CHAPTER IX COST WORKPAPERS
Witness: J. M. Rivera

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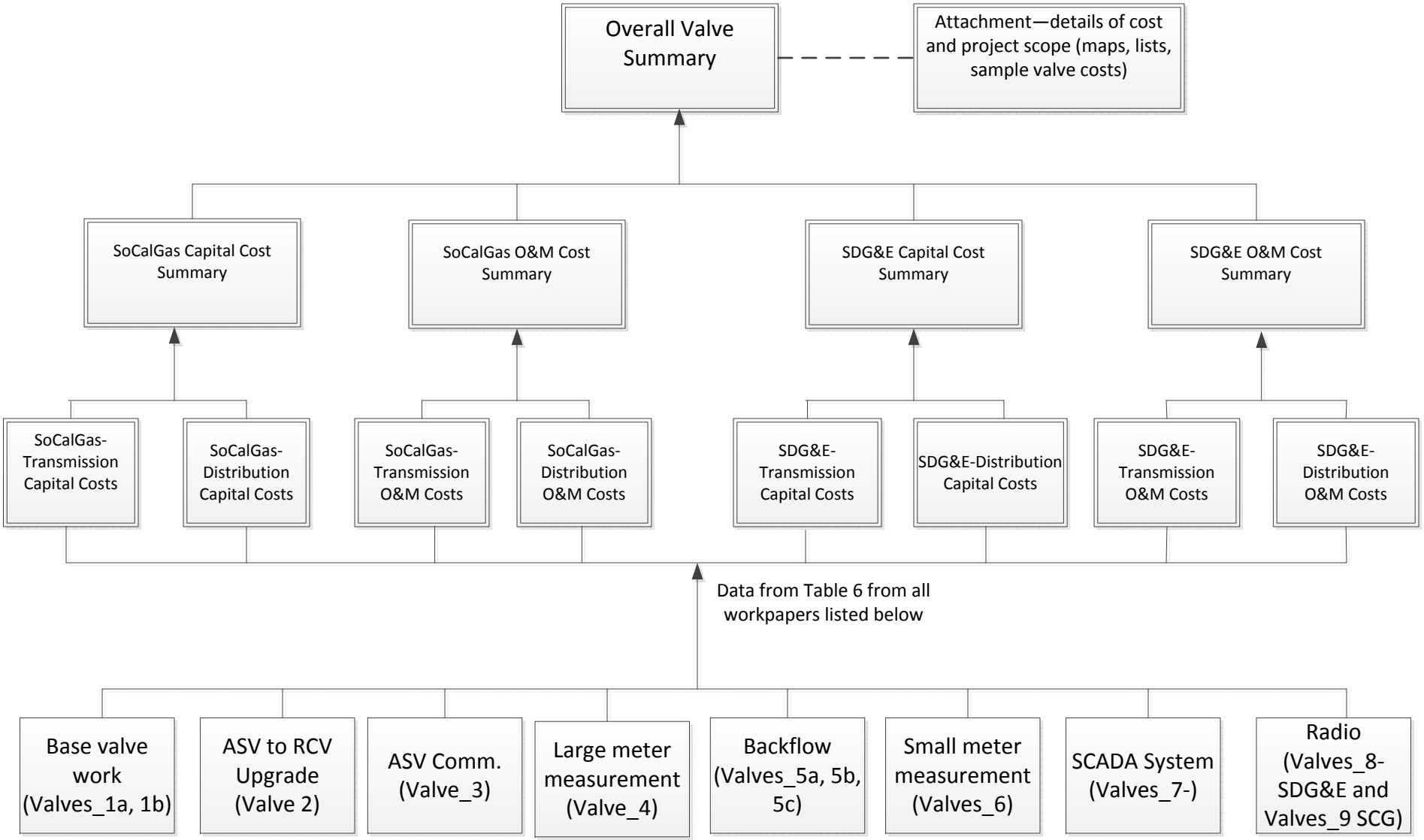
Pipeline Safety Enhancement Plan Summary

Valve Enhancement Plan Workpapers

Valve Enhancement Plan—Workpaper Map



Base Detailed Costs and Calculations for O&M and Capital are contained in the Valve workpapers prefix as valves 1_... thru valves_9...

WORKPAPER TITLE
Summary - Valve Asset and Program Overview Total Plan (Valves_Asset_Overview)
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Summary of Valves Capital - Total Plan Table A.1

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	4.6	4.9	5.6	5.6	20.7	28.7	49.4
DIRECT NON-LABOR	27.0	29.9	34.3	34.9	126.0	186.0	312.1
TOTAL DIRECT CAPITAL	31.6	34.8	39.8	40.4	146.7	214.8	361.5

FERC ACCT. 367/376

Table A.2 -O&M

Summary of Valves O&M - Total Plan Table A.2

FERC ACCT. 859.1/874.4

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PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.0	0.1	0.7	0.8	1.6	5.4	7.0
DIRECT NON-LABOR	0.1	0.2	0.3	0.4	0.9	8.1	9.1
TOTAL DIRECT O&M	0.1	0.3	1.0	1.2	2.6	13.5	16.1

This Workpaper provides a summary of the cost to complete all work associated with the SoCalGas/SDG&E Valve Enhancement Plan descibed in PSEP Testimony Chapter V. The Valve Enhancement Plan contains nine major capital additions (see Table B below) and related costs Elements which are discussed in PSEP Plan Chapter V and Cost Chapter IX. The associated capital costs for all assets to be installed to effect the Valve Enhancement Plan are summarized below and described/presented in full detail in 12 detailed workpapers at the back of this section. These workpapers are labeled with the prefix "Valves_1.." thru "Valves_9..." as noted in the Workpaper Map and Table B.1 below. These Workpapers contain the *base information from which all capital and O&M summaries are derived and extracted* . These workpapers include details on the basic assumptions, costs, and required scope of work performed each year for each Element Capital and O&M forecast. Attachment "Valves_Cap-1" provides an overview of assets included in the VEP and how they collectively serve to support rapid pipeline isolation. Attachment "Valves_Cap-2" provides detail on the major valves which had been identified for specific upgrades and replacement at the time of this Plan publication. Attachment "Valves_Cap-3" provides insight on how cost for valves were derived and what the resulting costs factors are for valve work of varying size, configuration and scope required to provide RCV/ACV functionality. Attachment "Valves_Cap-4" contains three figures which provide perspective on where SoCalGas and SDGE will perform valve work to create isolation sections on their transmission pipelines in alignment with the criteria set forth in Plan Chapter V.E.

Forecast Methodology - Summmary

The breakdown of how cost for these elements are are allocated to each company and FERC account are presented in workpapers as-referenced in Table B1. Table C provides an overview of how Plan Element Capital costs were assigned to the two companies and to Distribution or Transmission FERC designations. Work Papers subtitled "Valves_Cap_Summary_SDG&E" and "Valves_Cap_Summary SCG" provide capital summaries for the two companies. Resulting cost allocations to Distribution and Transmission by Company are presented in four additional Capital Work Papers as follows: "Valves_Cap_SCG_Trans", "Valves_Cap_SCG_Dist", "Valves_Cap_SDGE_Trans" and Valves_Cap_SDGE_Dist. Table D presents the similar allocation rationale to O&M. O&M costs by company are presented in Work Papers sub-titled "Valves_O&M Summary_SDGE" and "Valves_O&M_Summary_SCG." Table D presents the factors and rationale used to allocate O&M to the respective companies and distribution/transmission designations. These associated costs are presented in Workpapers subtitled "Valves_O&M_SCG_Trans", "Valves_O&M_SCG_Dist", "Valves_O&M _SDGE_Trans" and Valves_O&M_SDGE_Dist."

WORKPAPER TITLE
Summary - Valve Asset and Program Overview Total Plan (Valves_Asset_Overview)
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Table B
VALVE ENHANCEMENT PLAN CAPITAL COSTS ($ Millions) BY ELEMENT (SOCALGAS and SDG&E)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**286.7**
DIRECT LABOR	3.90	3.90	3.90	3.90	15.60	23.40	39.00
DIRECT NON-LABOR	24.77	24.77	24.77	24.77	99.09	148.63	247.71
94 ASV TO RCV							**20.87**
DIRECT LABOR	-	0.19	0.19	0.19	0.57	5.86	1.79
DIRECT NON-LABOR	-	2.03	2.03	2.03	6.09	39.54	19.08
COMM TO 100 ASVs							**0.22**
DIRECT LABOR	-	-	0.01	0.01	0.02	4.72	0.10
DIRECT NON-LABOR	-	-	0.02	0.02	0.03	26.64	0.12
20 LARGE METER SITES							**6.23**
DIRECT LABOR	0.04	0.04	0.04	0.04	0.15	0.22	0.37
DIRECT NON-LABOR	0.59	0.59	0.59	0.59	2.34	3.52	5.86
120 BACKFLOW PREV SITES							**23.29**
DIRECT LABOR	0.08	0.08	0.38	0.38	0.92	2.29	3.21
DIRECT NON-LABOR	0.28	0.28	2.44	2.44	5.45	14.63	20.08
40 TAP METERS							**4.05**
DIRECT LABOR	-	-	0.11	0.11	0.22	0.33	0.55
DIRECT NON-LABOR	-	-	0.70	0.70	1.40	2.10	3.50
SCADA SYSTEM EXPANSION							**3.75**
DIRECT LABOR	-	-	0.20	0.20	0.40	-	0.40
DIRECT NON-LABOR	-	-	1.68	1.68	3.35	-	3.35
SDGE RADIO SYSTEM EXP							**3.07**
DIRECT LABOR	-	0.13	0.13	0.13	0.39	-	0.39
DIRECT NON-LABOR	-	0.89	0.89	0.89	2.68	-	2.68
SCG RADIO SYSTEM EXP							**13.28**
DIRECT LABOR	0.60	0.60	0.60	0.60	2.39	1.20	3.59
DIRECT NON-LABOR	1.34	1.34	1.17	1.77	5.62	4.08	9.69
PLAN TOTALS-CAPITAL							**361.49**
DIRECT LABOR	4.61	4.94	5.56	5.56	20.67	38.02	49.41
DIRECT NON-LABOR	26.98	29.91	34.28	34.88	126.05	239.13	312.08

Table B.1

Associated Detailed Work Paper	Testimony Ref
Valves_1a_SDGE_Base Valves	V.E
Valves_1b_SCG Base Valves	
Valves_2_SCG ASV-to-RCV	V.E
Valves_3_SCG LB comm	V.E
Valves-4 large meter sta	V.F.1
Valves_5a_BF-T-SL_RCVs	V.F.2
Valves_5b_BF-T-Reg pilots	V.F.2
Valves_5c_BF-T-chk valves	V.F.2
Valves_6_small meters	V.F.3
Valves_7-base SCADA system exp	V.F.4
Valves_8 -SDGE radio system	V.F.5
Valves_9 SCG radio stystem	V.F.5

Table C and D below provide a summary of how cost have been allocated to each Company and FERC account designations for Capital and O&M, respectively. The assumptions and or detailed tables, where applicable are provided in Work Papers "Valves_1.." to "Valves_9.." under Table 6 in each worksheet. These factors are used to compute the capital allocated to each company in these same work papers in Table 7, where applicable. Totals for each company by FERC account are added for Capital and O&M to arrive at the totals presented for Capital in Table A.1 and O&M Table A.2. These costs are presented in two capital and O&M workpapers for each company.

WORKPAPER TITLE
Summary - Valve Asset and Program Overview Total Plan (Valves_Asset_Overview)
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Table C
Summary of Capital Allocation by Company and Operating/FERC Designation

	Company Split %	% FERC 376	% FERC 367	Allocation Method Summary
BASE VALVE WORK				
SDGE	18.1%			Actual Plan cost as computed in Workpaper WP Valve_1a_SDGE. The ratio of this cost as a percent of the base valve work for both companies (including SCG cost shown in WP Valve_1b_SCG) is shown.
SoCalGas	81.9%			Actual Plan cost as computed in Workpaper WP Valve_1b_SCG. The ratio of this cost as a percent of the base valve work for both companies (including SDGE cost shown in WP Valve_1a_SDGE) is shown.
Dist		20.1%		Actual valve count and required work estimated and applied based on pipeline designation - Dist or Trans =Dist$/(Trans$+Dist$). See Valves_1 Worksheet
Trans			79.9%	Actual valve count and required work estimated and applied based on pipeline designation - Dist or Trans =Trans$/(Trans$+Dist$). See Valves_1 Worksheet
94 ASV TO RCV				
SDGE	0			No conversions targeted for SDG&E.
SoCalGas	100			All work on SoCalGas Transmission facilties only
Dist		0		100% transmission - No existing ASVs on distribution pipelines.
Trans			100	100% transmission
COMM TO 100 ASVs				
SDGE	0			All work on SoCalGas Transmission facilties only-no SDGE Work
SoCalGas	100			All work on SoCalGas Transmission facilties only
Dist		0		n/a
Trans			100	100% transmission
20 LARGE METER SITES				
SDGE	14.7%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85.4%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		0%		n/a
Trans			100%	100% transmission
120 BACKFLOW PREV SITES				
SDGE	14.7%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85.4%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		100% Distribution
Trans			0	n/a
40 TAP METERS				
SDGE	14.7%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85.4%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		100% Distribution
Trans			0	n/a
SCADA SYSTEM EXP				
SDGE	14.7%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85.4%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		n/a
Trans			0%	SCADA Systsem singualrly operates transmission assets
SDGE RADIO SYSTEM EXP				
SDGE	100%			SDGE Radio System allocated only to SDGE as a 100% distribution asset.
SoCalGas	0%			All SDGE System
Dist		100%		Benefits all customers and supports many corporate functions, including Smart metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Trans			0%	n/a
SCG RADIO SYSTEM EXP				
SDGE	0%			N/A
SoCalGas	100%			SCG Radio System allocated only to SCG as a 100% distribution asset. Benefits all customers and supports many corporate functions, including AMI metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Dist		100%		100%: Benefits all customers and supports many corporate functions, including Smart metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Trans			0%	0%

Table D

WORKPAPER TITLE
Summary - Valve Asset and Program Overview Total Plan (Valves_Asset_Overview)
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Summary of O&M Allocation by Company and Operating/FERC Designation

(Allocations are not the same as capital allocations for each element)

	Company Split %	% FERC 376	% FERC 367	Allocation Method Summary
BASE VALVE WORK				
SDGE	**21.7%**			**Actual Plan O&M cost as computed in Workpaper WP Valve_1a_SDGE. The ratio of this cost as a percent of the combined valve count for both companies is shown.**
SoCalGas	**78.3%**			**Actual Plan O&M cost as computed in Workpaper WP Valve_1b_SCG. The ratio of this cost as a percent of the combined valve count for both companies is shown**
Dist		**20.1%**		**Actual valve count and required work estimated and applied based on pipeline designation - Dist or Trans =Dist$/(Trans$+Dist$) See Valves_1 Worksheet**
Trans			**79.9%**	**Actual valve count and required work estimated and applied based on pipeline designation - Dist or Trans =Trans$/(Trans$+Dist$) See Valves_1 Worksheet**
94 ASV TO RCV				
SDGE	**0**			**No conversions targeted for SDG&E.**
SoCalGas	**100**			**All work on SoCalGas Transmission Facilties only**
Dist		**0**		**100% transmission - No existing ASVs on distribution pipelines.**
Trans			**100**	**100% transmission**
COMM TO 100 ASVs				
SDGE	**0**			**All work on SoCalGas Transmission Facilties only-no SDGE Work**
SoCalGas	**100**			**All work on SoCalGas Transmission Facilties only**
Dist		**0**		**n/a**
Trans			**100**	**100% transmission**
20 LARGE METER SITES				
SDGE	**15%**			**Ratio of DOT post-1950 transmission pipeline miles in valve plan (12" and greater)**
SoCalGas	**85%**			**Ratio of DOT post-1950 transmission pipeline miles in valve plan (12" and greater)**
Dist		**0%**		**n/a**
Trans			**100%**	**100% transmission**
120 BACKFLOW PREV SITES (three elements)				
SDGE	**15%**			**Ratio of DOT post-1950 transmission pipeline miles in valve plan (12" and greater)**
SoCalGas	**85%**			**Ratio of DOT post-1950 transmission pipeline miles in valve plan (12" and greater)**
Dist		**100%**		**100% Distribution**
Trans			**0**	**n/a**
40 TAP METERS				
SDGE	**15%**			**Ratio of DOT post-1950 transmission pipeline miles in valve plan (12" and greater)**
SoCalGas	**85%**			**Ratio of DOT post-1950 transmission pipeline miles in valve plan (12" and greater)**
Dist		**100%**		**100% Distribution**
Trans			**0**	**n/a**
SCADA SYSTEM EXP				
SDGE	**15%**			**Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)**
SoCalGas	**85%**			**Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)**
Dist		**100%**		**n/a**
Trans			**0%**	**SCADA Systsem singualrly operates transmission assets**
SDGE RADIO SYSTEM EXP				
SDGE	**100%**			**SDGE Radio System allocated only to SDGE as a 100% distribution asset.**
SoCalGas	**0%**			**All SDGE System**
Dist		**100%**		**Benefits all customers and supports many corporate functions, including Smart metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.**
Trans			**0%**	**n/a**
SCG RADIO SYSTEM EXP				
SDGE	**0%**			**N/A**
SoCalGas	**100%**			**SCG Radio System allocated only to SCG as a 100% distribution asset. Benefits all customers and supports many corporate functions, including AMI metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.**
Dist		**100%**		**100%: Benefits all customers and supports many corporate functions, including Smart metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.**
Trans			**0%**	**0%**

Attachment: VALVES_CAP-1

Summary:

This attachment describes how assets proposed in the Valve Enhancement Plan will be employed to manage pipeline operations in the event of a rupture.

Automatic or Remote Controlled Isolation of Pipeline Sections Using Assets Proposed in the PSEP Valve Enhancement Plan - Overview:

SoCalGas' and SDG&E's proposed containment scheme will ultimately create approximately 327 new automated/remote-controlled isolation sections of pipeline, which are generally eight miles or less in length and can be rapidly isolated and managed in the event of an emergency. It is noteworthy that, due to valve spacing as has evolved on the Utilities transmission pipelines, retrofit of existing manual valves in their current locations under this Plan actually results in isolation lengths averaging 6 miles.

Each isolation section is to be equipped with some or all of the general monitoring and control assets depicted in Figure 1, and summarized below:

- new RCVs on the larger transmission lines (shown as Valves A1, A2, B1 and B2). Plan total: 327;
- Tap or connected pipeline RCVs, designated C1 and C2, installed to prevent back-flow from one major transmission line to another via and interconnecting supply line. Plan Total 40, with 120 comparable devices also installed;
- New meters on the major transmission pipelines to help operators determine gas flow direction, magnitude and rate-of-change. These are designated "M-Large." Plan Count: 20;
- New meters on the pipelines serving customers off of main transmission pipelines, designated "M-Tap" on Figure 1, to help operators determine gas flow direction to and from the major interconnection points with the larger pipeline. Plan Count 40;

- Pressure transmitters providing operators with real-time pressure and changes in pressure on both side of installed control valves and at metering stations and tap locations: Plan Count: 960;
- Redundant communication paths at all RCV locations, including emergency radio back-up to 3rd party data circuits. These are shown in the small boxes designate "Radio" on Valve B2, but all RCVs will be equipped in this manner. And all metering stations will have radio communications, whether by exception reporting under an emergency or will real-time data circuits.

Figure 1 is referenced to provide an overview of how these assets might serve system isolation. The Figure shows two typical transmission pipeline isolation sections on different pipelines, "A" and "B", both serving a smaller connecting pipeline (C") with customer loads. Pipelines A and B in some instances may be 10 miles or more apart. Each Section A and B, will require two valves, A1 and A2 and B1 and B2, respectively, to provide the mainline section isolation at nominal 8 mile intervals in the event of a rupture. However, closing line valves A1 and A2 alone in this in the event of a rupture in Section A will not stop the flow of gas from pipeline C from entering the broken section of pipe, in fact it will back feed all the way from large pipeline B to the break location if a valve or some other backflow prevention at location C1 is not installed. So an RCV -" C1" in this instance - must be closed also, in particular if it is a pipeline of sufficient pressure and diameter, to control the significant gas back flow in to broken Section A.

In addition, if an when a break does occur, meters M-Large and M-Tap, by way of remote monitoring (via radio system upgrade), will help gas control operators who are receiving

that information in real-time characterize to the magnitude and direction of gas flow and changes thereto in the pipelines. Information from each valve, its position opened or closed, and pressure measurements (and change in pressure versus time) on both sides of each valve, combined with the meter data will also help operators make their timely determination of what to do in the event the valves close automatically (where set up as an ASV) or to close the valve where all the valves in the Figure only serve in a remote control capacity.

Figure 2 shows the simplified closure of three valves to isolate and contain the break in Section A, with valves shown in black-fill representing closed valves (A1, A2, and C1). Customers served off of Pipeline C would continue to be served from major pipeline B under this scenario, while the ruptured section would be contained and depressurized.

Valve B2 shows a typical set-up at each of the six RCVs, which includes redundant controllers for reliability and the transmission of information to operations personnel using common carriers (Verizon, AT&T etc) and back-up transmission using Utility radio systems.

