendo 524		62	
Chappell 144	47		
Raderville 115-kV Switch Upgrade		205	225
Hayden 2272, 2476, & 2072	143		
Hayden 2772, 2872 & 2972	184	130	
Shiprock 3262, 3362, & 3462		65	85
Hayden 230-kV Switches	8	4	
Reactor Replacements			
Curecanti KV1A & KV1B	50		
Hayden KV1A, KV1B, KV2A			240
Other Substation Work			
Gering 162, 462, 966 and SS Switchgear	175	317	
Hayden SS Switchgear Replacement	125	125	125
CRSP Transformer Monitors	105	97	100

## 4.3 Communication System Improvements and Replacements

The goal of the Communications System Improvements and Replacements program is to maximize the reliability and availability of the communications system by infrastructure investments while minimizing its life cycle cost and responding to changes in user requirements, technology, and regulations.

- Replace analog MW radios with digital to reduce operational costs.
- Replace wide band radios with narrow-band to meet FCC mandates.
- Install fiber optic cable to reduce long term operational costs where appropriate.

Major Projects	Investn	nent (\$ thou	ısands)
	FY05	FY06	FY07
S. Colorado Joint MW System <sup>1</sup>	250		
Microwave Spur Replacements – (Wyoming,			
Nebraska, N.E. Colorado)	561	600	175
Microwave Spur Replacements - CRSP	550	2,300	1,900
UHF Radio Replacement	80		
VHF Mobile Radio Replacement	487	196	
Archer-Cheyenne Fiber Optic Cable <sup>1</sup>	25		
Estes-Valley Fiber Optic Cable <sup>1</sup>	164		
Granby-West Portal Fiber Optic Cable <sup>1</sup>	326		
Cody Fiber Optic Cable	84	272	
PMOC-Crossroads Fiber Optic Cable <sup>1</sup>	80	80	
Airport-Weld Fiber Optic Cable		472	
Horsetooth Tap-Flatiron Fiber Optic Cable			400
Flaming Gorge, Vernal, Grizzly Ridge			
Communications Buildings	550		

<sup>&</sup>lt;sup>1</sup> Joint project; Western cost shown.

# 4.4 Control, Protection and Metering Improvements and Replacements

The goal of the Control, Protection and Metering program is to maintain and improve system reliability by the cost effective application of control, protection and metering technologies at Western substations and meter sites.

- Replace electromechanical relays and revenue meters with microprocessor-based equipment.
- Implement Digital Control Systems (DCS) schemes in substations as opportunities arise.
- Replace the obsolete Direct Digital Interface (DDI) telemetry system with current technology.

Major Projects	Investment (\$ thousands)								
	FY05	FY06	FY07						
Glendo DCS Installation	40								
Protective Relay Replacements	1,294	1,330	1,380						
RTU Replacements	447	300	300						
DDI Replacements	218	290	210						

# 4.5 Mobile Equipment Replacements

The goal of the Mobile Equipment Replacement program is to assure that Western craftsmen have adequate, reliable equipment and tools available to accomplish the maintenance program efficiently and safely.

- Maintain adequate inventory for normal and emergency maintenance activities.
- Minimize life-cycle costs of equipment.

Planned Replacements	Invest	ment (\$ tho	usands)
	FY05	FY06	FY07
Brush Hog - Montrose	125		
Manlift, 47' - Brush	252		
Backhoe - Brush	100		
Tree Shredder - Montrose	425		
Versalift, 38' - Loveland		80	
Motor Grader - Craig			165
Line Truck - Casper		500	
Mobile Transformer - Loveland			800
Backhoe - Cody			100

## 4.6 Programmatic Improvements and Replacements

These program elements support the infrastructure of the Region that is not integrated with the transmission, substation, and communication systems. In general, they involve the buildings and facilities improvements, SCADA, and IT programs. The current program priorities are presented by designated individual elements and the projects and accomplishments are combined by fiscal year as follows:

#### **Priorities**

#### SCADA System:

- Install a new SCADA base system release.
- Expand RMR's Alternate Control Center to meet NERC requirements.
- Develop a Common Information Model (CIM) based ability to exchange modeling topology information.
- Upgrade the Remote Terminal Unit (RTU) data acquisition system at Loveland and Cheyenne.

#### Information Technology (IT):

- Maximize resource efficiencies by consolidating systems, automating processes, and implementing process improvements.
- Implement procedures and systems to maintain and secure existing systems to ensure business continuity.

#### Lands:

Develop and maintain a Geographic Information Systems (GIS) program that displays all regional generation sources, transmission lines, substations, communication facilities, office locations, archeological and cultural sites; and topographic, boundary, and municipal features relative to geographic and spatial reference.

#### Buildings and Facilities:

- Initiate facility inspections and develop remedial actions to reduce the risk of a catastrophic failure of any one facility's intended function.
- Incorporate unique designs that provide extended service life, especially for those facilities in remote locations, without adding significantly to the cost or routine maintenance.

Major Projects	Investm	ent (\$ thous	sands)
	FY05	FY06	FY07
SCADA Upgrades	227	488	478
E-Scheduling/E-Tagging	98		
IT General Support Systems (GSS)	172	46	15
Small Facility Projects (Civil /C&R)	300	1,250	950
Small Facility Projects (Electrical/RRADs)	281	200	200
Virginia Smith DC Tie HVAC Replacement		300	
GIS Development	150	287	287
WIN (substation integrated network)	173	315	180
Alternate Control Center	180	150	
Casper Storage Building			200
Operations Map Board Replacement			30
Gering Service Center Repairs	110		

# 5 TEN-YEAR BUDGET PROJECTIONS

The following spreadsheets list Western's capital budget estimates by project and by fiscal year.