Figure 1

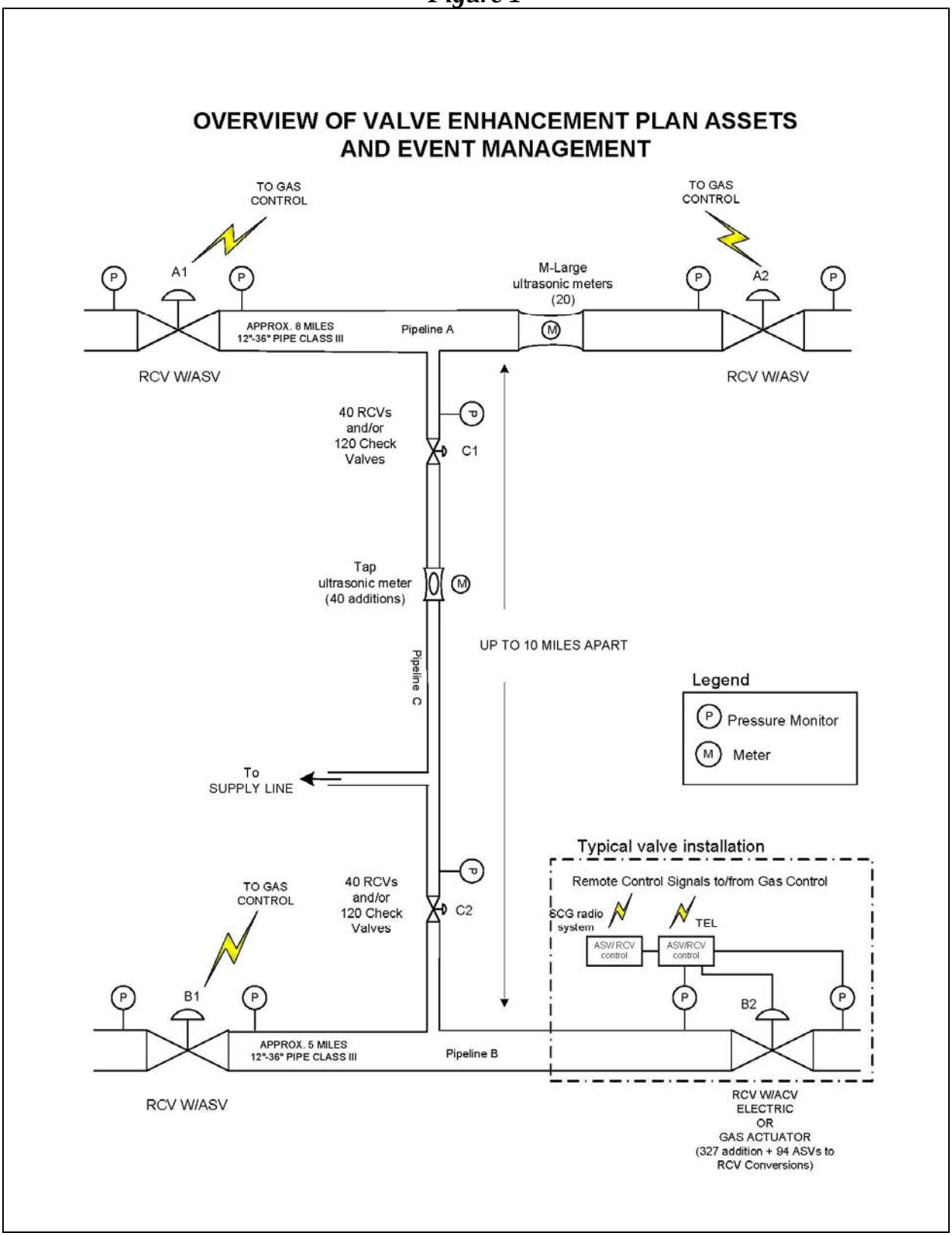
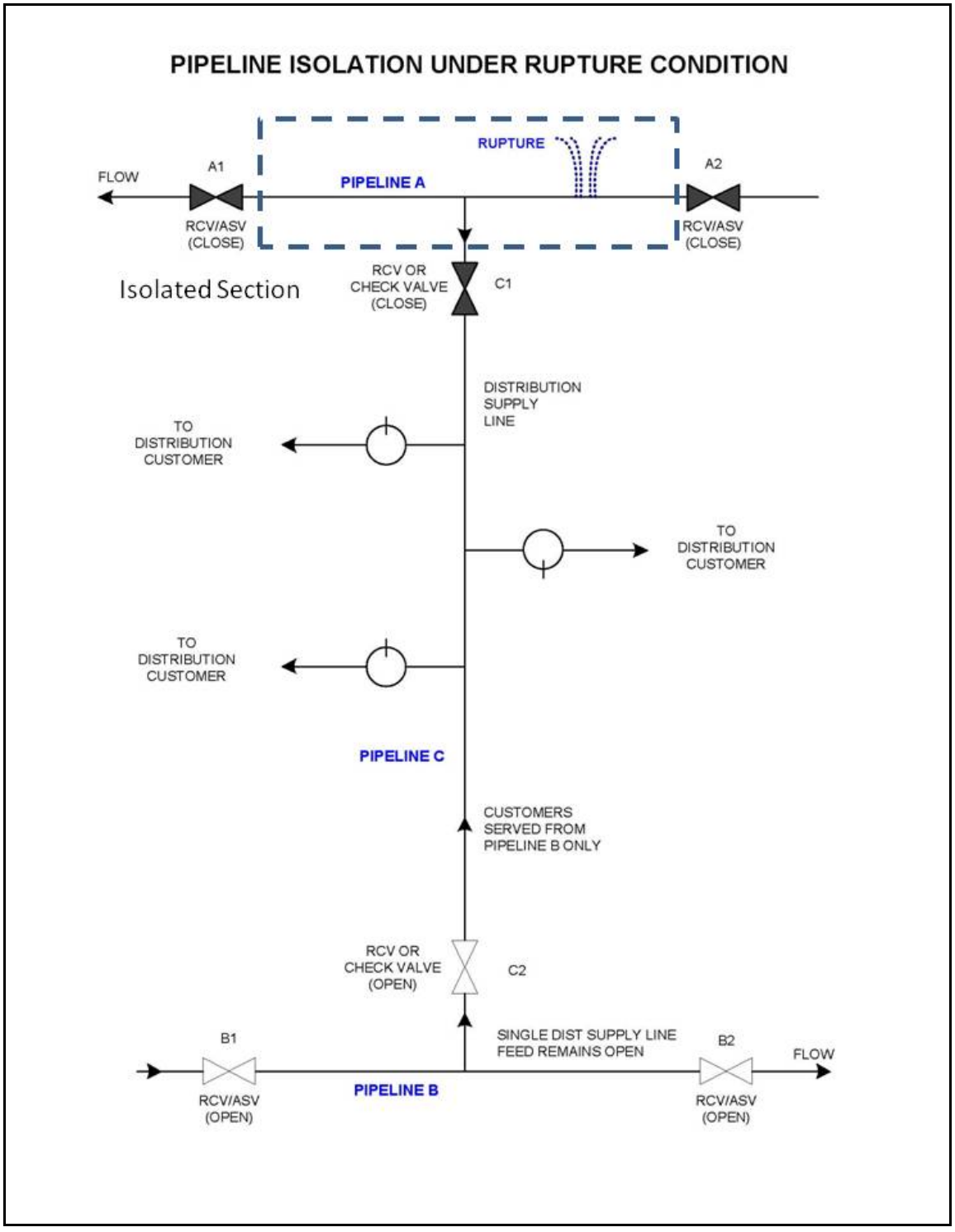

OVERVIEW OF VALVE ENHANCEMENT PLAN ASSETS AND EVENT MANAGEMENT
TO GAS CONTROL
TO GAS CONTROL
A1
A2
P
M-Large ultrasonic meters (20)
M
APPROX. 8 MILES 12"-36" PIPE CLASS III
Pipeline A
RCV W/ASV
RCV W/ASV
40 RCVs and/or 120 Check Valves
C1
Tap ultrasonic meter (40 additions)
UP TO 10 MILES APART
Pipeline C
Legend
Pressure Monitor
Meter
To SUPPLY LINE
Typical valve installation
Remote Control Signals to/from Gas Control
SCG radio system
TEL
ASV/RCV control
ASV/RCV control
TO GAS CONTROL
40 RCVs and/or 120 Check Valves
C2
B1
B2
APPROX. 5 MILES 12"-36" PIPE CLASS III
Pipeline B
RCV W/ASV
RCV W/ACV ELECTRIC OR GAS ACTUATOR (327 addition + 94 ASVs to RCV Conversions)

Figure 2


PIPELINE ISOLATION UNDER RUPTURE CONDITION
RUPTURE
FLOW
A1
PIPELINE A
A2
RCV/ASV
(CLOSE)
RCV/ASV
(CLOSE)
Isolated Section
RCV OR
CHECK VALVE
(CLOSE)
C1
DISTRIBUTION
SUPPLY
LINE
TO
DISTRIBUTION
CUSTOMER
TO
DISTRIBUTION
CUSTOMER
TO
DISTRIBUTION
CUSTOMER
PIPELINE C
CUSTOMERS
SERVED FROM
PIPELINE B ONLY
RCV OR
CHECK VALVE
(OPEN)
C2
B1
SINGLE DIST SUPPLY LINE
FEED REMAINS OPEN
B2
FLOW
RCV/ASV
(OPEN)
PIPELINE B
RCV/ASV
(OPEN)

The general design of the Valve Plan will ensure sufficient information and control options will be provided to the Gas Control center and to operations personnel to support more timely and informed management decisions around a confirmed pipeline event and/or any closure due to such events as control system failures.

Each isolation section will have a pre-programmed set of flow analyses (via computer simulation and analyses) and factors for operators to review and consider when deciding to open/close valves; or to simply stay the course during an emergency situation.

The Valve Plan valve approach will be to standardize upon a general design that provides for all valves to be both RCV and ASV-capable and fail “in-position” in the event of power or motive gas pressure loss. The implementation will also include features to record actual pressure excursion information so that ASV control mode can be activated when system operators have collected and compiled empirical data to provide for accurate forward-looking control setting of such devices.

Attachment: **Valves_Cap-2**

Listing of Major Valves included in PSEP Valve Enhancement Plan as of July 1, 2011

Summary of VEP Major Valve Work Locations

The following pages provide two lists of valves and associated costs which have been developed for SDG&E and SoCalGas for the valve enhancement plan implementation. The first list contains the transmission valves modifications for both SoCalGas and SDG&E which have been identified. The second list contains SDG&E distribution valves which will be modified as discussed in Testimony Chapter V. These valves lists are subject to continued refinement as the utilities perform additional assessments and engineering review in advance of Plan implementation.

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
37	5.75	0	12"	NV/NP	$ 691
37	9.84	0	12"	NV/NP	$ 691
37	14.62	0	12"	NV/NP	$ 691
37	19.4	0	12"	NV/NP	$ 691
37	25.41	0	12"	NV/NP	$ 691
37	34.86	1	12"	NV/NP	$ 691
37	39.93	0	16"	NV/NP	$ 803
85	105.72	0	24"	NV/NP	$ 999
85	113.67	0	24"	NV/NP	$ 999
85	119.16	0	24"	NV/NP	$ 999
85	125.00	0	24"	NV/NP	$ 999
85	129.87	0	18"	NV/NP	$ 803
85	134.68	0	18"	NV/NP	$ 803
85	137.99	0	18"	NV/NP	$ 803
85	144.26	0	24"	NV/NP	$ 999
85	151.63	0	24"	NV/NP	$ 999
115	.00	0	30"	C/P	$ 217
115	4.07	0	30"	C/P	$ 217
115	10.03	0	30"	A/VT	$ 957
115	17.94	0	20"	A/VT	$ 710
119	53.58	0	24"	NV/VT	$ 1,119
120	90.15	0	22"	NV/NP	$ 888
120	93.86	0	24"	NV/NP	$ 999
120	103.48	1	24"	NV/NP	$ 999
225	22.00	3	34"	C/P	$ 217
225	29.68	0	34"	C/P	$ 217
225	41.56	0	34"	C/P	$ 217
225	48.16	0	34"	C/P	$ 217
225	54.95	0	34"	NV/AG	$ 1,172
225	59.88	0	34"	NV/AG	$ 1,172
225	67.92	0	34"	NV/VT	$ 1,288
225	73.76	0	34"	A/AG	$ 343
225	80.78	0	34"	NV/AG	$ 1,172
235	113.04	0	34"	NV/AG	$ 1,172
235	158.38	0	30"	C/P	$ 217
235	170.55	0	24"	C/P	$ 217
235	177.50	0	30"	C/P	$ 217
235	177.50	1	30"		$ -
235	181.57	0	30"	C/P	$ 217
235	204.63	0	30"	C/P	$ 217
235	215.22	0	30"	C/P	$ 217
235	222.19	0	30"	C/P	$ 217

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
235	234.71	0	30"	C/P	$ 217
235	241.94	24	30"		$ -
247	3.72	0	16"	NV/VT	$ 923
247	6.90	0	16"	C/P	$ 217
247	14.31	0	16"	C/P	$ 217
247	19.00	0	16"	C/P	$ 217
293	8.23	0	16"	NV/VT	$ 923
293	11.88	0	12"	C/P	$ 217
324	12.00	0	30"	C/P	$ 217
324	18.0	0	34"	C/P	$ 217
324	26.09	0	34"	C/P	$ 217
324	38.80	0	34"	C/P	$ 217
325	0.82	0	24"	A/VT	$ 807
325	1.28	0	16"	C/P	$ 217
335	0	0	30"	A/AG	$ 343
335	7.84	0	30"	C/P	$ 217
335	20.05	0	30"	C/P	$ 217
335	30.09	0	30"	C/P	$ 217
335	37.73	0	30"	C/P	$ 217
335	44.70	0	30"	C/P	$ 217
335	52.24	0	30"	C/P	$ 217
335	57.29	0	30"	C/P	$ 217
335	64.91	0	30"		$ -
404	0.0	0	18"	NV/NP	$ 803
404	4.84	0	18"	NV/NP	$ 803
404	12.5	0	14"	NV/NP	$ 691
404	16.99	0	18"	NV/NP	$ 803
404	20.80	0	16"	NV/NP	$ 803
404	25.76	0	18"	NV/NP	$ 803
404	30.48	0	18"	NV/NP	$ 803
404	34.7	0	18"	NV/NP	$ 803
404	40.76	0	18"	NV/NP	$ 803
404	47.14	0	18"	NV/NP	$ 803
404	51.46	0	18"	NV/NP	$ 803
404	55.42	0	18"	NV/NP	$ 803
406	5.53	0	22"	NV/VT	$ 1,008
406	11.49	0	22"	NV/VT	$ 1,008
406	25.06	0	22"	NV/VT	$ 1,008
406	33.04	0	20"	C/P	$ 217
406	47.14	0	20"	NV/VT	$ 1,008
406	51.46	0	20"	NV/VT	$ 1,008
407	0.05	0	30"	A/VT	$ 957

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
407	7.45	0	30"	A/VT	$ 957
407	9.91	1	12"	NV/AG	$ 762
407	9.91	2	12"	NV/AG	$ 762
408	0.00	0	16"	NV/AG	$ 837
408	0.00	1	16"	NV/AG	$ 837
408	0.00	2	16"	NV/VT	$ 923
765	0.00	0	30"	A/AG	$ 343
765	6.20	0	30"	A/VT	$ 957
765	12.36	2	20"		$ -
765	12.36	0	26"	A/VT	$ 843
765	12.36	1	20"	NV/AG	$ 937
765	18.35	0	26"	A/AG	$ 317
765	22.80	0	26"	A/VT	$ 843
765	26.13	0	26"	NV/AG	$ 1,097
765	32.19	0	20"	A/VT	$ 710
767	5.45	0	30"	A/VT	$ 957
800	21.01	0	20"	A/VT	$ 710
1003	12.74	0	16"	NV/NP	$ 803
1003	20.60	0	12"	NV/NP	$ 691
1003	27.83	0	16"	NV/NP	$ 803
1003	32.03	0	16"	NV/NP	$ 803
1004	3.43	0	16"	NV/NP	$ 803
1004	8.06	0	16"	NV/NP	$ 803
1004	15.27	0	16"	NV/NP	$ 803
1004	20.83	0	16"	NV/NP	$ 803
1004	25.76	0	16"	NV/NP	$ 803
1004	34.18	0	16"	NV/NP	$ 803
1005	4.46	0	22"	NV/NP	$ 888
1005	9.26	0	22"	C/P	$ 217
1005	13.2	0	22"	C/P	$ 217
1005	18.04	0	20"	C/P	$ 217
1005	24.67	0	20"	C/P	$ 217
1005	38.01	0	16"	NV/AG	$ 837
1010	0.00	1	16"	NV/AG	$ 837
1010	3.61	0	16"	C/P	$ 217
1010	11.40	0	16"	C/P	$ 217
1010	17.81	0	16"	C/P	$ 217
1010	22.00	0	16"	NV/VT	$ 923
1010	27.01	0	16"	C/P	$ 217
1011	5.13	0	16"	NV/NP	$ 803
1013	0	0	24"	NV/AG	$ 1,017
1013	4.49	0	24"	A/AG	$ 311

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
1014	4.89	0	30"	NV/VT	$ 1,288
1014	10.60	0	30"	A/VT	$ 957
1014	18.42	0	30"	A/VT	$ 957
1014	21.44	0	30"	A/VT	$ 957
1014	27.69	0	30"	A/AG	$ 343
1015	.05	0	24"	NV/VT	$ 1,119
1015	6.07	0	20"	NV/VT	$ 1,008
1015	9.28	0	24"	NV/VT	$ 1,119
1016	4.30	0	36"	NV/AG	$ 1,301
1016	9.75	0	36"	NV/VT	$ 1,454
1016	13.94	0	30"	A/VT	$ 957
1017	0.00	0	30"	A/VT	$ 957
1017	12.96	0	30"	NV/VT	$ 1,288
1017	20.80	0	30"	A/VT	$ 957
1018	0	0	30"	A/VT	$ 957
1018	7.33	0	30"	C/P	$ 217
1018	12.27	0	30"	A/VT	$ 957
1018	17.55	0	30"	NV/VT	$ 1,288
1019	0.17	0	34"	NV/VT	$ 1,288
1019	4.93	0	34"	NV/VT	$ 1,288
1019	9.91	0	34"	NV/VT	$ 1,288
1020	0.01	0	24"	A/VT	$ 807
1020	6.3	0	30"	A/VT	$ 957
1024	0.31	0	30"	NV/AG	$ 1,172
1024	1.62	2	20"	NV/AG	$ 937
1026	31.46	0	12"	NV/NP	$ 691
1026	39.30	0	12"	NV/NP	$ 691
1026	44.50	0	12"	NV/NP	$ 691
1026	52.00	0	12"	NV/NP	$ 691
1026	59.80	0	12"	NV/NP	$ 691
1026	67.80	0	12"	NV/NP	$ 691
1026	70.80	0	12"	NV/NP	$ 691
1026	76.80	0	12"	NV/NP	$ 691
1027	0.00	0	12"	NV/NP	$ 691
1027	5.00	0	16"	NV/NP	$ 803
1027	11.75	0	16"	NV/NP	$ 803
1027	18.20	0	16"	NV/NP	$ 803
1027	28.97	0	16"	NV/NP	$ 803
1027	34.46	0	16"	NV/NP	$ 803
1028	5.00	0	24"	A/VT	$ 807
1028	11.75	0	24"	NV/VT	$ 1,119
1028	18.20	0	24"	NV/VT	$ 1,119

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
1028	22.77	0	24"	NV/VT	$ 1,119
1028	28.97	0	24"	A/VT	$ 807
1028	34.46	0	20"	A/VT	$ 710
1170	1.98	0	30"	NV/VT	$ 1,288
1170	5.90	0	30"	A/VT	$ 957
1171	.00	0	24"	NV/VT	$ 1,119
1172	.06	0	20"	NV/VT	$ 1,008
1172	0.40	0	30"	NV/AG	$ 1,172
1172	3.81	0	20"	C/P	$ 217
1173	.00	0	20"	NV/VT	$ 1,008
1173	2.51	0	20"	NV/VT	$ 1,008
1175	0.00	0	30"	A/VT	$ 957
1175	1.79	0	20"	C/P	$ 217
1175	1.98	0	30"	NV/VT	$ 1,288
1176	0.00	0	30"	A/VT	$ 957
1176	3.11	1	12"	NV/NP	$ 691
1176	3.11	2	12"	NV/NP	$ 691
1181	.00	0	24"	A/AG	$ 311
1181	5.22	0	30"	A/VT	$ 957
1185	0	0	30"	C/P	$ 217
1185	8.00	0	36"	C/P	$ 217
1185	15.27	0	36"	C/P	$ 217
1192.00	.00	0	30"	C/P	$ 217
1192	7.83	0	30"	A/VT	$ 957
1202	2.92	0	36"	A/VT	$ 1,076
1202	7.60	0	30"	A/AG	$ 343
1205	4.83	0	36"	A/VT	$ 1,076
1205	7.62	0	36"	A/VT	$ 1,076
1230	0.31	0	12"	A/VT	$ 544
1230	1.77	0	12"	A/VT	$ 544
2000	.18	0	24"	NV/NP	$ 999
2000	6.52	0	24"	NV/NP	$ 999
2000	81.01	0	24"	NV/NP	$ 999
2000	100.11	0	30"	NV/NP	$ 1,168
2000	107.13	0	30"	NV/NP	$ 1,168
2000	116.15	0	30"	NV/NP	$ 1,168
2000	125.13	0	30"	NV/NP	$ 1,168
2000	125.13	8	30"	NV/NP	$ 1,168
2000	135.22	0	30"	NV/NP	$ 1,168
2000	146.62	0	30"	NV/NP	$ 1,168
2000	161.14	0	30"	NV/NP	$ 1,168
2000	167.00	0	30"	NV/NP	$ 1,168

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
2000	172.31	0	30"	NV/NP	$ 1,168
2000	177.28	0	30"	NV/NP	$ 1,168
2000	181.34	0	30"	NV/NP	$ 1,168
2000	186.27	0	30"	NV/NP	$ 1,168
2000	193.18	13	20"	NV/NP	$ 888
2000	200.65	0	30"	NV/NP	$ 1,168
2000	206.33	0	30"	NV/NP	$ 1,168
2000	212.67	0	30"	NV/NP	$ 1,168
2000	212.70	0	26"	NV/AG	$ 1,097
2000	219.36	0	26"	NV/NP	$ 1,057
2000	222.71	0	26"	NV/NP	$ 1,057
2001	.1	0	30"	C/P	$ 217
2001	81.01	0	24"	A/AG	$ 311
2001	89.91	0	30"	C/P	$ 217
2002	95.00	0	30"	NV/NP	$ 1,168
2001	100.11	0	30"	C/P	$ 217
2001	107.13	0	30"	C/P	$ 217
2001	116.15	0	30"	C/P	$ 217
2001	125.13	0	30"	C/P	$ 217
2001	135.71	0	30"	C/P	$ 217
2001	144.94	0	30"	C/P	$ 217
2001	148.28	0	30"	A/VT	$ 957
2001	161.84	0	30"	C/P	$ 217
2001	168.49	0	30"	C/P	$ 217
2001	176.32	0	24"	NV/AG	$ 1,017
2001	179.65	0	30"	C/P	$ 217
2001	186.70	0	30"	C/P	$ 217
2001	193.31	0	30"	C/P	$ 217
2001	199.40	0	30"	C/P	$ 217
2001	204.68	0	30"	C/P	$ 217
2001	212.58	0	30"	A/AG	$ 343
2002	4.15	0	20"	NV/NP	$ 888
2002	6.81	0	24"	NV/NP	$ 999
2002	6.81	2	20"	NV/NP	$ 888
2003	5.56	0	30"	NV/NP	$ 1,168
2003	13.09	0	30"	NV/NP	$ 1,168
2003	18.69	0	30"	NV/NP	$ 1,168
2003	22.51	3	24"	NV/NP	$ 999
2003	27.00	0	30"	NV/NP	$ 1,168
2006	3.06	0	30"	A/VT	$ 957
2006	5.54	0	20"	NV/VT	$ 1,008
2051	81.01	0	30"	A/AG	$ 343