Yellow Highlight = New Project to list
Red Text = Change from previous version
Blue Text with strike out = will be removed from list

W Total = Western Only Costs
O Total = Trust and Joint Participation Costs
FY Total = Sum of W Total and O Total

PROJECT	Fund Power Sys	Project Total		FY05		W Total	FY06 O Total FY TOT	M Total	FY07	FY TOTAL	W Total	FY08	FY TOTAL	W Total	FY09	FY TOTAL	W Total	FY10	EY TOTAL	W Total	FY11	FY TOTAL	W Total	FY12	EY TOTAL	W Total	FY13 O Total   FY TOTAL	W Total	FY14
FROJECI	- ower sys	rotal	VV TOTA	u U IOIA	FITTOTAL	_ vv rotal	O IOIAI PT IOI	v rotal	J Total	FITOTAL	vv rotal	U IUtal	FITOTAL	w iotai	O TOTAL	. I TOTAL	vv rotar	O rotar	- I TOTAL	W IOTAI	O TOTAL I	IIIOIAL	W IOIAI	O rotal	TIOTAL	W IO(dl	J IOIAI FT IOIAL	AA LOGII	O TOTAL FT TOTAL
Transmission Lines																													
Cheyenne-Miracle Mile 230kV T-Line Upgrade	PSWCF	32,533	250		250	10500	10500	_		12600	8500		8500	400		400										'			
Cheyenne-Ault 230kV T-line Upgrade	PSWCF	15,975	-			-	<del>                                     </del>	475		475	4500		4500	11000		11000				100		100	400		400		50		
Distribution Line Repair/Replacement Gering-Gering Valley 34.5-kV T-Line	PSWCF PSWCF	550 325	1			100	100	225		225										100		100	400		400	50	50		
Troublesome-Colorado Pumps	PSWCF	550				100	100	220		220																550	550		
Lovell - Thermopolis 115-kV line Rebuild	PSWCF	700	150		150																								
Granby Pump Plant-Windy Gap 69-kV rebuild	PSWCF	9,580	150	450	600	1300	7050 8350	200	400	600																			
Front Range T-Line Improvements						-		-																		lacksquare			
Brush Tap - Ft Morgan West 115-kV Uprate- COMPI	PSWCF	775	1			-		-																					
Beaver Creek - Hoyt 230-kV Upgrade	PSWCF	17,880	3270	)	3270	9500	9500	4800		4800																i '			
Hoyt - Wiggins 115-kV Uprate	PSWCF	2,600	1700	)	1700	900	900																			'			
Dixon Creek-LaPorte 230-kV Upgrade - 3rd party	PSWCF	4.440				050		450	004	4074																			
Timnath - Black Hollow 230-kV Upgrade Weld-Flatiron 230kV Upgrade	PSWCF PSWCF	1,446 13,300	25		25	350	350	450	621	1071				350		350	6400		6400	6300		6300	250		250				
Hoyt-Brighton 230-kV Upgrade - Deleted	PSWCF	13,300												330		330	0400		0400	0300		0300	250		250				
Brighton-Terry Street 230-kV Upgrade - Deleted	PSWCF																												
Erie-Hoyt 230-kV Upgrade	PSWCF	27,300	300		300												1100		1100	12750		12750	12750		12750	400	400		
Ft Morgan West - Kiowa Creek 230-kV Upgrade	PSWCF	9,950																		200		200	600		600	8900	8900	250	250
Kiowa Creek - Rosedale 230-kV - Deleted	PSWCF PSWCF	10.750	1																	200		200	000		600	0700	0700	250	250
Kiowa Creek - Willoby 230-kV Upgrade  Rosedale- Weld 230-kV Upgrade - Deleted	PSWCF	10,750	1					-												200		200	600		600	9700	9700	250	250
Ault-Willoby 230-kV	PSWCF	8,850	1			1	† †				1												300		300	2000	2000	6250	6250
Beaver Creek-Ft Morgan West 230-kV Upgrade	PSWCF	8,900																					300		300	500	500	7900	7900
Erie-Longmont NW 230-kV Upgrade	PSWCF	14,600																								600	600	1100	1100
Wood Pole Penlacements (RS) COMPLETE	DOMOE	100	1	_		-	<del>                                     </del>	-		-	-	-							-									-	
Wood Pole Replacements (PS) - COMPLETE Wood Pole Test and Treatment (PS)	PSWCF PSWCF	100 4,617	455		455	815	815	480	+	480	480	1	480	80		80			1	400		400	480		480	480	480	480	480
Line Equipment Replacements - General (PS)	PSWMF	1,000	200		200	100	100	50		50	50		50	50		50	50		50	50		50	50		50	50	50	50	50
T-Line SubTotal		182,281	_		6950	23565			1021	20301	13530		13530	11880		11880	7550		7550	20000		20000	15730		15730	23230	23230	16280	16280
		,																								1 '			
Substations																										'			
Cheyenne Control Building - COMPLETE	PSWCF	855																											
Wray Substation Modifications	PSWCF	1,127	200		200																								
Walden Substation - CANCELLED Whitercolk Substation	PSWCF PSWCF	E 200	245		245	-		-																					
Whiterock Substation Yellowtail 2nd Transformer Addition	PSWCF	5,308 2,479	245 468	_	245 468			-																					
Lusk Rural - Podolak Improvements	PSWCF	400	.00		100			120		120	280		280																
Limestone 34.5-kV additions	PSWCF	850				75	75	425		425	50		50																
Willoby Switchyard (formerly Prospect Valley Tap)	PSWCF	3,135	40		135	950	1900 2850	50	100	150																'			
Whitney	PSWCF	2,014	400	350	750	-	<del>                                     </del>	_																					
Cheyenne-Miracle Mile Terminals								-																					
Snowy Range Substation 115-kV (Laramie)	PSWCF	4,801	4350	)	4350	450	450																						
Snowy Range Substation 230-kV (Laramie)	PSWCF	4,150									3900		3900	250		250													
Miracle Mile 230-kV additions	PSWCF	4,800				600	600	3700		3700	500		500																
Cheyenne 115-kV Shunt Capacitor	PSWCF PSWCF	400						50		50	325		325	25		25													
Ault 230-kV additions	PSWCF	2,100	1			+	+ +	350		350	1250		1250	500		500													
Front Range Transmission Improvements Terminal	s																												
Beaver Creek 230-kV Additions - DELAYED	PSWCF																												
Hoyt 230-kV Additions - DELAYED	PSWCF																												
Eric 230-kV/115-kV Additions - DELAYED  Kiowa Creek 230-kV/115-kV Additions - DELAYED	PSWCF PSWCF		-			-	<del>                                     </del>	_																					
Weld 230 kV Bay Addition —DELAYED	PSWCF		1			+	+ +	1																					
TOTAL ZOO KY Day Addition - DELATED	1 34401		1				1 1	1	1	t	1	1							t										
Platte Valley Voltage Conversion																													
Lingle Substation 69kV additions	PSWCF	2,355												205		205	1900		1900	250		250							
Torrington Substation 69kV additions Torrington - Wildcat 69kV additions	PSWCF PSWCF	3,530 3,130	1			-	+	-}	-	1	1	1		1			80 105	105	80 210	3200 650	1900	3200 2550	250 70	300	250 370				
Wildcat Substation 69-kV additions	PSWCF	3,130	1			-	+ +	-	-	<del>                                     </del>	1	<del>                                     </del>		1			100	100	210	000	1900	∠000	70	300	310			<b> </b>	
Gering Substation 69-kV additions	PSWCF	1,850	1			1	† †				1															50	50	1600	1600
-																										<sup>†</sup>			
McGrew Shunt Capacitor Addition	PSWMF	56	25		25																								
Alcova 362 & 562 Replacements - COMPLETE Alcova 462, 662, 862, 1062 Replacement	PSWMF PSWMF	215	1			-	+	-}	-	1	450	1	450	1				1	1	-									
Cheyenne KY8A Replacement - COMPLETE	PSWMF	450 95	1		-	1	+ +	-		<del> </del>	400	1	400						<del>                                     </del>										
Gering 642 Replacement - COMPLETE	PSWMF	50	1			1	† †				1																		
Gering Station Service Switchgear	PSWMF	200	175		175	25	25																			<sup>†</sup>			
Gering Breaker Replcmt: 162,462,966	PSWMF	292				292	292																						
Glendale KW1A - Replc Regulators (3 ea)	PSWMF	91	91		91	-	<del>                                     </del>	-		-	-	-							-									-	
Glendale 202 & 302 Replacement - Cancelled Glendo PCB 524 Replacment	PSWMF PSWMF	62	1		+	62	62	-		-	1	-		H +					1									+	
Granby Pumping Plant KY1A Rebuild	PSWMF	190	85	85	170	10	10 20			<u> </u>									1										
Granby Pumping Plant KY2A Rebuild	PSWMF	182				78	78 156	13	13	26																			
Granby Pumping Plant KY3A Rebuild	PSWMF	224						97	97	194	15	15	30																
Haxtun Interruptor MOI 164 Replacement	PSWMF	88				88	88						1=-								ļ <u> </u>								
Willow Creek KZ2A Replacement Chappell 144 Replacement	PSWMF PSWMF	235 102	47		47	-	+	-}	-	1	155	1	155	80	-	80		1	1	-									
Garland KZ1A Replacement	PSWMF	365	41		4/	70	105 310	22	33	55	1	<del>                                     </del>		1					<del>                                     </del>									+	
Lusk KZ1A Replacement - CANCELLED	PSWMF	50	1			,,,	50	- 22	55	- 55	1	1							t										
Limestone Substation Control Upgrades	PSWMF	396						224		224	172		172																
Raderville 115KV Switch Upgrade	PSWMF	430				205	70	225		225																			
Sidney KY1A Transformer Replacement	PSWMF	696	1		,-	50	50	646		646						- 10				- 12	<del>                                     </del>		10			<u> </u>		42	
Substation Disconnect Switch Replacements (PS)	PSWMF PSWMF	425 970	40 100		40 100	70	70	40 100		40 100	40 100	-	40 100	40 100		40 100	40 100		40 100	40 100		40 100	40 100		40 100	40 100	40 100	40 100	40 100
Substation Test Equipment - (PS)																													