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
2051	90.55	0	36"	C/P	$ 217
2051	100.97	0	36"	C/P	$ 217
2051	108.14	0	36"	C/P	$ 217
2051	116.40	0	36"	C/P	$ 217
2051	126.40	0	36"	C/P	$ 217
3000	0.56	0	30"	A/AG	$ 343
3000	241.95	73	20"		$ -
3000	247.04	0	30"	C/P	$ 217
3000	252.34	0	30"	C/P	$ 217
3000	256.28	0	24"		$ -
3000	261.73	0	30"	NV/VT	$ 1,288
3000	265.70	0	30"	NV/VT	$ 1,288
3000	273.99	0	30"	NV/VT	$ 1,288
3000	277.49	0	30"	A/VT	$ 957
3000	281.50	0	30"	A/VT	$ 957
3000	285.91	59	30"		$ -
3001	1.01	0	30"	A/VT	$ 957
3002	0.30	0	20"	A/VT	$ 710
3003	6.53	0	30"		$ -
3003	14.30	0	30"	NV/VT	$ 1,288
3003	21.46	0	30"	A/VT	$ 957
3003	28.83	0	34"	A/VT	$ 957
3007	0.00	0	30"	NV/VT	$ 1,288
4000	36.93	0	36"	C/P	$ 217
4000	49.21	0	36"	C/P	$ 217
4000	61.55	0	36"	C/P	$ 217
4000	61.55	1	20"	A/AG	$ 301
4000	72.70	0	36"	C/P	$ 217
4000	72.70	1	20"	A/AG	$ 301
4000	72.70	1	20"	A/AG	$ 301
4000	85.88	0	36"	C/P	$ 217
4000	92.74	0	36"	C/P	$ 217
4000	101.67	3	20"		$ -
4000	101.67	0	36"	NV/AG	$ 1,301
4000	107.25	0	36"	C/P	$ 217
4000	111.11	0	30"	C/P	$ 217
4000	118.10	0	36"	NV/VT	$ 1,454
4002	61.56	0	36"	A/AG	$ 361
4002	72.70	0	36"	C/P	$ 217
4002	76.62	0	30"		$ -
4002	82.78	0	24"	A/VT	$ 807
4002	84.56	0	36"	C/P	$ 217

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
4002	92.52	0	36"	C/P	$ 217
4002	100.37	0	36"	C/P	$ 217
4002	106.02	0	36"	C/P	$ 217
4002	109.89	0	30"	NV/VT	$ 1,288
5000	.158	0	36"	C/P	$ 217
5000	16.29	0	36"	C/P	$ 217
5000	126.40	0	36"	C/P	$ 217
5000	134.72	0	36"	C/P	$ 217
5000	140.58	0	36"	C/P	$ 217
5000	147.04	0	36"	C/P	$ 217
5000	153.98	0	36"	C/P	$ 217
5000	157.82	0	30"	C/P	$ 217
6900	0.00	0	30"	A/AG	$ 343
6900	5.13	0	36"	A/VT	$ 1,076
6900	12.91	0	36"	A/VT	$ 1,076
6900	18.20	0	30"	A/VT	$ 957
6900	22.77	0	30"	A/VT	$ 957
6900	28.97	0	30"	A/VT	$ 957
6905	23.78	0	30"	C/P	$ 217
6905	31.69	0	30"	A/VT	$ 957
6906	0.00	1	24"	C/P	$ 217
6906	0.00	2	24"	C/P	$ 217
6906	5.97	0	24"	A/VT	$ 807
6906	11.00	0	24"	A/VT	$ 807
6900	14.13	0	16"	A/VT	$ 647
6911	1.03	0	16"	A/VT	$ 647
7000	3.59	0	16"	A/VT	$ 647
7000	10.65	0	16"	A/VT	$ 647
7000	17.79	0	16"	A/VT	$ 647
7000	23.02	0	16"	A/VT	$ 647
7000	29.43	0	16"	NV/VT	$ 923
7000	38.44	0	20"	C/P	$ 217
7000	45.44	0	20"	C/P	$ 217
7000	53.27	0	20"	C/P	$ 217
7000	61.38	0	20"	C/P	$ 217
7025	.0	0	16"	C/P	$ 217
7025	4.17	0	12"	NV/VT	$ 811
7039	4.69	0	24"	A/VT	$ 807
7039	11.49	0	24"	A/VT	$ 807
7039	18.08	0	12"	NV/VT	$ 811
8045	.12	0	12"	NV/VT	$ 811
8109	40.76	0	20"	NV/VT	$ 1,008

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)
8109	44.49	0	20"	NV/VT	$ 1,008
8109	54.27	0	20"	NV/VT	$ 1,007.80
1600	*4.29*	*1601-0*	*16"*	*NV/NP*	*$ 803*
1600	*8.53*	*1602-0*	*16"*	*NV/NP*	*$ 803*
1600	*13.37*	*1603-0*	*16"*	*NV/NP*	*$ 803*
1600	*17.57*	*1604-0*	*16"*	*NV/NP*	*$ 803*
1600	*22.31*	*1605-0*	*16"*	*NV/NP*	*$ 803*
1600	*29.61*	*1607-0*	*16"*	*NV/NP*	*$ 803*
1600	*34.93*	*1609-0*	*16"*	*C/P*	
1600	*40.63*	*1611-0*	*16"*	*NV/NP*	*$ 803*
1600	*49.48*	*1615M-0S*	*16"*	*NV/NP*	*$ 803*
1601	*0*	*1620-0*	*16"*	*NV/VT*	*$ 923*
1601	*7.10*	*1622-0*	*16"*	*NV/VT*	*$ 923*
1601	*9.66*	*1623-0*	*16"*	*NV/VT*	*$ 923*
1602	*0.84*	*1602L-9170S*	*16"*	*NV/VT*	*$ 923*
2010	*0*	*2010-2009-0*	*20"*	*NV/VT*	*$ 1,008*
2010	*6.24*	*2010-2003.5*	*20"*	*NV/VT*	*$ 1,008*
1028	*34.46*	*1028-34.46-0*	*20"*	*A/VT*	*$ 710*
3010	*7.79*	*3010-3010-0*	*24"*	*A/AG*	*$ 311*
3010	*14.18*	*3010-3009-0*	*24"*	*A/AG*	*$ 311*
3010	*21.13*	*3010-3008-0*	*24"*	*A/AG*	*$ 311*
3010	*26.01*	*3010-3007-0*	*24"*	*A/AG*	*$ 311*
3010	*30.21*	*3010-3006-0*	*24"*	*A/AG*	*$ 311*
3010	*34.99*	*3010-3005-0*	*24"*	*A/AG*	*$ 311*
3010	*38.57*	*3010-3004-0*	*24"*	*A/AG*	*$ 311*
3010	*43.59*	*3010-3003-0*	*24"*	*A/AG*	*$ 311*
3600	*6.02*	*3600-3602-0*	*36"*	*A/AG*	*$ 361*
3600	*11.81*	*3600-3603-0*	*36"*	*A/AG*	*$ 361*
3600	*16.67*	*3600-3604-0*	*36"*	*A/VT*	*$ 1,076*
3600	*23.21*	*3600-3605-0*	*36"*	*A/VT*	*$ 1,076*
3600	*29.84*	*3600-3606-0*	*36"*	*A/VT*	*$ 1,076*
				SOCAL TOTAL	$ 230,314
				LESS ASV TO RCV CONVERSIONS (c/p)	$ 21,049
				SOCAL BASE TRANSMISSION VALVES_1b	$ 209,265
				SDGE BASE TRANSMISSION VALVES 1a	$ 19,278
				OVERALL TOTAL	$ 249,591

PSEP MAJOR TRANSMISSION VALVE UPGRADES

Line	Mile	Valve #	Valve Size	Installation Type	Modification Cost ($000)

Shaded Italicized valves = SDGE

INSTALLATION TYPE KEY

C/P = Control and Power only (ASV to RCV Conversions)

A/AG= New Actuator Above Ground

A/VT = New Actuator in Vault

NV/AG = New Valve and Actuator Above Ground

NV/VT = New Valve and Actuator in Vault

NV/NP = New Valve and Actuator in Replaced Pipe

BLANK = Existing RCV

SDGE DISTRIBUTION PRELIMINARY LIST OF VALVES ASSOCIATED WITH PSEP COST ESTIMATE.

Line	Mile	Valve #	Valve size	Installation type	Cost
49-5		75	16"	new valve/act	836,700
49-5		758	16"	new valve/act	836,700
49-7		3013	30"	new valve/act	1,171,570
49-11		2205	20"	new valve/act	936,840
49-11		806	16"	new valve/act	836,700
49-13		760	12"	new valve/act	762,060
49-14		1002	16"	new valve/act	836,700
49-16		832	16"	new valve/act	836,700
49-16		1040	16"	new valve/act	836,700
49-16		1041	16"	new valve/act	836,700
49-17		1011	16"	new valve/act	836,700
49-17		Mission Valley header	16"	new valve/act	836,700
49-18		Mission Valley header	20"	new valve/act	936,840
49-18		830	20"	new valve/act	936,840
49-21		1330	24"	new valve/act	1,017,290
49-21		1331	16"	new valve/act	836,700
49-21		1329	16"	new valve/act	836,700
49-22		744	20"	new valve/act	936,840
49-22		745	20"	new valve/act	936,840
49-22		1082	16"	new valve/act	836,700
49-22		1083	16"	new valve/act	836,700
49-22		1084	16"	new valve/act	836,700
49-23		884	20"	new valve/act	936,840
49-24		1175	12"	new valve/act	762,060
49-24		1176	12"	new valve/act	762,060
49-25		Mission Valley header	16"	new valve/act	836,700
49-26		639	12"	new valve/act	762,060
49-27		1261	16"	new valve/act	836,700
49-28		2176	16"	new valve/act	836,700
49-28		2665	16"	new valve/act	836,700
49-28		640	12"	new valve/act	762,060
49-28		646	12"	new valve/act	762,060
49-28		647	16"	new valve/act	836,700
49-31C		2630	36"	new valve/act	1,300,550
49-31C		2632	36"	new valve/act	1,300,550
49-333		1232	16"	new valve/act	836,700
49-333		1235	16"	new valve/act	940,700

Totals: **$32,658,060**

Attachment: **Valves_Cap-3**

Summary: Cost Factors Used for Valve Modifications

Summary:

The following describes how the cost factors for valves modification of different types were generated for use in Tables 8 for workpapers entitled “Valves_1a_SDGE-base-valves” and “Valves_1b SCG-base-valves”. These costs were applied to the valves counts as shown in Table 7 of those documents to produce the cost totals of Table 9 of those same documents and ultimately to produce the total costs for upgrading and/or replacing valves on the SDG&E and SoCalGas Transmission and Distribution system as part of the PSEP.

Basic Valve Cost Estimate

Cost to install an ACV/RCS is composed of the following:

- Material cost of valve
- Material cost of actuator
- Material cost of power, controls and telemetry
- Material cost for pipes
- Material cost for other in-directs such as lost gas, fees, and permits.
- Contract labor performed by a third-party contractor
- Utility labor performed by SoCalGas

Installation cost also depends on

- Size of the pipe
- Location of the valve

Installation of an ACV/RCS is divided into three main tasks

- Valve installation
- Actuator mount
- Power, controls and telemetry installation

The cost assumption for ACV/RCS installation was developed by averaging the cost estimates derived independently from SoCalGas and a third-party contractor. SoCalGas’ cost estimate is complete and includes the total cost for the entire project including installation of the valve, actuator, power, controls and telemetry for materials, contractor labor, and company labor, and other in-direct costs. The cost estimate from third party contractor is partially completed and includes only the installation cost for the valve and actuator for materials and contract labor. SoCalGas’ cost estimate is used throughout for company labor, other in-directs, and for the installations of power, controls and telemetry. An eight percent contingency factor was added to the averaged cost estimates of the two companies to arrive at the final cost.

Table x1 summarizes the ACV/RCV installation cost estimates by size and configurations. Table x2 through Table x5 show the breakdown of the cost estimate by each company for a sample 20-inch pipeline.

Table x1

Valve Unit Cost Estimate

All units are in thousand dollars

Pipe Diameter	**Config 1**: Install a new buried valve and above ground actuator with power, controls and telemetry on existing pipeline	**Config 2**: Install a new vaulted valve and actuator with power, controls and telemetry on existing pipeline in the street	Install power, control and telemetry	**Config. 3**: Install an existing valve with an actuator, power, control and telemetry	**Config. 4**: Install a new vaulted valve with an actuator, power, control and telemetry	Install a new vaulted valve and actuator with power, control and telemetry on new pipeline in the street (subtract $120k from Config. 2 for work being planned and valve installed as part of new pipeline)
	Avg (SCG and 3PC) estimate	Avg (SCG and 3PC) Estimate	SCG Estimate	Avg (SCG and 3PC) Estimate	3PC Estimate	Avg (SCG and 3PC) Estimate
12"	762.1	810.8	217.0	281.5	543.8	690.8
14"	762.1	810.8	217.0	281.5	543.8	690.8
16"	836.7	922.8	217.0	292.2	647.3	802.8
18"	836.7	922.8	217.0	292.2	647.3	802.8
20"	**936.8**	**1,007.8**	**217.0**	**300.9**	**710.3**	887.8
22"	936.8	1,007.8	217.0	300.9	710.3	887.8
24"	1,017.3	1,119.2	217.0	311.3	806.7	999.2
26"	1,096.7	1,177.0	217.0	317.4	842.7	1,057.0
30"	1,171.6	1,288.1	217.0	342.9	957.4	1,168.1
34"	1,171.6	1,288.1	217.0	342.9	957.4	1,168.1
36"	1,300.5	1,453.8	217.0	360.7	1,075.6	1,333.8

Note: SCG is SoCalGas and 3PC is a third-party consulting engineering and construction company.

Table x2

Config. 1: Example for a 20-inch diameter pipeline to install a new buried valve and above ground actuator with power, controls and telemetry on existing pipeline.

All units are in thousand dollars	**SoCalGas** [1]	**3rd-Party** [2]	**Average**
Actuator & Valve [3]	178.0	123.6	150.8
Pipe (Materials) [4]	71.0	52.2	61.6
Pipe (Contractor Labor) [5]	462.0	148.1	305.1
Pipe (Company Labor) [6]	133.0	133.0	133.0
Power, Controls, and Telemetry [7] (Materials)	77.0	77.0	77.0
Power, Controls, and Telemetry (Contract Labor)	95.0	95.0	95.0
Power, Controls, and Telemetry (Company Labor)	45.0	45.0	45.0
Subtotal	1,061.0	673.9	867.5
+ 8% Contingency			69.4
Total Cost			$936.8

Notes:

(1) SoCalGas provided cost estimate for the entire project including installation of the valve, actuator, power, controls and telemetry. Estimate includes materials, contractor labor, company labor, and other in-direct

(2) Third-party consulting firm provided cost estimate only for the installation of valve and actuator. Estimate includes materials and contract labor.

(3) Unit cost to purchase actuator and valve plus tax and delivery.

(4) New materials is used for each valve construction type, including FBE coated pipe and bends.

(5) Construction labor rates includes activities associated with pipe installation, including but not limited to, trench excavation (or pit excavation), pipe stringing/welding, pipe lowering/fitting, purging, tie-in, backfill/compaction, surface restoration (paving), radiographic inspection, mobilization/demobilization, pipeline removal, and pipeline cleaning .

(6) SoCalGas' cost estimate to design and permit the placement and installation at each location, plus supervision, inspection, and project management.

(7) SoCalGas' cost estimate to hook up actuator includes power drops, UPS, mechanical backup, and connection to SCADA system.

Table x3

Config. 2: Example for a 20-inch diameter pipeline to install a new vaulted valve and actuator with power, controls and telemetry on existing pipeline in the street.

All units are in thousand dollars	SoCalGas [1]	3rd-Party [2]	Average
Actuator & Valve [3]	197.0	123.6	160.3
Pipe (Materials) [4]	79.0	74.9	77.0
Pipe (Contractor Labor) [5]	512.0	157.8	334.9
Pipe (Company Labor) [6]	144.0	144.0	144.0
Power, Controls, and Telemetry [7] (Materials)	77.0	77.0	77.0
Power, Controls, and Telemetry (Contract Labor)	95.0	95.0	95.0
Power, Controls, and Telemetry (Company Labor)	45.0	45.0	45.0
Subtotal	1,149.0	717.3	933.2
+ 8% Contingency			74.7
Total Cost			$1,007.8

Notes:

(1) SoCalGas provided cost estimate for the entire project including installation of the valve, actuator, power, controls and telemetry. Estimate includes materials, contractor labor, company labor, and other in-direct

(2) Third-party consulting firm provided cost estimate only for installation of the valve and actuator. Estimate includes materials and contract labor.

(3) Unit cost to purchase actuator and valve plus tax and delivery.

(4) New materials is used for each valve construction type, including FBE coated pipe and bends. Vault pricing also includes vault and delivery.

(5) Construction labor rates includes activities associated with pipe installation, including but not limited to, trench excavation (or pit excavation), pipe stringing/welding, pipe lowering/fitting, purging, tie-in, backfill/compaction, surface restoration (paving), radiographic inspection, mobilization/demobilization, pipeline removal, and pipeline cleaning. Vault pricing also includes setting of vault and slurry backfill.

(6) SoCalGas' cost estimate to design and permit the placement and installation at each location, plus supervision, inspection, and project management.

(7) SoCalGas' cost estimate to hook up actuator includes power drops, UPS, mechanical backup, and connection to SCADA system.

Table x4

Config. 3: Upfitting an existing valve with an actuator, power, control and telemetry.

All units are in thousand dollars	**SoCalGas** [1]	**3rd-Party** [2]	**Average**
Cost of Actuator [3]	16.8	13.1	14.9
Labor (Contractor) [4]	7.5	130.4	69.0
Power, Controls, and Telemetry [5] (Materials)	77.0	77.0	77.0
Power, Controls, and Telemetry (Contract Labor)	95.0	95.0	95.0
Power, Controls, and Telemetry (Company Labor)	45.0	45.0	45.0
Total Cost	241.3	360.5	$300.9

Notes:

(1) SoCalGas provided cost estimate for the entire project including installation of the valve, actuator, power, controls and telemetry. Estimate includes materials, contractor labor, and company labor, and other in-direct costs.

(2) Third-party consulting firm provided cost estimate only for installation of the valve and actuator. Estimate includes materials and contract labor.

(3) Unit cost to purchase actuator plus tax and delivery.

(3) SoCalGas assumes no valve modification, where as, the third-party consulting firm assumes valve modification is needed to install an actuator on top of an existing valve.

(7) SoCalGas' cost estimate to hook up actuator includes power drops, UPS, mechanical backup, and connection to SCADA system.

Table x5

Config. 4: Example for a 20-inch diameter pipeline to install a new vaulted valve and actuator with power, controls and telemetry on existing pipeline in the street.

All units are in thousand dollars	**3rd-Party**
Actuator & Valve [1]	123.6
Pipe (Materials) [2]	74.9
Pipe (Contractor Labor) [3]	157.8
Subtract Spec Services actuator cost	-13.1
Subtract Spec Services contract labor	-130.4
Add upfit an existing valve with actuator, power, control and telemetry (Config. 3)	300.9
Pipe (Company Labor) [4]	144.0
Subtotal	657.7
+ 8% Contingency	52.6
Total Cost	$710.3

Notes:

(1) Unit cost to purchase actuator and valve plus tax and delivery.

(2) New materials is used for each valve construction type, including FBE coated pipe and bends. Vault pricing also includes vault and delivery.

(3) Construction labor rates includes activities associated with pipe installation, including but not limited to, trench excavation (or pit excavation), pipe stringing/welding, pipe lowering/fitting, purging, tie-in, backfill/compaction, surface restoration (paving), radiographic inspection, mobilization/demobilization, pipeline removal, and pipeline cleaning. Vault pricing also includes setting of vault and slurry backfill.

(4) SoCalGas' cost estimate to design and permit the placement and installation at each location, plus supervision, inspection, and project management.

Attachment: **Valves_Cap-4**

Summary: Major VEP Work Locations by Type

Overview of VEP Major Valve Work Locations

Attached Figures “A”, “B” and “C” provide a high-level overview of locations where major transmission pipeline valve work on the SoCalGas and SDG&E systems, as described and cost-estimated in Work Papers “Valves_1a-SDGE Valves” and “Valves_1b-SCG Valves” will be performed. Details regarding the valves included in this scope are delineated in Attachment Valves_Cap-2. The type of major work to be completed is shown as a color variation on the dots when viewed in with such display feature, and as described in the Legend of each chart. The seven work categories depicted range from converting existing ASVs to RCV functionality with controls retrofit to complete replacement of a buried manual valve with a new valve, actuator and electronic controls and communication equipment. The most extensive work of this type is retrofit where the existing buried valve must be replaced with a vaulted valve and actuator under a roadway. The cost by size for each variation of valve work is presented in Attachment “Valve_Cap-3” and detailed by Plan valve counts and tabular cost summaries in Work Papers noted above.

The intent of these Figures is to provide perspective to the broad scope of work which will be performed to create remote and automatically-controlled isolation sections on pipelines which meet the criteria set forth in Section V.E of this Plan. Details on subsidiary valves, generally smaller distribution valves, are not included for clarity and because as those valves will generally help isolate sections of pipeline depicted in the Figures.

It is also noteworthy that these figures (and the Valve Plan in general) include valve work which will be performed on pipelines which may ultimately be replaced as the Companies move through their PSEP implementation. The incremental cost for making such valves RCV/ASV capable (above just a simple buried manual valve installed during replacement) are contained in this Plan Section and are not included in Pipeline Work Paper costs.

Not included in the Figures are 100 existing ASV locations on the SCG system where communication linkage with Gas Control will be deployed. Existing RCVs, not subject to replacement under this plan are similarly omitted for clarity. Inclusion of these valves would work to shorten some of the intervals shown. The reader is also reminded that the Pipelines shown are generally 12” and above, operating at above 200 psig and are routed through location Class 3 or HCA areas.

Figure A

LA Basin Major VEP Work Locations

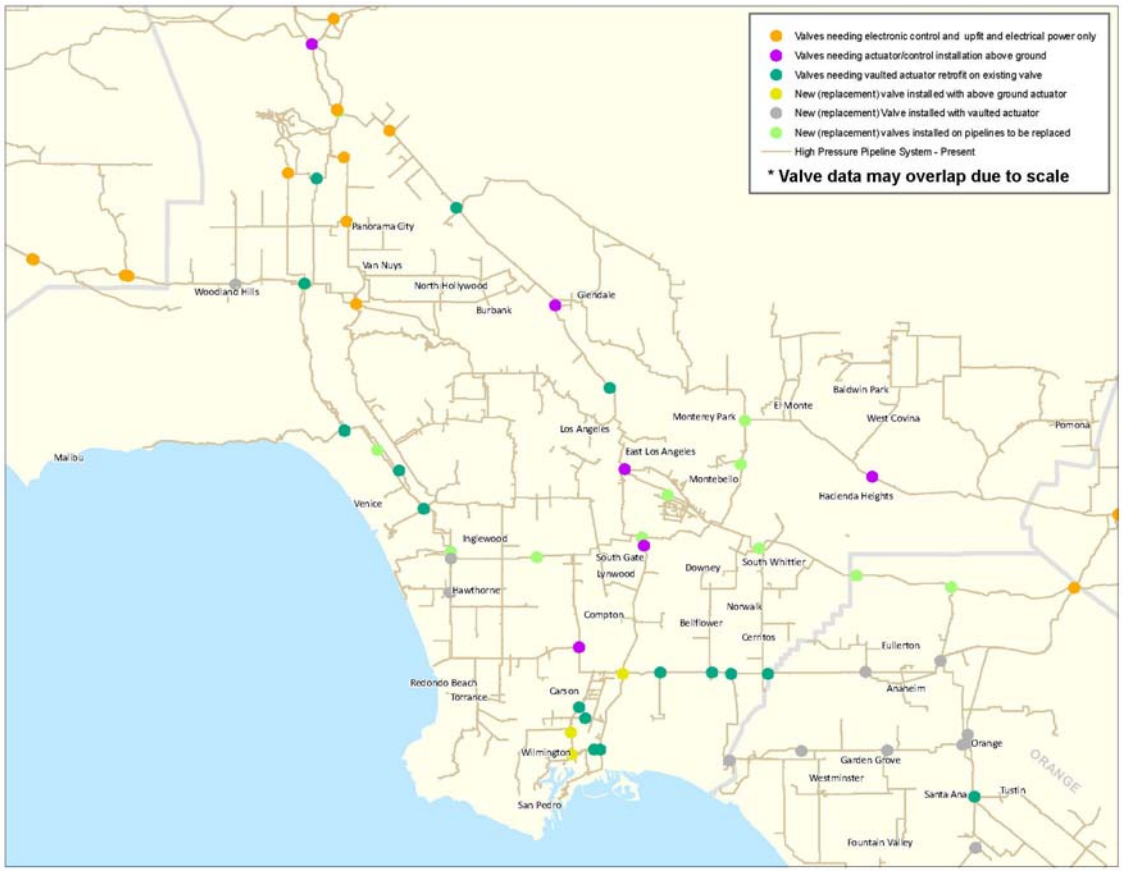


Figure B:

SDG&E and South Inland SoCalGas Major VEP Work Locations

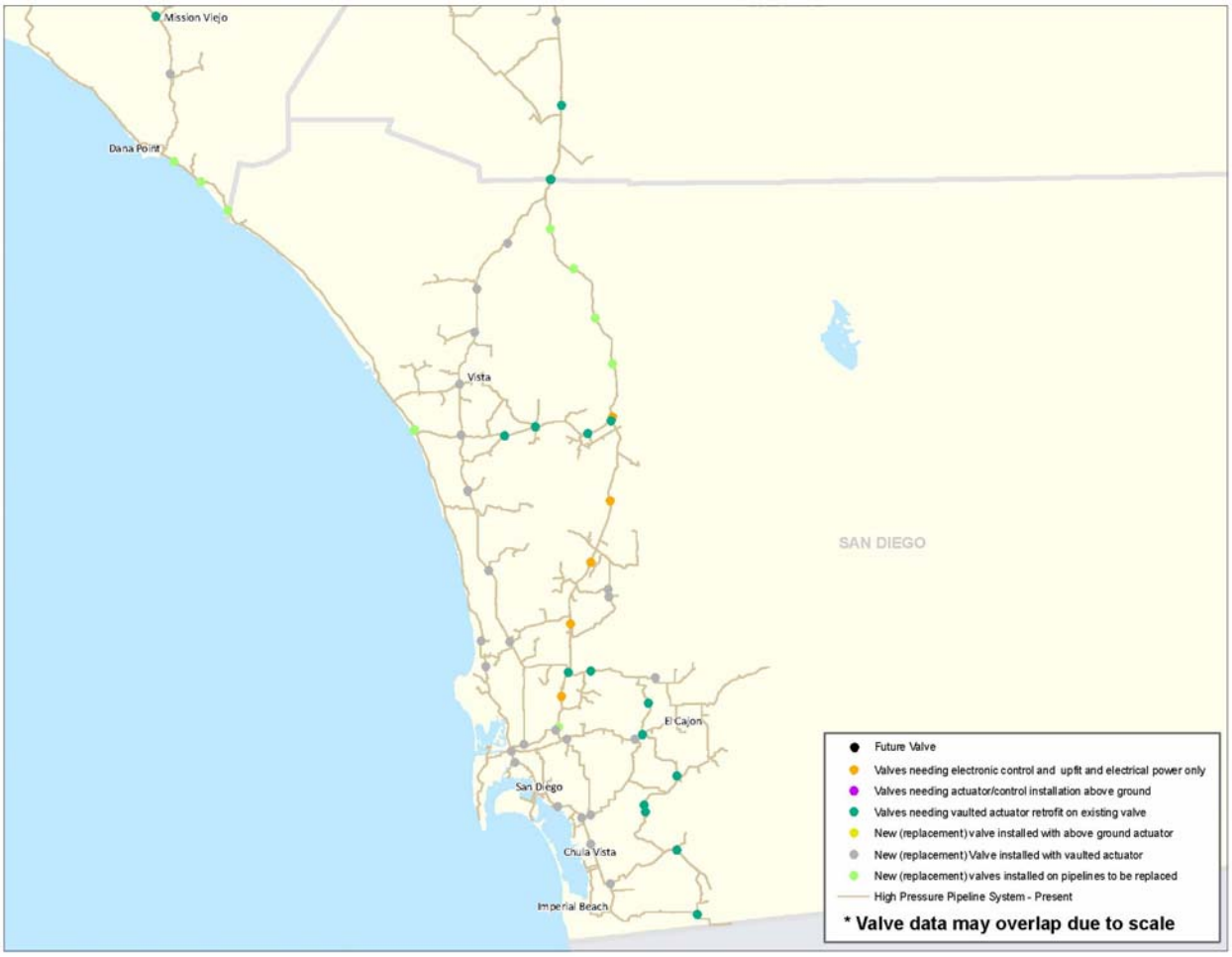
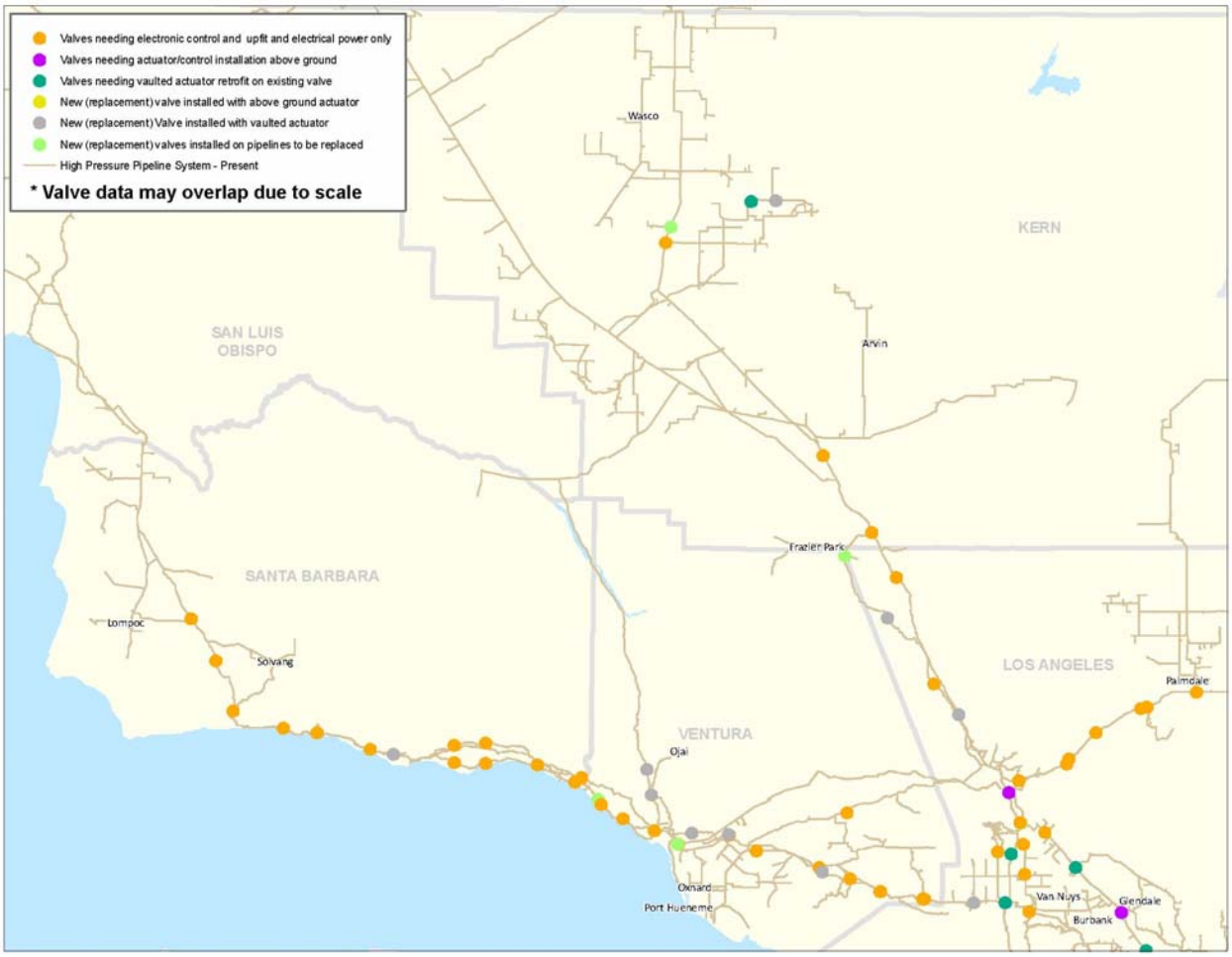


Figure C:

SoCalGas North Major VEP Work Locations



WORKPAPER TITLE	FERC ACCT.
Summary SoCalGas Capital Costs (Valves_Cap_Summary SCG)	367/376
WITNESS	**IN SERVICE DATE**
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	3.8	4.0	4.5	4.5	16.9	23.7	40.6
DIRECT NON-LABOR	22.4	24.5	28.2	28.8	103.8	156.5	260.4
TOTAL DIRECT CAPITAL	26.3	28.5	32.7	33.3	120.8	180.2	301.0

Project Description

This Workpaper provides a summary of the costs to complete all SoCalGas capital work elements associated with the Valve Enhancement Plan.

Forecast Methodology - Summmary

The breakdown of how costs for these elements are are allocated to each company and FERC account are presented in workpapers as-referenced in Table B.1. Resulting cost allocations to Distribution and Transmission for SoCalGas are presented Capital Work Papers "Valves_Cap_SCG_Trans" and Valves_Cap_SCG_Dist." The method by which capital is allocated to each Company is provided in Work Papers with the prefix range "Valves_1.." to "Valves_9..". The results above are taken by adding all SoCalGas capital shown in Table 6 of those workpapers as a result of those allocations

Table B

VALVE ENHANCEMENT PLAN COSTS ($ Millions) BY ELEMENT (SOCALGAS)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**234.7**
DIRECT LABOR	3.1	3.1	3.1	3.1	12.51	18.8	31.3
DIRECT NON-LABOR	20.3	20.3	20.3	20.3	81.39	122.1	203.5
94 ASV TO RCV							**20.9**
DIRECT LABOR	-	0.19	0.19	0.19	0.57	1.22	1.79
DIRECT NON-LABOR	-	2.03	2.03	2.03	6.09	12.99	19.08
COMM TO 100 ASVs							**0.22**
DIRECT LABOR	-	-	0.01	0.01	0.02	0.07	0.10
DIRECT NON-LABOR	-	-	0.02	0.02	0.03	0.09	0.12
20 LARGE METER SITES							**5.3**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.13	0.2	0.3
DIRECT NON-LABOR	0.5	0.5	0.5	0.5	2.00	3.0	5.0
120 BACKFLOW PREV SITES (three elements)							**19.9**
DIRECT LABOR	0.1	0.1	0.3	0.3	0.8	2.0	2.7
DIRECT NON-LABOR	0.2	0.2	2.1	2.1	4.6	12.5	17.1
40 TAP METERS							**3.5**
DIRECT LABOR	-	-	0.1	0.1	0.2	0.3	0.5
DIRECT NON-LABOR	-	-	0.6	0.6	1.2	1.8	3.0
SCADA SYSTEM EXPANSION							**3.2**
DIRECT LABOR	-	-	0.2	0.2	0.3	-	0.3
DIRECT NON-LABOR	-	-	1.4	1.4	2.9	-	2.9
SDGE RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCG RADIO SYSTEM EXP							**13.3**
DIRECT LABOR	0.6	0.6	0.6	0.6	2.4	1.2	3.6
DIRECT NON-LABOR	1.3	1.3	1.2	1.8	5.6	4.1	9.7
PLAN TOTALS-CAPITAL							**301.0**
DIRECT LABOR	3.8	4.0	4.5	4.5	16.9	23.7	40.6
DIRECT NON-LABOR	22.4	24.5	28.2	28.8	103.8	156.5	260.4

Table B.1

Associated Detailed Work Paper Table 6 Ref.	Testimony Ref
Valves_1a_SDGE_Base Valves	V.E
Valves_1b_SCG Base Valves	
Valves_2_SCG ASV-to-RCV	V.E
Valves_3_SCG LB comm	V.E
Valves-4 large meter sta	V.F.1
Valves_5a_BF-T-SL_RCVs	V.F.2
Valves_5b_BF-T-Reg pilots	V.F.2
Valves_5c_BF-T-chk valves	V.F.2
Valves_6_small meters	V.F.3
Valves_7-base SCADA system exp	V.F.4
Valves_8 -SDGE radio system	V.F.5
Valves_9 SCG radio stystem	V.F.5

WORKPAPER TITLE	FERC ACCT.
SoCalGas Transmission Valves Capital (Valves_Cap_SCG_Trans)	367
WITNESS	**IN SERVICE DATE**
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	2.8	2.9	3.1	3.1	12.0	17.8	29.8
DIRECT NON-LABOR	18.7	20.8	22.2	22.2	84.0	125.5	209.5
TOTAL DIRECT CAPITAL	21.5	23.7	25.3	25.3	95.9	143.4	239.3

Project Description

This workpaper provides a summary of all Valve Enhancement Plan capital costs allocated to SoCalGas Transmission FERC account 367. This is a transmission account.

Forecast Methodology

Each of the ten SoCalGas capital elements represented in Workpapers prefixed "Valve_1..." thru "Valve_9..." provide the basic cost information and Company and FERC allocations associated with this Plan. Allocations below are the summation of each of the lines denoted with "SCG -Trans" in the column entitled "Capital" in Table 6 of those respective Workpapers. Table 6 totals for "SCG Trans" for Labor and Non Labor in each Plan Year are shown below and added to arrive at the Plan Totals shown.

Table B
Cost Allocation to Company and FERC Capital

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**209.69**
DIRECT LABOR	2.7	2.7	2.7	2.7	10.9	16.4	27.3
DIRECT NON-LABOR	18.2	18.2	18.2	18.2	73.0	109.5	182.4
94 ASV TO RCV							**20.9**
DIRECT LABOR	-	0.2	0.2	0.2	0.6	1.2	1.8
DIRECT NON-LABOR	-	2.0	2.0	2.0	6.1	13.0	19.1
COMM TO 100 ASVs							**0.2**
DIRECT LABOR	-	-	0.0	0.0	0.0	0.1	0.1
DIRECT NON-LABOR	-	-	0.0	0.0	0.0	0.1	0.1
20 LARGE METER SITES							**5.3**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.1	0.2	0.3
DIRECT NON-LABOR	0.5	0.5	0.5	0.5	2.0	3.0	5.0
120 BACKFLOW PREV SITES (three elements)							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
40 TAP METERS							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCADA SYSTEM EXPANSION							**3.2**
DIRECT LABOR	-	-	0.2	0.2	0.3	-	0.3
DIRECT NON-LABOR	-	-	1.4	1.4	2.9	-	2.9
SDGE RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCG RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-

PLAN TOTALS-CAPITAL							**239.3**
DIRECT LABOR	2.8	2.9	3.1	3.1	12.0	17.8	29.8
DIRECT NON-LABOR	18.7	20.8	22.2	22.2	84.0	125.5	209.5

WORKPAPER TITLE	FERC ACCT.
SoCalGas Distribution Valves Capital (Valves_Cap_SCG_Dist)	376
WITNESS	**IN SERVICE DATE**
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	1.1	1.1	1.4	1.4	5.0	5.8	10.8
DIRECT NON-LABOR	3.7	3.7	6.0	6.6	19.9	31.0	50.9
TOTAL DIRECT CAPITAL	4.8	4.8	7.4	8.0	24.8	36.8	61.7

Project Description

This workpaper provides a summary of all Valve Enhancement Plan capital costs allocated to SoCalGas Distribution FERC account 376.

Forecast Methodology

Each of the ten SoCalGas capital elements represented by Workpapers prefixed "Valve_1." thru "Valve_9..." provide the basic cost information and Company and FERC allocations for SoCalGas Distribution elements associated with this Plan. Allocations below are the summation of each of the lines denoted with "SCG Dist" in the column entitled "Capital" in Table 6 of those respective Workpapers. Table 6 totals for "SCG Dist" for Labor and Non-Labor in each Plan Year are shown below and added to arrive at the Plan Totals shown.

Table B

Cost Allocation to Company and FERC Capital

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**25.0**
DIRECT LABOR	0.4	0.4	0.4	0.4	1.6	2.4	4.0
DIRECT NON-LABOR	2.1	2.1	2.1	2.1	8.4	12.6	21.0
94 ASV TO RCV							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
COMM TO 100 ASVs							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
20 LARGE METER SITES							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
120 BACKFLOW PREV SITES (three elements)							**19.9**
DIRECT LABOR	0.1	0.1	0.3	0.3	0.8	2.0	2.7
DIRECT NON-LABOR	0.2	0.2	2.1	2.1	4.6	12.5	17.1
40 TAP METERS							**3.5**
DIRECT LABOR	-	-	0.1	0.1	0.2	0.3	0.5
DIRECT NON-LABOR	-	-	0.6	0.6	1.2	1.8	3.0
SCADA SYSTEM EXPANSION							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SDGE RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCG RADIO SYSTEM EXP							**13.3**
DIRECT LABOR	0.6	0.6	0.6	0.6	2.4	1.2	3.6
DIRECT NON-LABOR	1.3	1.3	1.2	1.8	5.6	4.1	9.7

PLAN TOTALS-CAPITAL							**61.7**
DIRECT LABOR	1.1	1.1	1.4	1.4	5.0	5.8	10.8
DIRECT NON-LABOR	3.7	3.7	6.0	6.6	19.9	31.0	50.9

WORKPAPER TITLE	FERC ACCT.
Summary of SDG&E Capital Costs (Valves_Cap_Summary SDGE)	376/367
WITNESS	**IN SERVICE DATE**
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.8	0.9	1.0	1.0	3.7	5.1	8.8
DIRECT NON-LABOR	4.6	5.4	6.1	6.1	22.2	29.5	51.7
TOTAL DIRECT CAPITAL	5.3	6.4	7.1	7.1	25.9	34.6	60.5

Project Description

This Workpaper provides a summary of the cost to complete all SDGE capital work associated with the Valve Enhancement Plan.

Forecast Methodology - Summmary

The breakdown of how cost for these elements are are allocated to each company and FERC account are presented in workpapers as-referenced in Table B.1. Resulting cost allocations to Distribution and Transmission for SDG&E are presented Capital Work Papers "Valves_SDGE_Cap_Trans" and Valves_SDGE_Cap_Dist" which follow. The assumptions regarding how capital is allocated to each Company is provided in Work Papers with the prefix range "Valves_1.." to "Valves_9..." The results above are taken by adding all SDG&E capital shown in Table 6 of those workpapers as a result of those allocations.