28,380 22,980

## RMR Pick Sloan Capital Investment Plan - Ten-Year Detail

Yellow Highlight = New Project to list Red Text = Change from previous version Blue Text with strike out = will be removed from list W Total = Western Only Costs O Total = Trust and Joint Participation Costs FY Total = Sum of W Total and O Total

 
 Project
 FY05
 FY06

 Total
 W Total
 O Total
 FY TOTAL
 W Total
 O Total
 FY TOTAL
 FY07
W Total O Total FY TOTAL | FY08 | FY09 | FY10 | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Tot PROJECT PSWMF 1,150 50 50 CVT, PT, & CT replacement (PS) lisc. Substation Elect. Equipm. Replace. (PS) PSWMF 13,937 6406 530 6936 3265 2093 5408 6212 243 Communications HF Mobile Radio Replacements (PS) PSWMF 585 PSWMF rcher-Chevenne Fiber Optic Installation HF Radio Replacements (PS) PSWMF PSWMF PSWMF SBR - CBT Fiber Optic Installation 242 242 PSRAF APA - Cody Area Fiber Optic Installation PSWMF PSWMF MOC - Crossroads Fiber Optic Installation **PSWMF** ortel Microwave Replacements PSWMF 1,500 ommunications Test Equipment (PS)

WR Technology Test Bed Project (PS) PSWMF Control, Protection and Metering PSWMF 7,590 690 rotective Relay Replacements (PS) PSWMF PSWMF TU Replacements (PS) PSWMF 1,550 DI Replacements (PS) PSWMF 10,435 1300 Mobile & Heavy Equipment PSWMF /ersalift, 38' - Loveland orklift - Loveland (replacement) ınlift, 47' - Brush (replace 51931 PSWMF PSWMF PSWMF PSWMF PSWMF 450 450 PSWMF 4.900 PSWMF Mobile & Heavy Equipment Sub-tota 7.597 Programmatic Improvements It. Control Center Expansion - CH (PS) 75 300 PSWCF 5,665 /irginia Smith DC Tie HVAC Replacement PSWMF ring Service Center Repairs per Storage Bldg CADA Upgrades (PS) PSWMF 1,966 PSWMF 1,375 PSWMF 1,114 PSWMF ring 2507 Router PSWMF PSWMF perations Center Map Board Replacement PSWMF Misc. SubTota 14,243 CIP 10 Year Grand Total 289,841 17,443 1,567 19,010 31,939 9,385 41,351 30,028 1,353 31,381 25,146 17,990 14,735 105 14,840 300 21,450 22,980 90 25,236 17,990 29,200 1,900 31,100 28,380 22,980 17.443 19.010 31.939 41.324 30.028 25.236 17.990 17.990 14.735 14.840 29.200 31,100 21.150 21.450 28.380 22,980