Table B

VALVE ENHANCEMENT PLAN COSTS ($ Millions) BY ELEMENT (SDG&E)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**52.0**
DIRECT LABOR	0.8	0.8	0.8	0.8	3.09	4.6	7.737
DIRECT NON-LABOR	4.4	4.4	4.4	4.4	17.70	26.5	44.242
94 ASV TO RCV							**-**
DIRECT LABOR	-	-	-	-	-	4.6	
DIRECT NON-LABOR	-	-	-	-	-	26.5	
COMM TO 100 ASVs							**-**
DIRECT LABOR	-	-	-	-	-	4.6	
DIRECT NON-LABOR	-	-	-	-	-	26.5	
20 LARGE METER SITES							**0.912**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.02	0.0	0.054
DIRECT NON-LABOR	0.1	0.1	0.1	0.1	0.34	0.5	0.858
120 BACKFLOW PREV SITES (three elements)							**3.411**
DIRECT LABOR	0.0	0.0	0.1	0.1	0.1	0.3	0.470
DIRECT NON-LABOR	0.0	0.0	0.4	0.4	0.8	2.1	2.941
40 TAP METERS							**0.594**
DIRECT LABOR	-	-	0.0	0.0	0.0	0.0	0.081
DIRECT NON-LABOR	-	-	0.1	0.1	0.2	0.3	0.513
SCADA SYSTEM EXPANSION							**0.549**
DIRECT LABOR	-	-	0.0	0.0	0.1	-	0.059
DIRECT NON-LABOR	-	-	0.2	0.2	0.5	-	0.491
SDGE RADIO SYSTEM EXP							**3.074**
DIRECT LABOR	-	0.1	0.1	0.1	0.4	-	0.391
DIRECT NON-LABOR	-	0.9	0.9	0.9	2.7	-	2.683
SCG RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
PLAN TOTALS-CAPITAL							**60.5**
DIRECT LABOR	0.8	0.9	1.0	1.0	3.7	14.3	8.8
DIRECT NON-LABOR	4.6	5.4	6.1	6.1	22.2	82.6	51.7

Table B.1

Associated Detailed Work Paper Table 6 Ref.	Testimony Ref
Valves_1a_SDGE_Base Valves	V.E
Valves_1b_SCG Base Valves	
Valves_2_SCG ASV-to-RCV	V.E
Valves_3_SCG LB comm	V.E
Valves-4 large meter sta	V.F.1
Valves_5a_BF-T-SL_RCVs	V.F.2
Valves_5b_BF-T-Reg pilots	V.F.2
Valves_5c_BF-T-chk valves	V.F.2
Valves_6_small meters	V.F.3
Valves_7-base SCADA system exp	V.F.4
Valves_8 -SDGE radio system	V.F.5
Valves_9 SCG radio stystem	V.F.5

WORKPAPER TITLE	FERC ACCT.
SDG&E Transmission Valves Capital (Valves_Cap_SDGE_Trans)	367
WITNESS	**IN SERVICE DATE**
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.3	0.3	0.3	0.3	1.1	1.5	2.6
DIRECT NON-LABOR	1.8	1.8	2.0	2.0	7.6	10.6	18.2
TOTAL DIRECT CAPITAL	2.0	2.0	2.3	2.3	8.6	12.1	20.8

Project Description

This workpaper provides a summary of all Valve Enhancement Plan capital costs allocated to SDGE Transmission FERC account 367. This is a transmission account.

Forecast Methodology

Each of the eight SDGE capital elements represented by Workpapers prefixed with "Valve_1.." thru "Valve_9..." provide the basic cost information and Company and FERC allocations for the eight major SDG&E elements associated with this Plan. Allocations below are the summation of each of the lines denoted with "SDGE -Trans" in the column entitled "Capital" in Table 6 of those respective Workpapers. Table 6 totals for "SDGE Trans" for Labor and Non-Labor in each Plan Year are shown below and added to arrive at the Plan Totals shown.

WORKPAPER TITLE	FERC ACCT.
SDG&E Transmission Valves Capital (Valves_Cap_SDGE_Trans)	367
WITNESS	**IN SERVICE DATE**
Joseph Rivera	

Table B

Cost Allocation to Company and FERC Capital

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK	`						**19.32**
DIRECT LABOR	0.25	0.25	0.25	0.25	1.00	1.51	2.51
DIRECT NON-LABOR	1.68	1.68	1.68	1.68	6.72	10.08	16.81
94 ASV TO RCV							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
COMM TO 100 ASVs							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
20 LARGE METER SITES							**0.91**
DIRECT LABOR	0.01	0.01	0.01	0.01	0.02	0.03	0.05
DIRECT NON-LABOR	0.09	0.09	0.09	0.09	0.34	0.51	0.86
120 BACKFLOW PREV SITES (three elements)							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
40 TAP METERS							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCADA SYSTEM EXPANSION							**0.55**
DIRECT LABOR	-	-	0.03	0.03	0.06	-	0.06
DIRECT NON-LABOR	-	-	0.25	0.25	0.49	-	0.49
SDGE RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCG RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
PLAN TOTALS-CAPITAL							**20.78**
DIRECT LABOR	0.26	0.26	0.29	0.29	1.08	1.54	2.62
DIRECT NON-LABOR	1.77	1.77	2.01	2.01	7.56	10.60	18.16

CAPITAL WORKPAPER

WORKPAPER TITLE	FERC ACCT.
SDG&E Distribution Valves Capital (Valves_Cap_SDGE_Dist)	376
WITNESS	**IN SERVICE DATE**
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.5	0.7	0.7	0.7	2.6	3.5	6.2
DIRECT NON-LABOR	2.8	3.7	4.1	4.1	14.7	18.9	33.6
TOTAL DIRECT CAPITAL	3.3	4.3	4.8	4.8	17.3	22.4	39.7

Project Description

This workpaper provides a summary of all Valve Enhancement Plan capital costs allocated to SDGE Distribution FERC account 376. This is a distribution account.

Forecast Methodology

Each of the nine SDGE capital elements represented by Workpapers with the prefix range "Valve_1.." thru "Valve_9..." provide the basic cost information and Company and FERC allocations for the six major elements associated with this Plan under SDG&E Distribution. Allocations below are the summation of each of the lines denoted with "SDGE -Dist" in the column entitled "Capital" in Table 6 of those respective Workpapers. Table 6 totals for "SDGE Dist" for Labor and Non-Labor in each Plan Year are shown below and added to arrive at the Plan Totals shown.

WORKPAPER TITLE	FERC ACCT.
SDG&E Distribution Valves Capital (Valves_Cap_SDGE_Dist)	376
WITNESS	**IN SERVICE DATE**
Joseph Rivera	

Table B

Cost Allocation to Company and FERC Capital

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**32.66**
DIRECT LABOR	0.5	0.5	0.5	0.5	2.1	3.1	5.225
DIRECT NON-LABOR	2.7	2.7	2.7	2.7	11.0	16.5	27.434
94 ASV TO RCV							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
COMM TO 100 ASVs							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
20 LARGE METER SITES							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
120 BACKFLOW PREV SITES (three elements)							**3.41**
DIRECT LABOR	0.0	0.0	0.1	0.1	0.1	0.3	0.470
DIRECT NON-LABOR	0.0	0.0	0.4	0.4	0.8	2.1	2.941
40 TAP METERS							**0.59**
DIRECT LABOR	-	-	0.0	0.0	0.0	0.0	0.081
DIRECT NON-LABOR	-	-	0.1	0.1	0.2	0.3	0.513
SCADA SYSTEM EXPANSION							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SDGE RADIO SYSTEM EXP							**3.07**
DIRECT LABOR	-	0.1	0.1	0.1	0.4	-	0.391
DIRECT NON-LABOR	-	0.9	0.9	0.9	2.7	-	2.683
SCG RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
PLAN TOTALS-CAPITAL							**39.74**
DIRECT LABOR	0.5	0.7	0.7	0.7	2.6	3.5	6.167
DIRECT NON-LABOR	2.8	3.7	4.1	4.1	14.7	18.9	33.570

WORKPAPER TITLE	FERC ACCT.
Summary of Valve Plan O&M - SoCalGas (Valves_O&M_Summary_SOCALGAS)	859.1/874.4
WITNESS: Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.0	0.1	0.5	0.6	1.2	4.3	5.5
DIRECT NON-LABOR	0.1	0.1	0.2	0.3	0.7	7.5	8.2
TOTAL DIRECT O&M	0.1	0.2	0.7	0.9	1.9	11.7	13.7

Project Description

This Workpaper provides a summary of the cost to operate and maintain all SoCalGas assets associated with the Valve Enhancement Plan descibed in PSEP Testimony Chapter V, Sections E and F. The Valve Enhancement Plan contains 10 SoCalGas major capital addition elements (see Table B below) which require companion O&M activity and related expenses. The associated O&M costs for each of these elements are summarized below and described/presented in full detail in workpapers prefixed "Valves_1..." thru Valved_9.." in this workpaper grouping. Sub-Table B.1 provides the full and corresponding workpaper name under the heading "Associated Detailed Work Paper." Those workpapers include details on the basic assumptions, costs, and required scope of O&M work performed each year for each element. Tables 5 and 6 in those papers detail O&M costs by year for each Element, with Table 6 in each workpaper providing the detail of O&M cost allocated to each company. O&M expenses at the bottom of each Table 6 in those workpapers show the element O&M requirements for SoCalGas in each Plan year, by labor, non-labor and further broken down by distribution (FERC 874.4) and transmission (FERC 859.1) allocation. Compiled extracts of those summaries are presented in Table B below and are added to compute the total O&M Plan totals shown at the bottom of Table B. Maintenance costs for the Valve Enhancement Plan includes routine maintenance on a progressive number of control valves, meters, pressure monitors, SCADA equipment and Radios as the Plan moves through a 10 year timeframe. Field personnel to maintain this equipment and to operate expanded SCADA and radio systems provide the majority of labor costs. Non-Labor cost are incurred for commercial telecommunications, electric power consumables as detailed in each of the referenced workpapers, with the O&M detail by installed unit provided in Table 4 of those workpapers.

Forecast Methodology - Summmary

Table C provides an overview of how Plan Element costs O&M were assigned to the two companies and to Distribution or Transmission FERC accounts. Resulting SoCalGas cost allocations to Distribution and Transmission are presented in two additional O&M Work Papers sub-titled as follows: "Valves_O&M_SCG_Trans" and "Valves_O&M_SCG_Dist".

WORKPAPER TITLE	FERC ACCT.
Summary of Valve Plan O&M - SoCalGas (Valves_O&M_Summary_SOCALGAS)	859.1/874.4
WITNESS	
Joseph Rivera	

Table B

VALVE ENHANCEMENT PLAN O&M COSTS ($ Millions) BY ELEMENT (SOCALGAS)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**1.3**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.1	0.4	0.5
DIRECT NON-LABOR	0.1	0.1	0.1	0.1	0.2	0.5	0.8
94 ASV TO RCV							**0.4**
DIRECT LABOR	-	0.0	0.0	0.0	0.0	0.2	0.2
DIRECT NON-LABOR	-	0.0	0.0	0.0	0.0	0.2	0.2
COMM TO 100 ASVs							**0.1**
DIRECT LABOR	-	-	0.0	0.0	0.0	0.1	0.1
DIRECT NON-LABOR	-	-	0.0	0.0	0.0	0.0	0.0
20 LARGE METER SITES							**0.1**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.0	0.0	0.1
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120 BACKFLOW PREV SITES (three elements)							**0.2**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.0	0.1	0.2
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.0	0.1	0.1
40 TAP METERS							**0.1**
DIRECT LABOR	-	-	0.0	0.0	0.0	0.1	0.1
DIRECT NON-LABOR	-	-	0.0	0.0	0.0	0.0	0.0
SCADA SYSTEM EXPANSION							**6.4**
DIRECT LABOR	-	0.0	0.5	0.5	1.0	2.8	3.8
DIRECT NON-LABOR	-	0.1	0.1	0.2	0.3	2.2	2.5
SDGE RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCG RADIO SYSTEM EXP							**5.0**
DIRECT LABOR	-	-	-	0.1	0.1	0.4	0.5
DIRECT NON-LABOR	-	-	0.0	0.1	0.1	4.4	4.5
PLAN TOTALS-O&M							**13.7**
DIRECT LABOR	0.0	0.1	0.5	0.6	1.2	4.3	5.5
DIRECT NON-LABOR	0.1	0.1	0.2	0.3	0.7	7.5	8.2

Table B.1

Associated Detailed Work Paper Table 6 Ref.	Testimony Ref
Valves_1a_SDGE_Base Valves	V.E
Valves_1b_SCG Base Valves	
Valves_2_SCG ASV-to-RCV	V.E
Valves_3_SCG LB comm	V.E
Valves-4 large meter sta	V.F.1
Valves_5a_BF-T-SL_RCVs	V.F.2
Valves_5b_BF-T-Reg pilots	V.F.2
Valves_5c_BF-T-chk valves	V.F.2
Valves_6_small meters	V.F.3
Valves_7-base SCADA system exp	V.F.4
Valves_8 -SDGE radio system	V.F.5
Valves_9 SCG radio stystem	V.F.5

The assumptions and/or detailed tables, where applicable, which are used to compute the Table C allocations are provided in Work Papers prefixed "Valves_1..." to "Valves_9..." under Table 7 or Table 7a in each worksheet. These same factors were used to compute the O&M allocated to SoCalGas in the respective workpaper entries under Table 6.

WORKPAPER TITLE	FERC ACCT.
Summary of Valve Plan O&M - SoCalGas (Valves_O&M_Summary_SOCALGAS)	859.1/874.4
WITNESS	
Joseph Rivera	

Table C
Summary of O&M Allocation Company and FERC Designation

(Allocations are not the same as capital allocations for all elements)

	Company Split %	% FERC 375	% FERC 367	Allocation Method Summary
BASE VALVE WORK				
SDGE	0.216887			Actual Plan O&M cost as computed in Workpaper WP Valve_1a_SDGE. The ratio of this cost as a percent of the combined valve count for both companies is shown.
SoCalGas	0.783113			Actual Plan O&M cost as computed in Workpaper WP Valve_1b_SCG. The ratio of this cost as a percent of the combined valve count for both companies is shown
Dist		0.201274		Actual valve count and required work estimated and applied based on pipeline designation - Dist or Trans =Dist$/(Trans$+Dist$) See Valves_1 Worksheet
Trans			0.798726	Actual valve count and required work estimated and applied based on pipeline designation - Dist or Trans =Trans$/(Trans$+Dist$) See Valves_1 Worksheet
94 ASV TO RCV				
SDGE	0			No conversions targeted for SDG&E.
SoCalGas	100			All work on SoCalGas Transmission Facilties only
Dist		0		100% transmission - No existing ASVs on distribution pipelines.
Trans			100	100% transmission
COMM TO 100 ASVs				
SDGE	0			All work on SoCalGas Transmission Facilties only-no SDGE Work
SoCalGas	100			All work on SoCalGas Transmission Facilties only
Dist		0		n/a
Trans			100	100% transmission
20 LARGE METER SITES				
SDGE	15%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		0%		n/a
Trans			100%	100% transmission
120 BACKFLOW PREV SITES				
SDGE	15%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		100% Distribution
Trans			0	n/a
40 TAP METERS				
SDGE	15%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		100% Distribution
Trans			0	n/a
SCADA SYSTEM EXP				
SDGE	15%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		n/a
Trans			0%	SCADA Systsem singualrly operates transmission assets
SDGE RADIO SYSTEM EXP				
SDGE	100%			SDGE Radio System allocated only to SDGE as a 100% distribution asset.
SoCalGas	0%			All SDGE System
Dist		100%		Benefits all customers and supports many corporate functions, including Smart metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Trans			0%	n/a
SCG RADIO SYSTEM EXP				
SDGE	0%			N/A
SoCalGas	100%			SCG Radio System allocated only to SCG as a 100% distribution asset. Benefits all customers and supports many corporate functions, including AMI metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Dist		100%		100%: Benefits all customers and supports many corporate functions, including Smart metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Trans			0%	0%

OPERATIONS AND MAINTENANCE WORKPAPER

WORKPAPER TITLE	FERC ACCT.
SoCalGas Transmission Valves O&M (Valves_O&M_SCG_Trans)	859.1
WITNESS	
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.0	0.1	0.5	0.5	1.1	3.6	4.7
DIRECT NON-LABOR	0.1	0.1	0.2	0.3	0.6	2.9	3.5
TOTAL DIRECT O&M	0.1	0.2	0.7	0.8	1.7	6.5	8.3

Project Description

This workpaper provides a summary of all Valve Enhancement Plan O&M allocated to SoCalGas Transmission FERC account 859.1.

Forecast Methodology

Each of the ten SoCalGas O&M elements represented by Workpapers prefixed with "Valve_1." thru "Valve_9..." provide the basic cost information and Company and FERC O&M allocations associated with this Plan. Allocations below are the summation of each of the lines denoted with "SCG -Trans" in the column entitled "O&M" in Table 6 of those respective Workpapers. Table 6 totals for "SCG Trans" for Labor and Non-Labor in each Plan Year are shown below and added to arrive at the Plan Totals shown for SoCalGas FERC 859.1.

WORKPAPER TITLE	FERC ACCT.
SoCalGas Transmission Valves O&M (Valves_O&M_SCG_Trans)	859.1
WITNESS	
Joseph Rivera	

Table B

VALVE ENHANCEMENT PLAN O&M COSTS ($ Millions) BY ELEMENT (SOCALGAS)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**1.2**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.1	0.4	0.5
DIRECT NON-LABOR	0.1	0.1	0.1	0.1	0.2	0.5	0.7
94 ASV TO RCV							**0.4**
DIRECT LABOR	-	0.0	0.0	0.0	0.0	0.2	0.2
DIRECT NON-LABOR	-	0.0	0.0	0.0	0.0	0.2	0.2
COMM TO 100 ASVs							**0.1**
DIRECT LABOR	-	-	0.0	0.0	0.0	0.1	0.1
DIRECT NON-LABOR	-	-	0.0	0.0	0.0	0.0	0.0
20 LARGE METER SITES							**0.1**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.0	0.0	0.1
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120 BACKFLOW PREV SITES (three elements)							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
40 TAP METERS							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCADA SYSTEM EXPANSION							**6.4**
DIRECT LABOR	-	0.0	0.5	0.5	1.0	2.8	3.8
DIRECT NON-LABOR	-	0.1	0.1	0.2	0.3	2.2	2.5
SDGE RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCG RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
PLAN TOTALS-O&M							**8.3**
DIRECT LABOR	0.0	0.1	0.5	0.5	1.1	3.6	4.7
DIRECT NON-LABOR	0.1	0.1	0.2	0.3	0.6	2.9	3.5

OPERATIONS AND MAINTENANCE WORKPAPER

WORKPAPER TITLE	FERC ACCT.
SoCalGas Distribution Valves O&M (Valves_O&M_SCG_Dist)	874.4
WITNESS	
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.0	0.0	0.0	0.1	0.1	0.7	0.8
DIRECT NON-LABOR	0.0	0.0	0.0	0.1	0.1	4.6	4.7
TOTAL DIRECT O&M	0.0	0.0	0.0	0.2	0.2	5.2	5.4

Project Description

This workpaper provides a summary of all Valve Enhancement Plan capital costs allocated to SoCalGas Distribution FERC account 874.4.

Forecast Methodology

Each of the ten SoCalGas O&M elements represented by Workpapers prefixed with "Valve_1." thru "Valve_9..." provide the basic cost information and Company and FERC O&M allocations associated with this Plan. Allocations below are the summation of each of the lines denoted with "SCG -Dist" in the column entitled "O&M" in Table 6 of those respective Workpapers. Table 6 totals for "SCG-Dist" for Labor and Non-Labor in each Plan Year are shown below and added to arrive at the Plan Totals shown.

WORKPAPER TITLE	FERC ACCT.
SoCalGas Distribution Valves O&M (Valves_O&M_SCG_Dist)	874.4
WITNESS	
Joseph Rivera	

Table B

VALVE ENHANCEMENT PLAN O&M COSTS ($ Millions) BY ELEMENT (SOCALGAS)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**0.033**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
94 ASV TO RCV							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
COMM TO 100 ASVs							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
20 LARGE METER SITES							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
120 BACKFLOW PREV SITES (three elements)							**0.2**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.0	0.1	0.2
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.0	0.1	0.1
40 TAP METERS							**0.1**
DIRECT LABOR	-	-	0.0	0.0	0.0	0.1	0.1
DIRECT NON-LABOR	-	-	0.0	0.0	0.0	0.0	0.0
SCADA SYSTEM EXPANSION							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SDGE RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCG RADIO SYSTEM EXP							**5.0**
DIRECT LABOR	-	-	-	0.1	0.1	0.4	0.5
DIRECT NON-LABOR	-	-	0.0	0.1	0.1	4.4	4.5
PLAN TOTALS-O&M							**5.4**
DIRECT LABOR	0.0	0.0	0.0	0.1	0.1	0.7	0.8
DIRECT NON-LABOR	0.0	0.0	0.0	0.1	0.1	4.6	4.7

WORKPAPER TITLE	FERC ACCT.
Summary of Valves O&M SDGE (Valves_O&M_Summary SDGE)	859.1/874.4
WITNESS	
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.00	0.05	0.17	0.18	0.41	1.14	1.55
DIRECT NON-LABOR	0.01	0.05	0.08	0.09	0.23	0.66	0.89
TOTAL DIRECT O&M	0.02	0.10	0.25	0.27	0.64	1.80	2.44

Project Description

This Workpaper provides a summary of the cost to operate and maintain all SDG&E assets associated with the Valve Enhancement Plan descibed in PSEP Testimony Chapter V, Sections E and F. The Valve Enhancement Plan contains eight SDG&E major capital addition elements (see Table B below) which require companion O&M activity and related expenses. The associated O&M costs for each of these elements are summarized below and described/presented in full detail in workpapers prefixed "Valves_1..." thru Valved_9.." in this workpaper grouping. Sub-Table B.1 provides the full and corresponding workpaper name under the heading "Associated Detailed Work Paper." Those workpapers include details on the basic assumptions, costs, and required scope of O&M work performed each year for each element. Tables 5 and 6 in those papers detail O&M costs by year for each Element, with Table 6 in each workpaper providing the detailed O&M cost allocated to each company. O&M expenses at the bottom of each Table 6 in those workpapers show the element O&M requirements for SDG&E in each Plan year, by labor, non-labor and further broken down by distribution (FERC 874.4) and transmission (FERC 859.1) allocation. Compiled extracts of those summaries are presented in Table B below and are added to compute the total O&M Plan totals shown at the bottom of Table B. Maintenance costs for the Valve Enhancement Plan includes routine maintenance on a progressive number of control valves, meters, pressure monitors, SCADA equipment and Radios as the Plan moves through Phase 1A and 1B. Field personnel to maintain this equipment and to operate expanded SCADA and radio systems provide the majority of labor costs. Non-Labor cost are incurred for commercial telecommunications, electric power consumables as detailed in each of the referenced workpapers, with the O&M detail by installed unit provided in Table 4 of those workpapers. Note: not all Plan elements contain cost in both Distribution and Transmission designations nor for each company, as is shown by null entries in the table below.

Forecast Methodology - Summmary

Table C provides an overview of how Plan Element costs O&M were assigned to the two companies and to Distribution or Transmission FERC accounts. Resulting SDG&E cost allocations to Distribution and Transmission are presented in two additional O&M Work Papers sub-titled as follows: "Valves_O&M_SDGE_Trans" and "Valves_O&M_SDGE_Dist".