31.381 25.146

W Total = Western Only Costs
O Total = Trust and Joint Participation Costs
FY Total = Sum of W Total and O Total Yellow Highlight = New Project to list
Red Text = Change from previous version
Blue Text with strike out = will be removed from list

	Fund	Project		FY05			FY06	FY07		1	FY08	1		FY09		I	FY10		I	FY11		FY12			FY13		FY14
PROJECT	Power Sys		W Total		<b>FY TOTAL</b>	W Total	O Total FY TOTAL		FY TOTAL	W Total		TOTAL V	N Total		FY TOTAL	W Total		FY TOTAL	W Total		FY TOTAL			W Tota	O Total FY TOTAL	W Total C	
Transmission 12																											
Transmission Lines Animas-Laplata Project	CRSPWCF	6,000	243		243	3307	3397	1746	1746	275	+ + .	275													+ +		
Shiprock - Four Corners 345-kV Conversion	CRSPWCF	570	170		170	3337	3337	1740	1740	2/3		213															
Wood Pole Replacement (CRSP)	CRSPWCF	2,160														1000		1000	1080		1080	80	80				
	CRSPWCF	960											400		400	480		480	80		80						
	CRSPVMF CRSPVMF	481	200		200	105	405			50	<del>                                     </del>	50	50		F0	50		F0			F0	50	50	F0	50	50	50
Line Equipment Replacements - General (CRSP)	CKSPVIVIF	461	26		26	105	105			50		50	50		50	50		50	50		50	50	50	50	50	50	50
T-Line SubTotal		10,171	439		439	3502	3502	1746	1746	325	1 :	325	450		450	1530		1530	1210		1210	130	130	50	50	50	50
Substations																											
Silt Substation Upgrades - On Hold Indefinitely	DOLTCF	20						100	400	400		100	400		400	400		100	400		100	100	400	400	100	400	100
Substsation Test Equipment (CRSP)  Battery and Charger Replacements (CRSP)	CRSPVMF CRSPVMF	903 903	50 50		50 50	53 53	53 53	100 100	100	100 100			100		100	100 100		100	100		100	100	100 100	100	100	100	100 100
	CRSPVMF	552	18		18	48	48	100	100	45		45	50		50	50		50	50		50	50	50	50	50	50	50
	CRSPVMF	565	80		80	30	30	100	100	50		50	50		50	50		50	50		50	50	50	50	50	50	50
Bushing Replacements (CRSP)	CRSPVMF	298	60		60	78	78	100	100	60		60	40		- 40	40		- 10	40		- 40	40	40	40	40	40	- 10
Surge Arrester Replacements (CRSP) Transformer Monitors for Curecanti KZ1A	CRSPVMF CRSPVMF	506 105	58 105		58 105	68	68	100	100	40	+	40	40		40	40		40	40		40	40	40	40	40	40	40
Transformer Monitors for Waterflow KU1A	CRSPVMF	97	103		103	97	97																	1			
Transformer Monitors for Shiprock KU3A	CRSPVMF	100						100	100						_			_			_						
Monitors for WCMO Transformers	CRSPVMF	700	465		465	405	105	105	405	100			100		100	100		100	100		100	100	100	100	100	100	100
Hayden Station Service Replacement Archer 1566 Replacement	CRSPVMF CRSPVMF	400 102	125		125	125	125	125	125	25	+ +	25	+							+			+	1	+ +		
Archer 2224 Replacement	CRSPVMF	69	29		29					1	† †									<del>                                     </del>			1	1	† †		
Ault 1096 & 892 Replacement	CRSPVMF	240		240	240																						
Ault 692 Replacement	CRSPVMF	300								00		250	40	50	50										<del>                                     </del>		
Ault 696 Replacement Flaming Gorge KY2A & KY2B Uprate	CRSPVMF CRSPVMF	300 3,225	100		100	3000	3000	125	125	90	160	250	18	32	50									-			
Hayden 230-kV Switch Replacements	CRSPVMF	169	8	55	63	4	27 31	125	123																		
Fontenelle 252 Replacement - COMPLETE	SEVMF	84																									
Hayden 2072,2272,2476 Replacement	CRSPVMF	320	143		143																						
Hayden 2772, 2872, 2972 Replacement Shiprock 3262,3362,3462 Replacement	CRSPVMF CRSPVMF	314 255	184		184	130 65	130 65	85	85	85	+	85	20		20										+ +		
Midway 1886, 1562, 1662 Replacement	CRSPVMF	360				65	65	90	90	90		90	90		90	25		25						1			
Blue Mesa 1066, 1162, 1362, 1462 Replacement	CRSPVMF	360				65	65	90	90	90		90	90		90	25		25									
Vernal 1372, 1576, 1672 Replacement	CRSPVMF	312														172		172	140		140						
Vernal 1872, 2172 Replacement Collbran 362 Replacement	CRSPVMF CRSPVMF	220 110									+								120		120	100 60	100 60	50	50		
Rifle 282, 382 Replacement	CRSPVMF	200																				00	00	200	200		
Rifle 486, 582 Replacement	CRSPVMF																										
Shiprock KV1C, KV1D Reactor Replacement - Cancell	CRSPVMF	470																									
Curecanti KV1A, KV1B Reactor Replacement Hayden KV1A, KV1B, KV2A Reactor Replacement	CRSPVMF CRSPVMF	170 720	50		50			240	240	240	+	240	240		240									-	+		
	CRSPVMF	654						240	240	240	<del>                                     </del>	240	240		240	294		294	330		330	30	30				
Misc. Substation Elect. Equip. Replace. (CRSP)	CRSPVMF	4,200											800		800	500		500	500		500	600	600	800	800	1000	1000
Substations SubTotal		17,833	1060	295	1355	3881	27 3908	1455	1455	1115	410 1	1525	1698	82	1780	1456		1456	1530		1530	1230	1230	1490	1490	1440	1440
Communications																											
Microwave Spur Replacements (CRSP)		6,696	550		550	2300	2300	1900	1900	150		150															
So. Colorado Joint Microwave Project	CRSPWCF	1,345	250		250						$\bot$		Ţ	1			1								<del>                                     </del>		
3, 11 (1 )	CRSPVMF CRSPVMF	158	<b>—</b>							1	+					-			-				+	1	+ + +	1	
	CRSPVMF	147									+ +		+							+			+	1			
FGE, VNL, GRL Communication Bldgs (CRSP)	CRSPVMF	550	550		550																						
	CRSPVMF CRSPVMF	933 891	33		33	100 148	100	100	100	100	+	100	100		100	100		100	100		100	100	100	100	100	100	100
VHF Mobile Radio Replacements (CRSP)  Communications SubTotal	CKOPVIVIE		258 1641		258 1641	148 2548	148 2548	2000	2000	250	+ + .	250	100	<u> </u>	100	100		100	100		100	100	100	100	100	100	100
Communications SubTotal		10,720	1041		1041	2340	2340	2000	2000	230	1 1 '	230	.50		100	100		100	100		100	.00	100	100		.00	100
Control, Protection and Metering											<u> </u>												<u> </u>				
		7,454	604		604	640	640	690	690	690			690		690	690		690	690		690	690	690	690	690	690	690
	CRSPVMF CRSPVMF	950 597	50 72		50 72	50 50	50 50	100 50	100 50	100 50		100 50	100		100	100		100	100		100	100	100	100	100	100	100
	CRSPVMF	597 428	72		72	145	145	105	105	50	+ +	50								+			+	1	+ +		<u> </u>
CPM Sub-total		9,429	799		799	885	885	945	945	840	<del>                                     </del>	840	790		790	790		790	790		790	790	790	790	790	790	790
Mobile & Heavy Equipment																											
Misc Heavy Equipment Replacements (CRSP)		3,785						185	185	500		500	500		500	500		500	500		500	500	500	500	500	500	500
	CRSPVMF CRSPVMF	125 125	125		125					1	+ +									+			+	1	+ +	+	<u> </u>
Front End Loader - Montrose	CRSPVMF	150	120		120					150	† † .	150								<del>                                     </del>			1	1	† †		
	CRSPVMF																										
	CRSPVMF CRSPVMF	165	405		425			165	165	<u> </u>	+												1	1	<del>                                     </del>		
Tree shredder – Montrose  Mobile & Heavy Equipment Sub-total	CKSPVMF	425 <b>4,775</b>	425 550		425 550			350	350	650	<del>                                     </del>	650	500		500	500		500	500		500	500	500	500	500	500	500
wobile & ⊓eavy ⊑quipment Sub-total		4,775	ออป		ათ			<b>330</b>	აⴢՍ	000		UUU	<b>300</b>		อบป	<b>300</b>		อบป	200		อบป	300	500	500	500	300	500

# RMR CRSP Capital Investment Plan - Ten-Year Detail

Yellow Highlight = New Project to list

Red Text = Change from previous version

Blue Text with strike out = will be removed from list

W Total = Western Only Costs
O Total = Trust and Joint Participation Costs
FY Total = Sum of W Total and O Total

Fund Project Power Sys Total FY05 FY06 FY07 FY08 FY09 FY10 FY10 FY11 FY12 FY13 FY14
W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total | O Total | FY TOTAL | W Total PROJECT Programmatic Improvements Control Center Expansion - CH (CRSP) CRSPWMF 110 CRSPWCF 645 CRSPWCF 5,660 95 500 500 500 erations Center Map Board Replacement CRSPVMF 340 CRSPVMF 945 CRSPVMF 1,113 436 CRSPVMF 753 64 47 33 180 65 65 199 64 200 200 100 CRSPVMF 1.810 200 200 200 200 CRSPVMF 1,736 Misc. SubTotal 13,112 521 CIP 10 Year Grand Total 66,040 5,010 295 5,305 12,053 27 12,080 7,470 - 7,470 4,610 410 5,020 4,484 82 4,566 5,393 - 5,393 5,018 - 5,018 4,275 - 4,275 3,878 - 3,878 3,795 - 3,795

#### 5.1 Success Indicators

The goal of Western's Plan is to assure the most cost-effective use of available capital resources to assure long-term electric system reliability and availability. The following sections summarize the inventory of major power system equipment and indicators for measuring the success of our capital program.

#### **Facilities**

Western operates and maintains an extensive system of interconnected substations, transmission lines, and communication sites. The Region owns and operates 118 substations in the states of Wyoming, Nebraska, Colorado, New Mexico, and Utah. The substations comprise the majority of the maintained equipment in the Region, including 460 high voltage circuit breakers and 121 power transformers.

The substations are interconnected by 5,286 miles of transmission lines operating at voltages between 12,500 and 345,000 volts. The majority of the transmission lines (3,324 miles) were built using wood pole structures, with the remainder (1,962 miles) being of steel structure construction. The breakdown of line miles by voltage and construction is shown below:

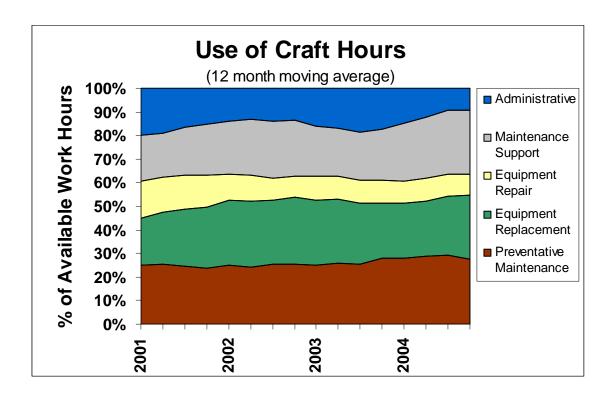
	Miles of Wood	Miles of Steel	
Voltage	Construction	Construction	Total
345-kV	0	383	383
230-kV	127	1,434	1,561
138-kV	306	24	330
115-kV	2,347	92	2,439
69-kV	243	25	268
<69-kV	301	4	305
Total	3,324	1,962	5,286

The electrical system is operated from the Loveland Control Center by means of an extensive communications network consisting of microwave, radio, and fiber optic links. The links are connected through 142 Western-owned communications sites.