WORKPAPER TITLE	FERC ACCT.
Summary of Valves O&M SDGE (Valves_O&M_Summary SDGE)	859.1/874.4
WITNESS	
Joseph Rivera	

Table B

VALVE ENHANCEMENT PLAN O&M COSTS ($ Millions) BY ELEMENT (SDG&E)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**0.355**
DIRECT LABOR	0.00	0.01	0.01	0.01	0.03	0.12	0.15
DIRECT NON-LABOR	0.01	0.02	0.02	0.02	0.07	0.14	0.21
94 ASV TO RCV							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
COMM TO 100 ASVs							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
20 LARGE METER SITES							**0.02**
DIRECT LABOR	0.00	0.00	0.00	0.00	0.00	0.01	0.01
DIRECT NON-LABOR	0.00	0.00	0.00	0.00	0.00	0.01	0.01
120 BACKFLOW PREV SITES (three elements)							**0.04**
DIRECT LABOR	0.00	0.00	0.00	0.00	0.00	0.02	0.03
DIRECT NON-LABOR	0.00	0.00	0.00	0.00	0.00	0.01	0.01
40 TAP METERS							**0.02**
DIRECT LABOR	-	-	0.00	0.00	0.00	0.01	0.02
DIRECT NON-LABOR	-	-	0.00	0.00	0.00	0.01	0.01
SCADA SYSTEM EXPANSION							**1.09**
DIRECT LABOR	-	0.01	0.08	0.08	0.17	0.49	0.66
DIRECT NON-LABOR	-	0.01	0.02	0.03	0.06	0.38	0.43
SDGE RADIO SYSTEM EXP							**0.92**
DIRECT LABOR	-	0.04	0.08	0.08	0.20	0.49	0.69
DIRECT NON-LABOR	-	0.02	0.04	0.04	0.11	0.12	0.22
SCG RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
PLAN TOTALS-O&M							**2.44**
DIRECT LABOR	0.00	0.05	0.17	0.18	0.41	1.14	1.55
DIRECT NON-LABOR	0.01	0.05	0.08	0.09	0.23	0.66	0.89

Table B.1

Associated Detailed Work Paper Table 6 Ref.	Testimony Ref
Valves_1a_SDGE_Base Valves	V.E
Valves_1b_SCG Base Valves	
Valves_2_SCG ASV-to-RCV	V.E
Valves_3_SCG LB comm	V.E
Valves-4 large meter sta	V.F.1
Valves_5a_BF-T-SL_RCVs	V.F.2
Valves_5b_BF-T-Reg pilots	V.F.2
Valves_5c_BF-T-chk valves	V.F.2
Valves_6_small meters	V.F.3
Valves_7-base SCADA system exp	V.F.4
Valves_8 -SDGE radio system	V.F.5
Valves_9 SCG radio stystem	V.F.5

The assumptions and/or detailed tables, where applicable, which are used to compute the Table C allocations are provided in Work Papers prefixed "Valves_1..." to "Valves_9..." under Table 7 or Table 7a in each worksheet. These same factors were used to compute the O&M allocated to SDG&E in the respective workpaper entries under Table 6.

WORKPAPER TITLE	FERC ACCT.
Summary of Valves O&M SDGE (Valves_O&M_Summary SDGE)	859.1/874.4
WITNESS	
Joseph Rivera	

Table C
Summary of Company and Operating Classification/FERC Designation

(Allocations are not the same as capital allocations for each element)

	Company Split %	% FERC 376	% FERC 367	Allocation Method Summary
BASE VALVE WORK				
SDGE	0.216887			Actual Plan O&M cost as computed in Workpaper WP Valve_1a_SDGE. The ratio of this cost as a percent of the combined valve count for both companies is shown.
SoCalGas	0.783113			Actual Plan O&M cost as computed in Workpaper WP Valve_1b_SCG. The ratio of this cost as a percent of the combined valve count for both companies is shown
Dist		0.201274		Actual valve count and required work estimated and applied based on pipeline designation - Dist or Trans =Dist$/(Trans$+Dist$) See Valves_1 Worksheet
Trans			0.798726	Actual valve count and required work estimated and applied based on pipeline designation - Dist or Trans =Trans$/(Trans$+Dist$) See Valves_1 Worksheet
94 ASV TO RCV				
SDGE	0			No conversions targeted for SDG&E.
SoCalGas	100			All work on SoCalGas Transmission Facilties only
Dist		0		100% transmission - No existing ASVs on distribution pipelines.
Trans			100	100% transmission
COMM TO 100 ASVs				
SDGE	0			All work on SoCalGas Transmission Facilties only-no SDGE Work
SoCalGas	100			All work on SoCalGas Transmission Facilties only
Dist		0		n/a
Trans			100	100% transmission
20 LARGE METER SITES				
SDGE	15%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		0%		n/a
Trans			100%	100% transmission
120 BACKFLOW PREV SITES (three elements)				
SDGE	15%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		100% Distribution
Trans			0	n/a
40 TAP METERS				
SDGE	15%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		100% Distribution
Trans			0	n/a
SCADA SYSTEM EXP				
SDGE	15%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
SoCalGas	85%			Ratio of DOT post 1950 transmission pipeline miles in valve plan (12" and greater)
Dist		100%		n/a
Trans			0%	SCADA Systsem singualrly operates transmission assets
SDGE RADIO SYSTEM EXP				
SDGE	100%			SDGE Radio System allocated only to SDGE as a 100% distribution asset.
SoCalGas	0%			All SDGE System
Dist		100%		Benefits all customers and supports many corporate functions, including Smart metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Trans			0%	n/a
SCG RADIO SYSTEM EXP				
SDGE	0%			N/A
SoCalGas	100%			SCG Radio System allocated only to SCG as a 100% distribution asset. Benefits all customers and supports many corporate functions, including AMI metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Dist		100%		100%: Benefits all customers and supports many corporate functions, including Smart metering and the Pipeline Infrastructure Monitoring Program presented in Chapter VI.
Trans			0%	0%

WORKPAPER TITLE	FERC ACCT.
SDG&E Transmission Valves O&M (Valves_O&M_SDGE_Trans)	859.1
WITNESS	
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.0	0.0	0.1	0.1	0.2	0.5	0.730
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.1	0.4	0.532
TOTAL DIRECT O&M	0.0	0.0	0.1	0.1	0.3	1.0	1.262

Project Description

This workpaper provides a summary of all Valve Enhancement Plan O&M costs allocated to SDG&E Transmission FERC account 859.1.

Forecast Methodology

Workpapers prefixed with "Valve_1.." thru "Valve_9..." in this workpaper grouping provide the basic cost information and Company and FERC allocations for the eight major SDG&E elements associated with this Plan. O&M allocations below are the summation of each of the lines denoted with "SDGE -Trans" in the column entitled "O&M" in the bottom half of Table 6 of those respective Workpapers. Table 6 totals for "SDGE Trans" for Labor and Non-Labor in each Plan Year are shown below and added to arrive at the Plan Totals. Note: not all Plan elements contain cost in both Distribution and Transmission designations nor for each company, as is shown by null entries in the table below.

WORKPAPER TITLE	FERC ACCT.
SDG&E Transmission Valves O&M (Valves_O&M_SDGE_Trans)	859.1
WITNESS	
Joseph Rivera	

Table B

VALVE ENHANCEMENT PLAN O&M COSTS ($ Millions) BY ELEMENT (SDG&E)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK							**0.154544**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.0	0.1	0.064
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.0	0.1	0.091
94 ASV TO RCV							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
COMM TO 100 ASVs							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
20 LARGE METER SITES							**0.015901**
DIRECT LABOR	0.0	0.0	0.0	0.0	0.0	0.0	0.009
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.0	0.0	0.007
120 BACKFLOW PREV SITES (three elements)							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
40 TAP METERS							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCADA SYSTEM EXPANSION							**1.091639**
DIRECT LABOR	-	0.0	0.1	0.1	0.2	0.5	0.658
DIRECT NON-LABOR	-	0.0	0.0	0.0	0.1	0.4	0.434
SDGE RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SCG RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
PLAN TOTALS-O&M							**1.262084**
DIRECT LABOR	0.0	0.0	0.1	0.1	0.2	0.5	0.730
DIRECT NON-LABOR	0.0	0.0	0.0	0.0	0.1	0.4	0.532

OPERATIONS AND MAINTENANCE WORKPAPER

WORKPAPER TITLE	FERC ACCT.
SDG&E Distribution Valves O&M (Valves_O&M_SDGE_Dist)	874.4
WITNESS	
Joseph Rivera	

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
DIRECT LABOR	0.00	0.04	0.09	0.09	0.22	0.60	0.82
DIRECT NON-LABOR	0.01	0.03	0.05	0.05	0.15	0.22	0.36
TOTAL DIRECT O&M	0.01	0.07	0.14	0.14	0.37	0.81	1.18

Project Description

This workpaper provides a summary of all Valve Enhancement Plan O&M costs allocated to SDGE Distribution FERC account 874.4.

Forecast Methodology

Workpapers prefixed with "Valve_1.." thru "Valve_9..." in this workpaper grouping provide the basic cost information and Company and FERC allocations for the eight major SDG&E elements associated with this Plan. O&M allocations below are the summation of each of the lines denoted with "SDGE -Dist" in the column entitled "O&M" in the bottom half of Table 6 of those respective Workpapers. Table 6 totals for "SDGE Dist" for Labor and Non-Labor in each Plan Year are shown below and added to arrive at the Plan Totals. Note: not all Plan elements contain cost in both Distribution and Transmission designations nor for each company, as is shown by null entries in the table below.

WORKPAPER TITLE	FERC ACCT.
SDG&E Distribution Valves O&M (Valves_O&M_SDGE_Dist)	874.4
WITNESS	
Joseph Rivera	

Table B

VALVE ENHANCEMENT PLAN O&M COSTS ($ Millions) BY ELEMENT (SDG&E)

PROJECT COST ($000,000 IN 2011$)	2012	2013	2014	2015	2012-2015	2016-2021	Total
BASE VALVE WORK (66)							**0.201**
DIRECT LABOR	0.002	0.003	0.005	0.006	0.015	0.068	0.083
DIRECT NON-LABOR	0.008	0.009	0.010	0.011	0.037	0.081	0.118
94 ASV TO RCV							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
COMM TO 100 ASVs							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
20 LARGE METER SITES							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
120 BACKFLOW PREV SITES							**0.042**
DIRECT LABOR	0.000	0.000	0.001	0.002	0.003	0.025	0.027
DIRECT NON-LABOR	0.000	0.000	0.000	0.001	0.001	0.013	0.015
40 TAP METERS							**0.023**
DIRECT LABOR	-	-	0.001	0.001	0.002	0.015	0.016
DIRECT NON-LABOR	-	-	0.000	0.000	0.001	0.006	0.007
SCADA SYSTEM EXPANSION							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
SDGE RADIO SYSTEM EXP							**0.915**
DIRECT LABOR	-	0.041	0.081	0.081	0.204	0.488	0.692
DIRECT NON-LABOR	-	0.022	0.043	0.041	0.106	0.117	0.223
SCG RADIO SYSTEM EXP							**-**
DIRECT LABOR	-	-	-	-	-	-	-
DIRECT NON-LABOR	-	-	-	-	-	-	-
PLAN TOTALS-O&M							**1.181**
DIRECT LABOR	0.002	0.044	0.087	0.090	0.223	0.595	0.818
DIRECT NON-LABOR	0.008	0.031	0.054	0.053	0.145	0.217	0.363

Workpaper Title: Valves_1a-SDGE Base Valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1a_SDGE-Base valves

Plan Element Description:	SDG&E Base Valve RCV/ASV Modification and Installations.									
Element Purpose:	Modify or replace valves to add ASV and RCV functionality in DOT Pipeline Isolation Sections. Enable isolation and depressurization of pipeline within 45 minutes from rupture under RCV mode, less under ASV operations.									
Element Scope of Installation:	Upfit or replace 66 manual valves of various size and configurations to be made ASV and RCV capable. Replace all reduced port valves to support pigging operations as part of work, where such work has not already been planned and funded elsewhere. All valves to be equipped with ASV and RCV funtionality, include pressure measurement on both sides of the valve, primary and back-up SCADA communications and voting system for ASV operations. Criteria for creating isolations sections: all pipelines operating at 200 psig or greater and 1) 20" or greater operating at 20% or more of SMYS; and/or 2) all pipelines 12" or larger in diameter operating at 30% or more of SMYS. See Attachment Valves_Cap-2 for details on specific valves in-scope. Note: Backflow prevention valves presented under workpaper "Valves_5a_BF_RCVs" are not included in the cost totals presented nor tallied in this work-paper. There are 40 such valves split between the utilities, with eight projected for SDGE bringing the total Plan count for SDGE valves to 74.									
Unit / Device definition	n/a									
Device Description Model / Mfg.	n/a									
Base Device Cost:	n/a		**field locations**	66						
Communications device:	SCADA comm via radio and commercial data circuits.									

Workpaper Title: Valves_1a-SDGE Base Valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1a_SDGE-Base valves

TABLE 1 **CAPITAL INSTALLATION SCHEDULE (average valve locations completed)**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
units installed	7	7	7	7	7	7	7	7	7	7	66
cumulative	7	13	20	26	33	40	46	53	59	66	

Overview of Basic Assumptions and factors used for capital cost estimations used : Preliminary survey/review of each existing DOT transmission pipeline valve site available to create remote-controlled or automated 8-mile or less isolation sections was performed. This work continues to be refined. Based on preliminary work, 66 valves were identified as required to create isolation sections by modification or replacement with a fully-opening ball valve, actuator, communications, electric power and controls. These valves are detailed in master valve priority list under attachment Valves_Cap-2 and shown graphically in Attachment Valves_Cap-4, Figure b. Valve work totals required by size and configuration are shown in Table 7 below. Each of these identified sites was multiplied by the cost factors in Table 8 to produce the total SDGE valve cost estimates shown in Table 9. Cumulative costs ($52MM) are shown in Table 3 below and have been levelized for a 10-year period. This forecast methodology will allow for procurement, contractor and workforce stability over the Plan period; and allow for some flexibility for work to be re-prioritized based on the schedule of other Plan pipeline work being performed in the vicinity. All valve work to be completed in Phase 1.

note: valve totals contain fractions of a valve because of arithmetic scaling taken for valves in pipe to be replaced. Total reduce by 25% to account for optimized spacing when lines replaced with a net effect of two valves reduced.

Table 2

Unit Capital Cost Table 2 not used for Valves as each valve location individually estimated based on size and scope of work to be performed - see Tables 7-9 below and Attachments Valves_Cap-2 and Valves_Cap-3.

Table 3: Cost Computation Method: Summation of all cost in Table 9, allocated by yearly valve counts as a ratio of total Plan valves shown in Table 1.

Table 3 **Capital Cost by Year - Direct $**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital Cost	$ 5,197,909	$ 5,197,909	$ 5,197,909	$ 5,197,909	$ 5,197,909	$ 5,197,909	$ 5,197,909	$ 5,197,909	$ 5,197,909	$ 5,197,909	**51,979,093**
Labor	$ 675,728	$ 675,728	$ 675,728	$ 675,728	$ 675,728	$ 675,728	$ 675,728	$ 675,728	$ 675,728	$ 675,728	6,757,282
non-labor	$ 4,522,181	$ 4,522,181	$ 4,522,181	$ 4,522,181	$ 4,522,181	$ 4,522,181	$ 4,522,181	$ 4,522,181	$ 4,522,181	$ 4,522,181	45,221,811

Workpaper Title: Valves_1a-SDGE Base Valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1a_SDGE-Base valves

Overview of basic assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5. Table 4 below is a zero-based estimate for valve O&M work for a complex station which provides RCV/ASV and overpressure protection with dual communications and pressure reads. Costs include annual calibrations of electronic equipment, vault inspections, lubrication, testing and allowance for troubleshooting and unscheduled maintenance, as experienced by the Utilities on similar assets. Maintenance costs include year-1 inspections, training and maintenance data systems modifications post-construction, which will be handled under O&M. The unit labor and non-labor totals shown in Table 4 are multiplied by the cumulative valve counts in Table 1 for each year to derive the annual maintenance costs.

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.** (Cost to maintain one unit each year)

O&M/$per unit/yr	Rates/hrs or qnty.	hours or qnty.	Sub total	Assumptions/notes on line item
Union labor - troubleshoot/rep	$ 44.13	8	$ 353.04	sr inst tech
Mgmt Labor -prog mgmt	$ 52.88	2	$ 105.77	tech, Gas Control and IT support staff and prg management
Union labor - routine maint	$ 44.13	8	$ 353.04	calibrate 2 PTs, PLC linebreak control, comm, power/UPS check, stroke check
Non-labor	$ 200.00	1	$ 200.00	misc materials, travel and incidentals, 10 year minor electronics refresh, consumables.
Location Fee	$ -	0	$ -	
electric power	$ 20.00	12	$ 240.00	main mlv site electric power
comm	$ -	0	$ -	included in scada costs
Other 2	$ -	0		
TOTAL			$ 1,251.85	
			$ 811.85	labor
			$ 440.00	non-labor

Workpaper Title: Valves_1a-SDGE Base Valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_1a_SDGE-Base valves

Table 5 Cost Computation Method: Table 4 unit operating cost (labor and Non-labor) multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 **Operating and Maintenance Cost by Year - Direct ($1000s)**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Total	**17,069**	**21,169**	**25,268**	**29,368**	**33,468**	**37,568**	**41,668**	**45,767**	**49,867**	**53,967**	**355,179**
Labor	2,659	5,318	7,976	10,635	13,294	15,953	18,612	21,270	23,929	26,588	$ 146,234
Non-labor	14,410	15,851	17,292	18,733	20,174	21,615	23,056	24,497	25,938	27,379	$ 208,945

Summary of Cost Allocation Method/Rationale

Method: Capital cost are assigned to Distribution where valves are located on SDG&E distribution designated pipelines. Similar allocation made for Transmission pipeline valves. Table 9a shows the Distribution and Transmission allocated costs computed from Table 9. These values are apportioned by year in Table 6 below based on % of total valve work performed in a year as shown in Table 1. FERC accounts are as follows: Distribution Capital-376, Transmission Capital-367, Distribution O&M - 874.4, Transmission O&M-859.1. Labor cost allocated at 16% of total valve work for smaller distribution valves and 13% for larger transmission valves.

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year Capital	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	251,159	251,159	251,159	251,159	251,159	251,159	251,159	251,159	251,159	251,159	**2,511,589**
SDGE trans Non-labor	1,680,833	1,680,833	1,680,833	1,680,833	1,680,833	1,680,833	1,680,833	1,680,833	1,680,833	1,680,833	**16,808,327**
SDGE Dist - Lab	522,547	522,547	522,547	522,547	522,547	522,547	522,547	522,547	522,547	522,547	**5,225,468**
SDGE Dist - non lab	2,743,371	2,743,371	2,743,371	2,743,371	2,743,371	2,743,371	2,743,371	2,743,371	2,743,371	2,743,371	**27,433,709**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	**-**
Total Plan	**5,197,909**	**5,197,909**	**5,197,909**	**5,197,909**	**5,197,909**	**5,197,909**	**5,197,909**	**5,197,909**	**5,197,909**	**5,197,909**	**51,979,093**

Year O&M	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	1,157	2,314	3,471	4,628	5,784	6,941	8,098	9,255	10,412	11,569	**63,629**
SDGE trans Non-labor	6,270	6,897	7,524	8,151	8,778	9,405	10,032	10,659	11,286	11,913	**90,915**
SDGE Dist - Lab	1,502	3,004	4,506	6,008	7,510	9,012	10,513	12,015	13,517	15,019	**82,606**
SDGE Dist - non lab	8,140	8,954	9,768	10,582	11,396	12,210	13,024	13,838	14,652	15,466	**118,030**
SCG Trans - Lab											
SCG Trans non-lab											
SCG Dist lab											
SCG Dist non-lab											
Total Plan											**355,179**

Workpaper Title: Valves_1a-SDGE Base Valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1a_SDGE-Base valves

Table 7 below contains a summary of all SDG&E valve counts and the required scope of work to make the existing valves fully-opening ball valves capable of ASV and RCV operation and capable of providing pressure control into isolation section of pipelines greater than 12" as defined by criteria set forth in the Valve Enhancement Plan Section V.E. Numbers and configurations are based on preliminary review of existing system valves. These valve counts are multiplied by the estimated unit cost as shown in Table 8, which represents the cost to perform one valve alteration or replacement, as-described, to provide the RCV/ASV functionality required. The resulting cost for all work is shown in Table 9. Distribution pipeline (as of this writing) valves are denoted in the Column containing "(Distribution"-Far Right Column). All other valves are on transmission department-operated pipelines. The incorporation of new RCVs may ultimately alter the designation of a pipeline, moving short distribution sections of pipe into the transmission realm to provide operational standardization and uniformity in service processes.