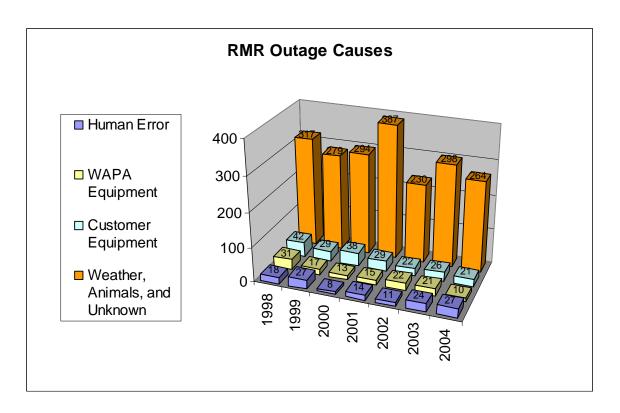
#### **Indicators**

We can measure the success of our efforts in several ways:

Leading Indicators. Measurable activities that result in positive outcomes are considered to be leading indicators. For example, increasing the amount of resources allocated to preventative maintenance activities on equipment should result in a reduction of critical equipment failures. Similarly, increasing the amount of resources allocated to equipment improvement and replacement activities should result in fewer equipment-related outages. The following chart shows RMR's percentage allocation of craft labor for preventative maintenance and equipment replacement activities over the last four years as compared to other activities.



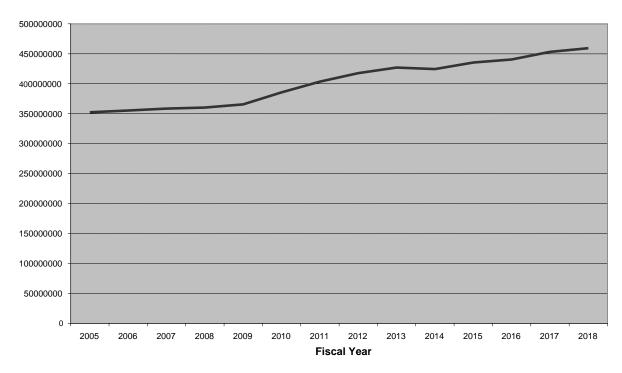
Lagging Indicators. The ultimate goal of the Capital Investment Program is to assure electric system reliability. Therefore, the result of an effective program should be fewer power outages due to equipment failures. Since the results of a poorly maintained or managed power system would not be apparent for several years, equipment outage rates tend to be a lagging performance indicator. The following chart shows the annual number of outages in the control system due to all causes including weather, equipment failures, and human error.



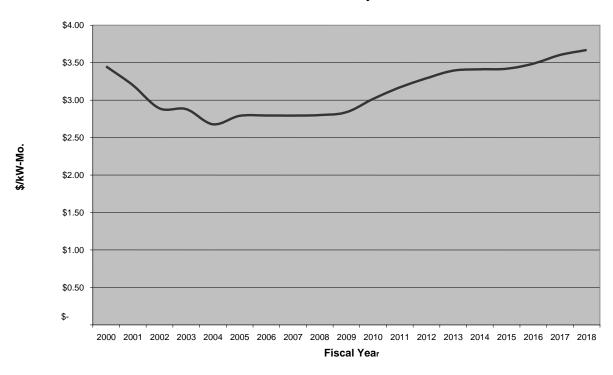
Financial Indicators. Western has identified two financial measures that reflect a cost-effective investment program: Net Plant Investment and Rate Impact. Western does not believe that it is possible to maintain system reliability under current load and generation growth conditions without increasing Net Plant Investment. A flat or declining Net Plant Investment is an indicator of a deteriorating system. Conversely, Western must consider the impact on the transmission rate of increasing the Net Plant Investment too rapidly, which result in an unacceptable growth in the rate. As the following graphs indicate, Western's proposed Plan seeks to successfully balance these issues.

The Plan results in an annual growth rate in plant investment for the LAP system of approximately 2% from 2005 through 2018.

#### **LAP Net Plant Investment**



The rate impact of these investments also shows an annual growth rate of 2% per year. However, the estimated rate in FY 2018 is only slightly higher than the rate that Western initiated in 2000.



**LAP Transmission Rate Projection** 

In determining the estimated rate impact, Western used an average load growth rate of 2% per year.

Western will continue to update its Plan and will collaborate with CRSP to develop similar financial indicators for the CRSP transmission system.

#### **Comments & Questions provided by Western States Power Corporation**

According to the graph on page 26 titled "Use of Craft Hours", RMR is using about 50% of the craft hours each year. Is that typical in the utility industry? What is the other half of the time used for?

• This graph represents activities considered to have positive results as a measurement of a leading indicator for success. RMR identified Preventative Maintenance and Equipment Replacement as the activities for this measurement. The graph in the Capital Improvement Plan (CIP) has been changed to show the distribution of all craft labor hours. For FY2005, the distribution was:

Administrative 9%
Maintenance Support 28%
(technical training, safety meetings, tool maint, etc.)
Equipment Replacement 27%
Preventative Maintenance 27%
Repair & Emergency 9%

Western does not have any benchmarking data to show how this compares with other utilities.

In the graph on page 27 titled "RMR Outage Causes", it appears that human errors have about doubled (8, 14, 11 in FY-00, 01, 02 compared to 24 & 27 in FY 03 & 04). Is there any reason for the increase in human errors? Is anything being done to reduce them?