TABLE 7 **Summary of SDGE major valves included in PSEP**

	Add control valve features to Pipe subject to replacement. (Line 1600) transmission.	Add Valves to Branch and short segments (Distribution)	Hazard Short Intervals (New valves cut in in new locations) (Transmission)	ASV Comm Only -costed separately	Other Plug Valve replacements to convert to RCV. (Transmission)	Add RCV to ASV or actuator-costed separately (Transmission)	Base MLVs Add Above Ground Actuator and Controls (Transmission)	Base MLVs Add Actuators/controls in Vault (Transmission)	Retrofit/New valve/actuator controls - above ground act. (Transmission)	Retrofit/New valve/actuator controls - in vault below street. (Transmission)	Totals
12"	0	8	0	0	0	0	0	0	0	0	8
14"	0	0	0	0	0	0	0	0	0	0	0
16"	8	18	0	0	0	0	0	4	0	0	30
18"	0	0	0	0	0	0	0	0	0	0	0
20"	0	7	0	0	0	0	0	4	0	0	11
22"	0	0	0	0	0	0	0	0	0	0	0
24"	0	0	0	0	0	0	8	0	0	0	8
26"	0	0	0	0	0	0	0	0	0	0	0
30"	0	2	0	0	0	0	0	0	0	0	2
34"	0	0	0	0	0	0	0	0	0	0	0
36"	0	2	0	0	0	0	0	5	0	0	7
TOTALS	***8***	***37***	***0***	***0***	***0***	***0***	***8***	***13***	***0***	***0***	***66***

Table 7a

Distribution Valve Total	37	56.49%	of Total Valves for maintenance Allocation
Transmission Valve Total	29	43.51%	of Total Valves for maintenance Allocation

Note: excludes comm to ASVs - 0 SDG&E , 8 Back flow prevention RCVs and ASV to RCV conversion (0-SDG&E)

Workpaper Title: Valves_1a-SDGE Base Valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1a_SDGE-Base valves

Table 8 below is a summary of direct cost to retrofit or replace valves to provide ASV and RCV functionality based on valve size and scope of work to be performed. Details on these cost factors are provided under Attachment Valves_Cap-3

Table 8

Pipe Diameter	Cost of Different Retrofit and New Valve Installation Options ($1000s)						
	unit $- replace old valve with RCV above ground Actuator (A/AG.)	unit $- replace all in old pipe Costs below st actuator ($1000)	unit $ add controls and elect costs ($1000)	Unit $add actuator, cont/elect (above G or ready vault) A/AG	Unit $ add act uator, controls ,elect below street.	add act, elec, controls pnue in ready vault (add AG act plus control col)	Add new valve and controls in pipeline being replaced (excavated)
	Config "C"	Config "D"	Config "E"	Config "F"	Config "G"	Config H	Config "I"
	INSTALLATON COSTS BY TYPE FOR VARYING SIZED VALVES ($1000s)						
12"	762	811	217	281	544	281	691
14"	762	811	217	281	544	281	691
16"	837	923	217	292	647	292	803
18"	837	923	217	292	647	292	803
20"	937	1,008	217	301	710	301	888
22"	937	1,008	217	301	710	301	888
24"	1,017	1,119	217	311	807	311	999
26"	1,097	1,177	217	317	843	317	1,057
30"	1,172	1,288	217	343	957	343	1,168
34"	1,172	1,288	217	343	957	343	1,168
36"	1,301	1,454	217	361	1,076	361	1,334

Workpaper Title: Valves_1a-SDGE Base Valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1a_SDGE-Base valves

Table 9 SDG&E Base Valve Modification Costs ($1000s)

Size	Upfit existing valves with actuator, elecricity, controls, telemetry below street.	Up-fit all ASVs to RCV with electricity and Comm-Costs already included in another tab (Config A).	Replace Plug valves with RCV/ASV FO Ball Valves (50/50 mix Config C and Config D-above and below grade split).	Valves needing actuator and controls retrofit above ground actuator (Config F).	New valves, actuator and controls in old pipe above ground.	Hazard short interval valve cut in new large pipe w/actuator above ground (Config C).	New valves on replaced pipelines discount valve count 25%. Reduce cost for coincident PL work (Config I).	SDGE branch and short length Class 3 sections DISTRIBUTION (Config C).
	VALVE COSTS ($1000s) BY TYPE OF UPGRADE/REPLACEMENT CONFIGURATION BASED ON VALVE COUNTS TABLE 7 AND COST FACTORS IN SDG&E TABLE 8							
12"	-	-	-	-	-	-	-	6,096
14"	-	-	-	-	-	-	-	-
16"	2,589	-	-	-	-	-	6,021	15,061
18"	-	-	-	-	-	-	-	-
20"	2,841	-	-	-	-	-	-	6,558
22"	-	-	-	-	-	-	-	-
24"	-	-	-	2,490	-	-	-	-
26"	-	-	-	-	-	-	-	-
30"	-	-	-	-	-	-	-	2,343
34"	-	-	-	-	-	-	-	-
36"	5,378	-	-	-	-	-	-	2,601
TOTALS	**10,809**	**-**	-	**2,490**	-	-	**6,021**	**32,659**
							19,320	**32,659**
							Trans Total	**Dist Total**

Table 9a

TOTAL SDG&E PLAN ($1000s)		$ 51,979
SDGE Distribution		32,659
SDGE Transmission Total		19,320

Capital Summary	
0.6283137	percent of Capital $ for Distribution Valves
0.3716863	percent of Capital $ for Transmission Valves

Workpaper: Valves_1b_SCG-Base valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1b_SCG-Base valves

Plan Element Description:	SoCalGas Base Valve RCV/ASV Modification and Installations									
Element Purpose:	Modify or replace valves to add ASV and RCV functionality in DOT Pipeline Isolation Sections. Enable isolation and depressurization of pipeline within 45 minutes from rupture under RCV mode, less under ASV operations.									
Element Scope of Installation:	Modify or replace 261 manual gas transmission pipeline valves of various size and configurations to effect ACV and RCV functionality. Replace all reduced port valves to support pigging operations as part of work, where such work has not already been planned and funded elsewhere. All valves to support ASV and RCV operations, include pressure measurement on both sides of the valve, primary and back-up SCADA communications and voting system for ASV operations. Criteria for creating isolations sections: all pipelines operating at 200 psig or greater and 1) 20" or greater operating at 20% or more of SMYS; 2) all pipelines 12" or larger in diameter operating at 30% or more of SMYS. See attached list Valves_Cap-2 for details on specific valves in-scope. Note: Backflow prevention valves presented under workpaper "Valves_5a_BF_RCVs" are not included in the cost totals presented nor tallied in this work-paper. There are 40 such valves split between the utilities.									
Unit / Device definition	n/a									
Device Description Model / Mfg.	n/a									
Base Device Cost:	n/a		**field locations**	261						
Communications device:	SCADA comm via radio and commercial data circuits.									

Workpaper: Valves_1b_SCG-Base valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_1b_SCG-Base valves

TABLE 1 CAPITAL INSTALLATION SCHEDULE (average valve locations completed)

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
units installed	26	26	26	26	26	26	26	26	26	26	261
cumulative	26	52	78	105	131	157	183	209	235	261	

note: valve totals may contain a fraction of a valve because of arithmetic scaling taken for valves in pipe to be replaced. Total reduce by 25% to account for optimized spacing when lines replaced. 22 valves reduced.

Overview of Basic Assumptions and factors used for capital cost estimations used : Preliminary survey/review of each existing DOT transmission pipeline valve site available to create remote-controlled or automated 8-mile or less isolation sections was performed. This work continues to be refined. Based on preliminary work, 261 valves were identified as required to create isolation sections by modification or replacement with a fully-opening ball valve, actuator, communications, electric power and controls. These valves are detailed in master valve priority list under attachment Valves_Cap-2 and shown graphically in Attachment Valves_Cap-4. Valve work totals required by size and configuration are shown in Table 7 below. Each of these identified sites was multiplied by the cost factors in Table 8 to produce the total SoCalGas valve cost estimates shown in Table 9. Cumulative cost ($235 MM) are shown in Table 3 below and have been levelized for a 10-year period. This forecast methodology will allow for procurement, contractor and workforce stability over the Plan period; and allow for some flexibility for work to be re-prioritized based on the schedule of other Plan pipeline work being performed in the vicinity of valve targeted work. All valve work to be completed in Phase 1.

Table 2

Unit Capital Cost Table 2 not used for Valves as each valve location individually estimated based on size and scope of work to be performed - see Tables 7-9 below and Attachments Valves_Cap-2 and Valves_Cap-3.

Table 3: Cost Computation Method: summation of all cost in Table 9, prorated by yearly valve counts as a percent of total Plan valves shown in Table 1.

Table 3 **Capital Cost by Year - Direct $**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital Cost	$ 23,473,955	$ 23,473,955	$ 23,473,955	$ 23,473,955	$ 23,473,955	$ 23,473,955	$ 23,473,955	$ 23,473,955	$ 23,473,955	$ 23,473,058	**234,738,657**
Labor	$ 3,051,614	$ 3,051,614	$ 3,051,614	$ 3,051,614	$ 3,051,614	$ 3,051,614	$ 3,051,614	$ 3,051,614	$ 3,051,614	$ 3,051,498	30,516,025
non-labor	$ 20,422,341	$ 20,422,341	$ 20,422,341	$ 20,422,341	$ 20,422,341	$ 20,422,341	$ 20,422,341	$ 20,422,341	$ 20,422,341	$ 20,421,560	204,222,631

Workpaper: Valves_1b_SCG-Base valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1b_SCG-Base valves

Overview of basic assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5. Table 4 below is a zero-based estimate for valve work for a complex station which provides RCV/ASV and overpressure protection with dual communications and pressure reads. Costs include annual calibrations of electronic equipment, vault inspections, lubrication, testing and allowance for troubleshooting and unscheduled maintenance, as experienced by the Utilities on similar assets. Maintenance costs include year-1 inspections, training and maintenance data systems modifications post-construction, which will be handled under O&M. The unit labor and non-labor totals shown in Table 4 are multiplied by the cumulative valve counts in Table 1 to derive the annual maintenance costs.

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.** (Cost to maintain on unit each year)

O&M/$per unit/yr	Rates/hrs or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Union labor - troubleshoot/rep	$ 44.13	8	$ 353.04	sr inst tech
Mgmt Labor -prog mgmt	$ 52.88	2	$ 105.77	tech, Gas Control and IT support staff and prg management
Union labor - routine maint	$ 44.13	8	$ 353.04	calibrate 2 TPs, PLC linebreak control, comm, power/UPS check, stroke check
Non-labor	$ 200.00	1	$ 200.00	misc materials, travel and incidentals, 10 year minor electronics refresh, consumables.
Location Fee	$ -	0	$ -	
electric power	$ 20.00	12	$ 240.00	main mlv site electric power
comm	$ -	0	$ -	included in scada costs
Other 2	$ -	0		
TOTAL			$ 1,251.85	
			$ 811.85	labor
			$ 440.00	non-labor

Table 5 Cost Computation Method: Table 4 unit operating cost (labor and Non-labor) multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 **Operating and Maintenance Cost by Year - Direct ($1000s)**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Total	**61,630**	**76,433**	**91,236**	**106,039**	**120,843**	**135,646**	**150,449**	**165,252**	**180,055**	**194,858**	**1,282,441**
Labor	9,600	19,200	28,800	38,400	48,001	57,601	67,201	76,801	86,401	96,001	$ 528,006
Non-labor	52,030	57,233	62,436	67,639	72,842	78,045	83,248	88,451	93,654	98,857	$ 754,435

Workpaper: Valves_1b_SCG-Base valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1b_SCG-Base valves

Summary of Cost Allocation Method/Rationale

Method: Capital cost are assigned to Distribution where valves are located on SCG distribution-designated pipelines. Similar allocation made for Transmission pipeline valves. Table 9a shows the Distribution and Transmission allocated costs computed from Table 9. These values are apportioned by year in Table 6 below based on % of total valve work performed in a year as shown in Table 1. FERC accounts are as follows: Distribution Capital-375, Transmission Capital-367, Distribution O&M - 874.4, Transmission O&M-859.1 Labor cost allocated at 16% of total valve work for smaller distribution valves and 13% for larger transmission valves.

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year Capital	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor											
SDGE trans Non-labor											
SDGE Dist - Lab											
SDGE Dist - non lab											
SCG Trans - Lab	2,725,968	2,725,968	2,725,968	2,725,968	2,725,968	2,725,968	2,725,968	2,725,968	2,725,968	2,725,863	**27,259,573**
SCG Trans non-lab	18,243,015	18,243,015	18,243,015	18,243,015	18,243,015	18,243,015	18,243,015	18,243,015	18,243,015	18,242,317	**182,429,450**
SCG Dist lab	400,796	400,796	400,796	400,796	400,796	400,796	400,796	400,796	400,796	400,780	**4,007,941**
SCG Dist non-lab	2,104,177	2,104,177	2,104,177	2,104,177	2,104,177	2,104,177	2,104,177	2,104,177	2,104,177	2,104,097	**21,041,693**
Total Plan	**23,473,955**	**23,473,955**	**23,473,955**	**23,473,955**	**23,473,955**	**23,473,955**	**23,473,955**	**23,473,955**	**23,473,955**	**23,473,058**	**234,738,657**

Year O&M	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor											
SDGE trans Non-labor											
SDGE Dist - Lab											
SDGE Dist - non lab											
SCG Trans - Lab	9,357	18,713	28,070	37,426	46,783	56,139	65,496	74,852	84,209	93,566	514,611
SCG Trans non-lab	50,710	55,781	60,852	65,923	70,994	76,065	81,136	86,207	91,278	96,349	735,295
SCG Dist lab	244	487	731	974	1,218	1,461	1,705	1,948	2,192	2,436	13,396
SCG Dist non-lab	1,320	1,452	1,584	1,716	1,848	1,980	2,112	2,244	2,376	2,508	19,140
Total Plan	**61,630**	**76,433**	**91,236**	**106,039**	**120,843**	**135,646**	**150,449**	**165,252**	**180,055**	**194,858**	**1,282,441**

Workpaper: Valves_1b_SCG-Base valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1b_SCG-Base valves

Table 7 below contains a summary of all SoCalGas valve counts and the required scope of work to make the existing valves fully-opening ball valves capable of ASV and RCV operation and capable of providing pressure control into isolation section of pipelines greater than 12" as defined by criteria set forth in the Valve Enhancement Plan. Numbers and configurations are based on preliminary review of existing system valves. These valve counts are multiplied by the estimated unit cost as shown in Table 8, which represents the cost to perform one valve alteration or replacement to provide the RCV/ASV functionality required. The resulting cost for all work is shown in Table 9. Distribution pipeline valves (as of this writing) are denoted in the Column containing "(Distribution" - far right Column). All other valves listed are on transmission department operated pipelines. The incorporation of new RCVs may ultimately alter the designation of a pipeline, moving short distribution sections of pipe into the transmission realm to provide operational standardization and uniformity in service processes.

TABLE 7 **Summary of SoCalGas major valves included in the PSEP**

	Add Valve control valve features to Pipe subject to replacement. (Transmission)	Add Valves to Branch and short segments (Distribution)	Hazard Short Intervals (New valves cut in in new locations) (Transmission)	ASV Comm Only - costed separately	Other Plug Valve replacements to convert to RCV. (Transmission)	New valve and above ground actuator replaced pipelines	Base MLVs Add Above Ground Actuator and Controls (Transmission)	Base MLVs Add Actuators/controls in Vault (Transmission)	Retrofit/New valve/actuator controls - above ground act. (Transmission)	Retrofit/New valve/actuator controls in vault below street. (transmission)	Totals
12"	10	17	4	0	0	1	0	2	1	3	38
14"	1	0	0	0	0	0	0	0	0	0	1
16"	19	11	4	0	0	2	0	6	2	5	49
18"	8	0	4	0	0	0	0	0	0	0	12
20"	4	2	2	0	0	1	3	5	1	10	28
22"	0	0	0	0	0	0	0	0	0	3	3
24"	7	1	0	0	0	1	3	9	1	7	29
26"	2	0	0	0	0	1	1	2	1	0	7
30"	16	0	4	0	0	1	9	29	1	12	72
34"	0	0	0	0	0	2	1	1	2	4	10
36"	0	0	2	0	0	1	1	5	1	2	12
TOTALS	***67***	***31***	***20***	***0***	***0***	***10***	***18***	***59***	***10***	***46***	***261***

Table 7a

Distribution Total	31
Transmission Total	230
	261

Valve ratio for O&M

0.118547752	**percent Distribution Valves**
0.881452248	**percent Transmission Valves**

Note: excludes comm to ASVs (94) , 8 Back-flow prevention RCVs and ASV to RCV conversion (100).

Table 8 below is a summary of direct cost to Upfit or replace valves to provide ASV and RCV functionality based on valve size and scope of work to be performed. Details on these cost factors are provided under Attachment Valves_Cap-3.

Workpaper: Valves_1b_SCG-Base valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1b_SCG-Base valves

Table 8

Pipe Diameter	Cost of Different Retrofit and New Valve Installation Options ($1000s)						
	unit $- replace old valve with RCV above ground Actuator (A/AG.)	unit $- replace all in old pipe Costs below st actuator ($1000)	unit $ add controls and elect costs ($1000)	Unit $add actuator, cont/elect (above G or ready vault) A/AG	Unit $ add act uator, controls ,elect below street.	add act, elec, controls pnue in ready vault (add AG act plus control col)	Add new valve and controls in pipeline being replaced (excavated)
	Config "C"	Config "D"	Config "E"	Config "F"	Config "G"	Config H	Config "I"
	INSTALLATON COSTS BY TYPE FOR VARYING SIZED VALVES ($1000s)						
12"	762	811	217	281	544	281	691
14"	762	811	217	281	544	281	691
16"	837	923	217	292	647	292	803
18"	837	923	217	292	647	292	803
20"	937	1,008	217	301	710	301	888
22"	937	1,008	217	301	710	301	888
24"	1,017	1,119	217	311	807	311	999
26"	1,097	1,177	217	317	843	317	1,057
30"	1,172	1,288	217	343	957	343	1,168
34"	1,172	1,288	217	343	957	343	1,168
36"	1,301	1,454	217	361	1,076	361	1,334

Workpaper: Valves_1b_SCG-Base valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_1b_SCG-Base valves

Table 9 SoCalGas Base Valve Modification Costs ($1000s) Includes 8% contingency.

Size	Upfit existing valves with actuator, elecricity, controls, telemetry below street.	Up-fit all ASVs to RCV with electricity and Comm-Costs already included in another tab (Config A).	Replace Plug valves with RCV/ASV FO Ball Valves (50/50 mix Config C and Config D-above and below grade split).	Valves needing actuator and controls retrofit above ground actuator (Config F).	New valves, actuator and controls in old pipe above ground.	Hazard short interval valve cut in new large pipe w/actuator above ground (Config C).	New valves on replaced pipelines discount valve count 25%. Reduce cost for coincident PL work (Config I).	SDGE branch and short length Class 3 sections (Config C).
	VALVE COST ($1000s) BY TYPE OF UPGRADE/REPLACEMENT CONFIGURATION BASED ON VALVE COUNTS TABLE SDG&E 1 AND COST IN SDG&E TABLE 2							
12"	1,088	-	3,195	-	762	3,048	7,254	12,955
14"	-	-	-	-	-	-	518	-
16"	3,884	-	6,287	-	1,673	3,347	15,052	9,204
18"	-	-	-	-	-	3,347	6,623	-
20"	3,552	-	11,015	903	937	1,874	3,329	1,874
22"	-	-	3,023	-	-	-	-	-
24"	7,260	-	8,852	934	1,017	-	6,745	1,017
26"	1,685	-	1,097	317	1,097	-	2,378	-
30"	27,764	-	16,628	3,086	1,172	4,686	19,273	-
34"	957	-	7,495	343	2,343	-	-	-
36"	5,378	-	4,208	361	1,301	2,601	-	-
TOTALS	**51,568**	**-**	**61,801**	**5,944**	10,302	18,903	**61,172**	**25,050**
							209,689	**25,050**
							trans total	**dist total**

Table 9a

TOTAL SCG PLAN ($1000s)		$ 234,739
SoCalGas Distribution		25,050
SoCalGas Transmission		209,689

Capital ratio by FERC Desig.

10.67%	percent Distribution Valves $
89.33%	percent Transmission Valves $

Workpaper: Valves_2_SCG -ASV-to-RCV

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_2_SCG -ASV-to-RCV

Valve Element Description:	**Convert 94 existing SoCalGas ASVs to full Remote Control Capability .**
Valve Element Purpose:	Enhance emergency operations and rupture management by providing Gas System Operators the capability to remotely operate 94 existing Automatic Shutoff Valves on the SocalGas Transmission pipeline system. These are the valves which bound Class 3/HCA pipeline locations; and which will be used to provide 8-mile or less sectionalization of gas transmission pipelines 12" and greater. ASV functionality will remain a control option at these sites, but the installation of almost 300 additional RCVs on the SCG system requires that these valves also be capable of remote operation when this complexity is added to the SoCalGas pipeline system.
Scope of Installation:	Targeted valves already have actuators installed which are capable of being closed by a local, battery or solar powered-electronic controller. These controllers are typically not equipped with communications to provide SCADA operators with visibility into pressure and valve status at each location, nor to operate the valves remotely. Proposed work to include new PLC/ panels with retention of local Linebreak controller, commercial electric power and battery back-up, dual communications (company radio and commercial data circuits). Each valve location to be equipped with dual pressure monitors (each side of valve). Most of these locations are to be above ground facilities. Major cost variables include location and proximity to electric power source (still under review at the time this estimate was prepared.)
Unit/Device definition	n/a
Device Description Model/Mfg.	n/a
Base Device Cost:	
Communications device:	radio and SCADA telecomm circuit (2 path with redundancy) — **Polling System**: Operations Control SCADA with backup AMI or other radio based hard switchover.

CAPITAL INSTALLATION SCHEDULE

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Units installed in year	-	10	10	10	10	10	10	10	11	13	**94**
Cumulative		10	20	30	40	50	60	70	81	94	

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: Each site equipped with new control panel, dual communications, UPS, dual pressure sensors and will retain local linebreak control capability. Largest unknown as of June, 2011 was the availability of power at each location. Cost are based on historical utility cost to convert pneumatic actuated valves with controls to provide for RCV capability. The cost presented are beyond some of those historical cost SoCalGas can draw upon for comparison due to addition redundant ASV/RCV controllers and emergency path back-up radio communications and dual pressure monitoring at each valve location.

Workpaper: Valves_2_SCG -ASV-to-RCV

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_2_SCG -ASV-to-RCV

Table 2 **Single Unit Capital Costs (Installed and Commissioned)**

Element	Rates/hr or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Labor Project Planning/Adm	$ 55	240	$ 13,200	Senior Engineer includes design (80% standard to be developed.) All project management/support.
Permit and/or siting	$ 1,000	1	$ 1,000	where applicable
Labor union install/config.	$ 45	40	$ 1,800	Trans senior instrument spacialist
Contract Services	$ 80,000	1	$ 80,000	construction services, mechanical, electric
Labor QA/test/ config:	$ 50	80	$ 4,000	technician and tech staff composite
Electronic Components	$ 25,000	1	$ 25,000	RTU and related components
Other Materials/encl/mount	$ 20,000	1	$ 20,000	
Communication Devices	$ 2,000	1	$ 2,000	radio and commercial data modems and enclosures
Host system confirmation	$ 60	1	$ 60	system integration check-field to SCADA
Electrical Power	$ 75,000	1	$ 75,000	allowance for multiple pole requirements, plus all service costs.
TOTAL			**$ 222,060**	
			$ 19,060	labor
			$ 203,000	non-labor

Table 3: Cost Computation Method: (Table 2 single unit cost multiplied by units shown in Table 1 for each year.