• The increase in human errors is due partly to the new digital control systems being designed into our new and refurbished substations. This is a substantial change in equipment and technology, and the learning curve has been challenging. The new control systems tend to magnify the effect of commissioning and testing errors. In the last year, Western has adopted a design standard for digital control systems which should help in better training for our technicians and field engineers.

In the graph on page 29 titled "Net Plant Investment", there seems to be a knee in the curve about 2008. What is causing the change in slope?

• The transmission rate study performed for the 10 year CIP assumed that plant would be booked two years after the costs were incurred. (e.g., the amount spent in 2005 would be booked in 2007). When a rate calculation is made, the most recent results of operations occur two years before the rate year. (e.g., 2007 financial information is used in the rate calculation for 2009). Therefore, costs incurred in 2005 will not affect the rate until 2009. The curve for the Net Plant Investment graph changes in 2009 because the costs were projected to increase to the \$26 million level in 2005 and that level was maintained through 2015.

# The Lovell-Thermopolis 115-kV rebuild project dropped about \$8.4 million from the FY04 to the FY05 capital investment plans. Why?

The planned rebuild of the Lovell-Thermopolis 115-kV line was cancelled due to budget cuts in FY05 with the remainder of the project deferred at least 10 years. Prior to canceling this project, RMR rebuilt approximately 10 miles of the line. The sections rebuilt contained the majority of the structures identified to be in the worst condition.

The Beaver Creek-Hoyt 230-kV upgrade project went up by about \$5.1M but most of the other Front Range 230-kV projects were deferred. Was the Front Range system redesigned? How long was the 230-kV projects delayed? Is it after the 10-years study period?

• The estimate for Beaver Creek-Hoyt 230-kV Upgrade was updated to reflect the recent increase in steel prices.

The overall the timeline for the entire Front Range Transmission Improvements Projects remains the same with the anticipated completion date being about 2022. RMR has adjusted the plan to focus on rebuilding all the transmission lines first prior to constructing any of the 230-kV substations. Subsequently, all substation projects were deferred to the end to the Project, and the transmission line projects were redefined to fit the budget availability within each fiscal year.

# WSPC-LAP provided \$1.8M in FY04 for the Yellowtail transformer. Is the item listed the same project?

• Yes, WSPC-LAP funding was used for the project listed in the CIP titled Yellowtail 2nd Transformer Addition.

#### Are the microwave replacements being jointly planned with the USBR and others?

 Yes, the microwave replacement projects are being planned jointly with the USBR and other non-federal participants (Tri-State and Excel). In some cases the old microwave equipment is being replaced with fiber optics. Most of these are also joint participation projects.

# The E-scheduling/tagging program costs went down about \$900K in Pick Sloan and about doubled in CRSP. What changed?

• The scope for this program did not change. Further review identified errors made in the CIP spreadsheet which caused incorrect project totals. These have been corrected in the final FY05 version.

#### What is the WIN project? What do the customers get for the \$1M investment?

• This project will accomplish the networking of intelligent electronic devices (meters, relays, controllers, etc.) in our major substations. This will allow better remote diagnostics and monitoring of critical equipment parameters. The customers will get better reliability, quicker analysis and response to disturbances and outages, and lower travel costs to remote sites.

# What is involved in the alternate control center (ACC)? Are there any joint discussion about this project with USBR and others?

This is to meet North American Electricity Reliability Council (NERC) control area
operator requirements that we have a remote, fully functional control center
capability. The USBR control functions and the Western Electricity Coordinating
Council (WECC) Rocky Mountain - Desert Southwest Reliability Center, which
normally operate out of the Loveland Dispatch facility, are accommodated in the
ACC.

# What is involved in the map board replacement? How will the customers benefit from the \$690K costs?

• Currently the map board is a matrix of individual rear-projection video monitors that are controlled by a computer to display Western's system. The primary maintenance of the map board has been replacement of the projector lamps that have a life of about 400 hours. The manufacturer of the monitors has given Western notice that it will no longer manufacture replacement lamps (bulbs) for the monitors. Western has purchased enough spare bulbs for several years of replacements.

Control Area Operators are required by the NERC to have constant visibility of system conditions and a dynamic map board is an efficient way to monitor these conditions. The required visibility extends beyond the Western Area Colorado-Missouri (WACM) control area and large displays are needed in order to get this overview. An investigation of the August 14, 2003, Northeast blackout led to the conclusion that, a lack of observability by all involved parties compounded the severity of this event.

Western believes that a dynamic map board is critical to reliable operations and our course of action is to replace the map board before the supply of spare bulbs is exhausted.

There is \$100k per year in test equipment expenses for each of substation, communications and control/protection/metering categories. How are the customers benefiting from \$2.8M cost? Are these consumables and/or replacements?

• New equipment technologies are primarily responsible for the increase in test equipment costs. The new digital microwave communication system, as well as the increased use of fiber optics, requires new types of maintenance and diagnostic test sets for the communications technicians. The new generation of microprocessor relays and digital control systems require new test equipment for the meter/relay technicians. And advanced technologies for substation diagnostics to support Reliability Centered Maintenance (RCM), such as infrared thermography and acoustic and vibration analysis, require new equipment for the substation mechanics. The costs include both the replacements of some older test equipment as well as acquisition of new types of diagnostic equipment as previously listed.

#### The line item for Battery and Battery Charger about doubled. Why?

• Two factors have influenced this. First, the valve-regulated batteries Western began using instead of flooded cells about 15 years ago have a designed life span of about 15 years. Second, with our RCM program, we have begun a more aggressive battery testing program than we previously had. This has shown the need for an increased level of battery replacements.

The Sunlight communication building is about \$150K but the Flaming Gorge (FGE), Vernal (VNL), and Grizzly Ridge (GRL) communication buildings are listed at a total of \$1.15M (about \$380K each). Why the big difference?

Further review identified errors made in the CIP spreadsheet causing incorrect project totals. These have been corrected in the final FY05 version. The total cost of the FGE, VNL and GRL communication buildings is \$550K (\$183K each). This cost includes providing the generator sets for VNL and GRL, which weren't included in the Sunlight communication building.

#### **Comments & Questions provided by MEAN**

#### **Delays** and reductions in Funding

MEAN is concerned about delays and deferrals that have occurred because of budget constraints. It is our understanding that many of these delays are related to budget constraints and Congressional mandates. We are also concerned that funds get earmarked for projects that are not a high priority to Western, and large amounts of construction funds have been used to benefit a relatively small segment of the Western's transmission system. This makes it difficult for Western-RMR's customers to support alternative funding sources when Western-RMR's appropriations are being cut. We appreciate that Western has used alternative funding sources, such as Western States Power Corporation (WSPC), to fund capital projects that have a demonstrated need, such as the Miracle Mile-Cheyenne-Ault improvements. However, as a participant in WSPC, MEAN is concerned that the current funding sources cannot support the potential future funding requirements.

• Western appreciates MEAN's concern regarding the recent trend of delays and deferral of planned work as a result of unplanned projects being included and funding earmarked by legislation within Western's C&R program. Certain funding constraints are outside Western's control. Western fully understands the importance of alternate customer funding sources such as WSPC. Without this resource, it would be extremely difficult to continue to meet our core mission objectives. The RMR CIP has been developed and revised to reflect a reasonable anticipated source of funding, either from appropriations or alternate funding.

#### Platte Valley 34.5 to 69 kV Voltage Conversion

As was provided in our 2003 comments on the Plan, MEAN is still very concerned about the impact of this project on its members located in the Platte Valley of Nebraska. The most recent proposal, presented in spring 2003, appears to directly impact the City of Mitchell and Village of Morrill, NE. It appears the plan is of great benefit to some utilities on either end of the valley by not converting them to 69 kV; however, the plan will have a disproportionate impact on those utilities that are in the middle of the Platte Valley system. It is our understanding that one of the reasons for the voltage conversion is designed to improve voltage, some of which is caused by low power factors in this area. We would prefer to see Western require ALL transmission customers in this area to maintain a power factor of at least 95%, as is called for in the Schedule of Rates for Firm Electric Service. If there are MEAN members that are contributing to this problem, we would be pleased to work with Western and the member(s) to correct the problem and stay in compliance with their contract obligations. Enforcing minimum power factor requirements alone could defer or eliminate the need for voltage conversion. This would place the cost burden on those customers that are causing the operational issue and thus the costs.

The customer-specific costs of the conversion, such as replacing substation transformers, should somehow be allocated across all customers that benefit from the conversion,

including those customers at either end of the line that are not being required to convert their distribution facilities. Additionally, as the date for the actual conversion approaches, Western should re-evaluate the entire area to determine if the conversion is needed to meet minimum reliability criteria.

We appreciate the efforts Western has undertaken to keep affected customers involved in this project and are hopeful that Western will continue this approach in the planning process. This includes meeting with the customers who will be impacted by this conversion to assist in planning and reviewing other ways regional problems might be mitigated with other options that might lower cost.

• Western continues to analyze options to address the problems with the Platte Valley 34.5-kV system. Also, Western will continue to make every effort to keep all the customers of the system involved and informed as potential solutions for this area are further developed. Western intends to have a customer meeting in the fall of 2005 to update and discuss changes with the project.

The problems with the Platte Valley system are not limited to voltage issues. Thermal overloading of equipment also limits the number of operating and switching configurations in the 34.5-kV system without the proposed upgrades.

In RMR's FY05 CIP, Western adjusted the Platte Valley Conversion Projects by delaying the start of the Lingle and Torrington 69-kV additions by two years. This change compresses the schedule for the project from eight years to six and allows more time to work out the numerous issues. The completion date for the conversion remains 2015.

#### Miracle Mile-Cheyenne-Ault Improvements

MEAN continues to support increasing transmission capacity on the TOT 3 interface and would be concerned if there are any delays in these projects. This constrained path causes a great deal of disruption in regional power markets and any relatively low-cost, achievable methods to increase transfer capability should be undertaken.

Since all transmission customers, point-to-point as well as network customers, are responsible for the costs of this improvement, the increased capacity should be allocated to network customers as well as point-to-point users. MEAN would like to have comparable access to the increased capacity on TOT 3 when the improvements are placed in service. Before the improvements are initiated, Western should ensure that the allocation of capacity is done on a fair, reasonable and non-discriminatory basis. MEAN continues to be very interested in discussing this impact and outcome further with Western. To ensure our long term rights, MEAN has already submitted an application for such reservation and we are aware it remains on file at Western-RMR's offices.

• Capacity over and above Western's needs for delivery of Federal allocations will be made available and marketed through the Open Access Same-time Information System per Western's Open Access Transmission Tariff.

#### Front Range Improvements

We continue to support improvements that would strengthen reliability in the Front Range. We agree these efforts should occur before new development makes it impossible to achieve the necessary upgrades without a disruption in service and higher installation and maintenance costs. One of our members, the Town of Lyons, CO, will be served from a new 115-kV tap being installed in the coming year. We would be very concerned if the line were reconstructed and operated solely at 230 kV, as would a great deal of other Western customers with taps and substations in this area. This is an issue we discussed in detail with Western prior to Lyons initiating the installation of the facility. We would support the construction of a double circuit, 230-kV line with one side operated at 115 kV for the foreseeable future, until a reasonable transition plan that mitigates individual customer impacts is developed.

• Western appreciates MEAN's support of the Front Range Improvements. This project is very important to RMR in order to insure long term reliability for our customers served by this system. It is reassuring that Western's customers recognize the benefits achieved by rebuilding the transmission lines comprising the Front Range Improvements as 230-kV double circuits. By building for 230-kV capability but operating initially at 115-kV, Western is maximizing the utilization of the available rights of way while postponing the expense of converting the numerous delivery points on these lines to 230-kV operation.

The Town of Lyons' Dougherty Substation is planned as a tap on Western's Lyons-Longmont NW 115-kV transmission line. Western's plan for this line section is for a double circuit 230-kV line with one circuit operated at 115-kV.