Table 3 **Capital Cost by Year - Direct**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital Cost	**-**	**2,220,600**	**2,220,600**	**2,220,600**	**2,220,600**	**2,220,600**	**2,220,600**	**2,220,600**	**2,442,660**	**2,886,780**	**20,873,640**
Labor	-	190,600	190,600	190,600	190,600	190,600	190,600	190,600	209,660	247,780	1,791,640
non-labor	-	2,030,000	2,030,000	2,030,000	2,030,000	2,030,000	2,030,000	2,030,000	2,233,000	2,639,000	19,082,000

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5. Assumes total of 12 hours per year per site by technician for each RCV, including travel time (as incremental to existing ASV costs), for routine checks, troubleshooting/repair and occasional module replacement. Non-labor assumes misc travel expenses associate with site visits. Table was 5 computed by taking the cumulative number of units installed in each plan year from Table 1 and multiplying by the Table 4 O&M per-unit costs. It is assumed each unit will receive one O&M check in the first year of installation as part of non-capital commissioning.

Workpaper: Valves_2_SCG -ASV-to-RCV

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_2_SCG -ASV-to-RCV

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.** (Cost to maintiain on unit each year)

Element	Rates/hrs or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Union labor - troubleshoot/r	$ 44.13	4	$ 176.52	sr inst tech
Mgmt Labor -prog mgmt	$ 52.88	2	$ 105.77	tech support and management
Union labor - routine maint	$ 44.13	6	$ 264.78	technician
Non-labor	$ 200.00	1	$ 200.00	
Location Fee	$ -	0	$ -	
electric power	$ 20.00	12	$ 240.00	utility power fee
comm	$ -	0	$ -	included in scada costs
Other 2	$ -	0		
TOTAL			**$ 987.07**	
			$ 547.07	labor
			$ 440.00	non-labor

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan year.

Table 5 **Operating and Maintenance Cost by Year - Direct**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
	-	9,871	19,741	29,612	39,483	49,353	59,224	69,095	79,953	92,785	**449,117**
Labor	-	5,471	10,941	16,412	21,883	27,353	32,824	38,295	44,313	51,425	248,917
Non-labor	-	4,400	8,800	13,200	17,600	22,000	26,400	30,800	35,640	41,360	200,200

Summary of Cost Allocation

Allocation Rationale: All cost above in Tables 3 and 5 are mapped to SoCalGas transmission in Table 6 below. Costs are allocated to SoCalGas under FERC 367 for Capital and 859.1 for O&M for this element.

Workpaper: Valves_2_SCG -ASV-to-RCV

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_2_SCG -ASV-to-RCV

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year Capital	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - non lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans - Lab	-	190,600	190,600	190,600	190,600	190,600	190,600	190,600	209,660	247,780	**1,791,640**
SCG Trans non-lab	-	2,030,000	2,030,000	2,030,000	2,030,000	2,030,000	2,030,000	2,030,000	2,233,000	2,639,000	**19,082,000**
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	**-**
Total Plan	-	2,220,600	2,220,600	2,220,600	2,220,600	2,220,600	2,220,600	2,220,600	2,442,660	2,886,780	**20,873,640**

Year O&M	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - non lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans - Lab	-	5,471	10,941	16,412	21,883	27,353	32,824	38,295	44,313	51,425	**248,917**
SCG Trans non-lab	-	4,400	8,800	13,200	17,600	22,000	26,400	30,800	35,640	41,360	**200,200**
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	**-**
Total Plan	**-**	**9,871**	**19,741**	**29,612**	**39,483**	**49,353**	**59,224**	**69,095**	**79,953**	**92,785**	**449,117**

Note on related work papers: Each of the line elements in Table 6 above are added to the appropriate summary work papers entitled "Valves_Cap_SCG_Trans", "Valves_Cap_SCG_Dist", "Valves Cap_SDGE_Trans" and "Valves_Cap_SDGE_Dist" to compute total Valve Enhancement Plan allocaton by company and Distribution and Transmssion. Similar addition occurs for O&M under Workpapers entitled "Valves_O&M_SCG_trans", Valves_O&M_SCG_Dist", Valves_O&M_SDGE_trans", and Valves_O&M_SDGE_Dist".

Workpaper: Valves_3_SCG-LB comm

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_3_SCG-LB comm

Technology Description:	**Retrofit 100 SoCalGas linebreak control devices with communications using company radio system data transmission and reporting by exception only (valve state or sudden pressure changes.)**
Technology Purpose:	Enable remote monitoring of linebreak control information by Gas Control operators to determine if local controller has tripped a valve closed.
Techology Scope of Installation:	Retrofit existing locations with AMI module or equivalent device to to read (alarm) into new host or SCADA system when valve state changes. Allow opertors to view data in real-time for by interrogation under emergency conditions.
Unit / Device definition	Radio module and related installation/configuration
Device Description Model / Mfg.	n/a
Base Device Cost:	n/a
Communications device:	radio module. **Polling System** PIM or 3rd party-with gateway to SCADA system and Operations

TABLE 1 CAPITAL INSTALLATION SCHEDULE

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Units installed in year (assumes one site partially completed each year)	-	-	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	**100**
		-	13	25	38	50	63	75	88	100	Cumulative

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: Each of 100 locations provided with remote radio communications: Cost for radio modems provided by radio system mfg and assumes 2-way comm modules. Cost for installation and maintenance is based on utility projections for design and installation of each site including site survey and purchase of minor equiment to mount and, where possible provide auxiliary power to communications modules. These low cost installations will not provide continuous polling of the sites, but provide exception alarming and the ability to poll alarming devices for short periods to get limited real-time data for up to 30 minutes. Data to be capable of transmission includes pressure, rate of pressure drop, valve status (open/close) and battery power level.

Workpaper: Valves_3_SCG-LB comm

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_3_SCG-LB comm

Table 2 Single Unit Capital Costs (Installed and Commissioned)

Element	Rates/hr or qnty.	hours or qtny.	Sub total	Other assumptions/notes on line item
Labor Project Planning/Admin.	$ -	0	$ -	
Permit and/or siting	$ -	0	$ -	
Labor union install/config.	$ 44.13	20	$ 883	Tech/survey site/plan and implement installation
Contract Services	$ -	0	$ -	
Labor QA/test/ config:	$ -	0	$ -	
Electronic Components	$ 200.00	1	$ 200	misc wires, fittings
Other Materials/encl/mount/nl	$ 500.00	1	$ 500	other mounting apparatus (poles, enclosures, aux battery or xtra solar panel
Communication Devices	$ 500.00	1	$ 500	radio module - 2 way comm. vendor estimate
Host system confirmation	$ 50.48	2	$ 101	Labor to integrate into polling system
Electrical Power	$ -	1	$ -	
TOTAL			$ 2,184	total capital cost based on a single location installation
			$ 984	Total Labor
			$ 1,200	Total non-labor

Table 3 Capital Cost by Year - Direct

Table 3: Cost Computation Metho

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTALS
Capital Cost	-	-	27,295	27,295	27,295	27,295	27,295	27,295	27,295	27,295	218,356
Labor	-	-	12,295	12,295	12,295	12,295	12,295	12,295	12,295	12,295	98,356
non-labor	-	-	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	120,000

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5.
Assumes total of 4 hours per year per site by technician, including travel time, for routine checks, troubleshooting/repair and occasional module replacement. Non-labor assumes misc travel expenses associated with site visits. Units will alarm on low battery and tamper conditions. Response to each and required. Annual system check also included. Table 5 computed by taking each cumulative number of units installed in a year and multiplying by the Table 4 O&M per unit costs. It is assumed each unit will receive one O&M check in the first year of installation as part of non-capital commissioning.

Workpaper: Valves_3_SCG-LB comm

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_3_SCG-LB comm

Table 4 UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.

(Cost to maintiain on unit each year)

Element	Rates/hrs or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Union labor - troubleshoot/rep	$ 44.13	2	$ 88.26	Technician Labor Rate
Mgmt Labor -prog mgmt	$ -	0	$ -	
Union labor - routine maint	$ 44.13	2	$ 88.26	
Non-labor	$ 40.00	1	$ 40.00	periodic module and/or battery change
Location Fee	$ -	0	$ -	
electric power	$ -	0	$ -	
comm	$ -	0	$ -	
Other 2	$ -	0		
TOTAL			**$ 216.52**	
			$ 176.52	labor
			$ 40.00	non-labor

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan year.

Table 5 Operating and Maintenance Cost by Year - Direct

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
	-	-	2,707	5,413	8,120	10,826	13,533	16,239	18,946	21,652	97,434
Labor	-	-	2,207	4,413	6,620	8,826	11,033	13,239	15,446	17,652	79,434
Non-labor	-	-	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	18,000

Summary of Cost Allocation Method/Rationale

Method: Table 6 allocations below are taken by multiplying total costs from Tables 3 and 5 above for Capital and O&M, respectively, for each year by the percentages assignable to each company and then to the distribution transmission split for this asset base. **Allocation Rationale:** All assets which will require upfit of communication devices to allow operators to know when existing Line break controls have closed a valve reside on the SoCalGas Transmission pipeline system. Thus, all system costs are allocated to SoCalGas under FERC 367 for Capital and 859.1 for O&M.

Workpaper: Valves_3_SCG-LB comm

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data | **Valves_3_SCG-LB comm**

Table 6 Allocation of Costs to Company and FERC Accounts

Year Capital	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Total**
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - non lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans - Lab	-	-	12,295	12,295	12,295	12,295	12,295	12,295	12,295	12,295	**98,356**
SCG Trans non-lab	-	-	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	**120,000**
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	**-**
Total Plan	-	-	27,295	27,295	27,295	27,295	27,295	27,295	27,295	27,295	**218,356**

Year O&M	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Total**
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - non lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans - Lab	-	-	2,207	4,413	6,620	8,826	11,033	13,239	15,446	17,652	**79,434**
SCG Trans non-lab	-	-	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	**18,000**
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	**-**
total Plan 20" 20%	**-**	**-**	**2,707**	**5,413**	**8,120**	**10,826**	**13,533**	**16,239**	**18,946**	**21,652**	**97,434**

Note on related work papers: Each of the line elements in Table 6 above are added to the appropriate summary work papers entitled "Valves_Cap_SCG_Trans", "Valves_Cap_SCG_Dist", "Valves Cap_SDGE_Trans" and "Valves_Cap_SDGE_Dist" to compute total Valve Enhancement Plan allocaton by company and Distribution and Transmssion. Similar addition occurs for O&M under Workpapers entitled "Valves_O&M_SCG_trans", Valves_O&M_SCG_Dist", Valves_O&M_SDGE_trans", and Valves_O&M_SDGE_Dist".

WorkPaper Valves_4- large meter sta

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_4- large meter sta

Technology Description:	Install large measuring stations on HP gas transmission lines to support enhanced operational flexibility and system diagnosis in the event of a rupture or accidental closing of an ASV/RCV in an area with complex piping, where loss of customer service may be experienced within two hours of valve closure.
Technology Purpose:	Better decision-making data for transmission system operation to support remote and automatic valve installations, and to help identify leak/system inbalances in on the transmission system.
Techology Scope of Installation:	Install either in-line or insertion ultrasonic metering stations in vaults below grade to measure gas flow on large gas transmission pipelines. Include SCADA telemetry , pressure measurement and back-up battery power. Pipeline to remain piggable in all instances. Where meters are in-line, provision for isolation and bypass to be provided, including manual isolation valves.
Unit/Device definition	One high pressure metering station retrofit on an existing high-pressure gas pipeline.
Device Description	
Model/Mfg.	n/a
Base Device Cost:	
Communications device:	SCADA telecomm circuit and/or radio system **Polling System** Operations Control SCADA.

TABLE 1 **CAPITAL INSTALLATION SCHEDULE**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Units installed in year	2	2	2	2	2	2	2	2	2	2	20
		4	6	8	10	12	14	16	18	20	Cumulative

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: Each site equipped with new meter, vault, temp and pressure measurement, methane and vault water level sensor and electronic flow computer. UPS and SCADA communicatons also included in base design. As of July, 2011, final locations for these meters were still under engineering review. Most will be located in the LA Basin and SDGE City center. Approximately one new meter for each 15 RCVs installed.

WorkPaper Valves_4- large meter sta

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_4- large meter sta

Table 2 **Single Unit Capital Costs (Installed and Commissioned)**

Element	Rates/hr or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Labor Project Planning/Admin/design	$ 46	200	$ 9,135	Senior Engineer and proj manager (employ standard design TB dev)
Permit and/or siting	$ 1,000	1	$ 1,000	
Labor union install/config.	$ 44	120	$ 5,296	Trans senior instrument specialist
Contract Services and non labor	$ 150,000	1	$ 150,000	Electrical panel fab, vault core, base mechanical/electrical installation
Labor QA/test/ config:	$ 44	80	$ 3,530	
Electronic Components	$ 40,000	1	$ 40,000	flow computer, transmitters, ups, PLC cabinet and electronics, methane, water level
Other Materials/fittings	$ 80,000	1	$ 80,000	meter, valves, vaults
Communication Devices	$ 2,000	1	$ 2,000	radio and common carrier data modems and enclosures
Host system confirmation	$ 46	8	$ 365	scada/IT technicians and field labor
Electrical Power	$ 20,000	1	$ 20,000	installation of power to vaulted meter site (composite average - 20 sites).
TOTAL			$ 311,326	
			$ 18,326	labor -total
			$ 293,000	non-labor total

Table 3: Cost Computation Method: (Table 2 single unit cost multiplied by units shown in Table 1 for each year.

Table 3 **Capital Cost by Year - Direct**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital Cost	622,652	622,652	622,652	622,652	622,652	622,652	622,652	622,652	622,652	622,652	6,226,520
Labor	36,652	36,652	36,652	36,652	36,652	36,652	36,652	36,652	36,652	36,652	366,520
Non-labor	586,000	586,000	586,000	586,000	586,000	586,000	586,000	586,000	586,000	586,000	5,860,000

WorkPaper Valves_4- large meter sta

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_4- large meter sta

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5. Assumes total of 12 hours per year per site by technician for each , metering station, including travel time, for routine checks, troubleshooting/repair and occasional module replacement. Non-labor assumes misc travel expenses associate with site visits. Table 5 computed by taking each cumulative number of units installed in a year and multiplying by the Table 4 O&M per-unit costs. It is assumed each unit will receive one O&M check in the first year of installation as part of non-capital commissioning.

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.** (Cost to maintiain on unit each year)

Capital Costs / per unit	Rates / hrs or qnty.	hours or qtny.	Sub total	Assumptions / notes on line item
Union labor - troubleshoot / rep	$ 44.13	6	$ 264.78	sr inst tech - 1 call out per year with resoulution.
Mgmt Labor -prog mgmt	$ 52.88	2	$ 105.77	
Union labor - routine maint	$ 44.13	4	$ 176.52	routing calibration and testing.
Non-labor	$ 200.00	1	$ 200.00	incidentals and minor parts allowance
Location Fee	$ -	0	$ -	
electric power	$ 20.00	12	$ 240.00	utility service
comm	$ -	0	$ -	included in scada costs
Other 2	$ -	0		
TOTAL			**$ 987.07**	
			$ 547.07	labor
			$ 440.00	non-labor

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 **Operating and Maintenance Cost by Year - Direct**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
TOTAL	1,974	3,948	5,922	7,897	9,871	11,845	13,819	15,793	17,767	19,741	108,578
Labor	1,094	2,188	3,282	4,377	5,471	6,565	7,659	8,753	9,847	10,941	**60,178**
Non-labor	880	1,760	2,640	3,520	4,400	5,280	6,160	7,040	7,920	8,800	**48,400**

WorkPaper Valves_4- large meter sta

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_4- large meter sta

Summary of Cost Allocation

Method: Table 6 allocations below are taken by multiplying total costs from Tables 3 and 5 above for Capital and O&M, respectively, for each year by the percentages shown below under Table 7 Distribution/Transmission split and allocation by Company. **Allocation Rationale:** All large meters under this Element are transmission pipeline assets . Thus, all system costs are allocated to SoCalGas and SDG&E under FERC 367 for Capital and 859.1 for O&M. Allocation to each company is based on the relative miles of transmission pipeline in each company served by these meters, resulting in a split of 14.65% of total costs to SDG&E and a 85.35% assignment to SoCalGas. Relative transmission pipelines 12" and greater in Class 3/HCA locations served by meters as part of this plan.: SDGE-126 miles, SoCalGas-736 miles, as shown in Table 7.

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital											
SDGE trans -Labor	5,368	5,368	5,368	5,368	5,368	5,368	5,368	5,368	5,368	5,368	**53,677**
SDGE trans Non-labor	85,820	85,820	85,820	85,820	85,820	85,820	85,820	85,820	85,820	85,820	**858,198**
SDGE Dist - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - non lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans - Lab	31,284	31,284	31,284	31,284	31,284	31,284	31,284	31,284	31,284	31,284	**312,843**
SCG Trans non-lab	500,180	500,180	500,180	500,180	500,180	500,180	500,180	500,180	500,180	500,180	**5,001,802**
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	**-**
total Plan 20" 20%	622,652	622,652	622,652	622,652	622,652	622,652	622,652	622,652	622,652	622,652	**6,226,520**

Year O&M	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	160	320	481	641	801	961	1,122	1,282	1,442	1,602	**8,813**
SDGE trans Non-labor	129	258	387	516	644	773	902	1,031	1,160	1,289	**7,088**
SDGE Dist - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - non lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans - Lab	934	1,868	2,802	3,736	4,670	5,603	6,537	7,471	8,405	9,339	**51,365**
SCG Trans non-lab	751	1,502	2,253	3,004	3,756	4,507	5,258	6,009	6,760	7,511	**41,312**
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	**-**
total Plan 20" 20%	**1,974**	**3,948**	**5,922**	**7,897**	**9,871**	**11,845**	**13,819**	**15,793**	**17,767**	**19,741**	**108,578**

WorkPaper Valves_4- large meter sta

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_4- large meter sta

SDG 911,875
SDG&E

Table 7 Utility Allocation	SDGE	SCG
Relative transmission pipeline miles under plan as of June 1	126.36	736.49
% of utility total (allocation)	14.65%	85.35%
Distribution allocation	0%	0%
Transmission allocation	0%	100%

Ratio of large transmission pipeline served by these meters.

Post 50 pipe 12" diameter and greater.

Note on related work papers: Each of the line elements in Table 6 above are added to the appropriate summary work papers entitled "Valves_Cap_SCG_Trans", "Valves_Cap_SCG_Dist", "Valves Cap_SDGE_Trans" and "Valves_Cap_SDGE_Dist" to compute total Valve Enhancement Plan allocaton by company and Distribution and Transmssion. Similar addition occurs for O&M under Workpapers entitled "Valves_O&M_SCG_trans", Valves_O&M_SCG_Dist", Valves_O&M_SDGE_trans", and Valves_O&M_SDGE_Dist".

Insert Any Other Relevant Drawings Tables and/or Diagrams Here.

Workpaper: Valves_5a-BF-T-SL_RCVs

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_5a-BF-T-SL_RCVs

Technology Description:	**Install Remote Control Capability on 40 supply valves to prevent backflow into ruptured transmission pipelines.**
Technology Purpose:	Prevent the backflow of gas from laterals and around bridle valves into an isolated section of a ruptured transmission line. Ensure any backflow is less than that capable of a PIR-equivalent of approximately 80 by closing major valves, typically greater than 8" in diameter. (Manual control of 8" valves is typically easily accomplished by field personnel.)
Techology Scope of Installation:	Install 40 new full RCV capable valves spread across SDGE and SCG pipelines 10" and greater valves. Each site to include valve, actuator, ASV controller and separate PLC for RCV operation. Include dual communications (commercial data circuit with SCG radio back-up) and dual pressure monitoring. Valves to fail in-position and be capable of volume (where read is available) and pressure control in either flow direction.
Unit/Device definition	n/a
Device Description Model/Mfg.	n/a
Base Device Cost:	
Communications device:	common carrier w/AMI radio back-up(2 path) — **Polling System** — Operations Control SCADA with backup AMI based hard switchover.

TABLE 1 **CAPITAL INSTALLATION SCHEDULE**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Units installed in year	-	-	5	5	5	5	5	5	5	5	**40**
cumulative units		-	5	10	15	20	25	30	35	40	

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: 40 new valve sites (replace existing valves where required.) Each vaulted site is equipped with new valve, actuator control panel, dual communications, UPS (or integrated with existing systems), and dual pressure sensors. At least 50% of these sites will be in locations adjacent to planned main transmission RCVs installions, and so where this occurs, cost synergies for power, controls and contractor being on site will exist. Average vaulted-RCV cost based on 12" and discounting for adjacent work is $482k per valve as shown below. Based on preliminary survey, valve sizes will range from 10" to 20". As of July, 2011 the final list and scope of valves by location was still a work in progress requiring detailed site engineering surveys.

Workpaper: Valves_5a-BF-T-SL_RCVs

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_5a-BF-T-SL_RCVs

Table 2 Single Unit Capital Costs (Installed and Commissioned)

Element	Rates/hr or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Labor Project Planning/Adm	$ 53	1000	$ 52,885	Senior Engineer/Proj manager/designer
Permit and/or siting	$ 5,000	1	$ 5,000	predominant city street installation
Labor union install/config.	$ 44	80	$ 3,530	Trans senior instrument spacialist
Contract Services	$ 200,000	1	$ 200,000	Electrical panel fab, vault core, actuator power-up and test.
Labor QA/test/ config:	$ 44	0	$ -	
Electronic Components	$ 25,000	1	$ 25,000	2-Lineguars and possible RTU
Other Materials/encl/mount	$ 170,000	1	$ 170,000	assume these sites coincide with other RCV locations (save on contractor costs and construction, synergy.)
Communication Devices	$ 1,000	1	$ 1,000	low end radio module and conventional commercial data comm device.
Other	$ 60	1	$ 60	
Electrical Power	$ 25,000	1	$ 25,000	Assume 50% of locations cannot employ mlv power source due to remote location.
TOTAL			$ 482,475	
			$ 56,475	labor total
			$ 426,000	non-labor Total

Table 3: Cost Computation Method: (Table 2 single unit cost multiplied by units shown in Table 1 for each year.

Table 3 Capital Cost by Year - Direct

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital Cost	-	-	2,412,375	2,412,375	2,412,375	2,412,375	2,412,375	2,412,375	2,412,375	2,412,375	**19,299,001**
Labor	-	-	282,375	282,375	282,375	282,375	282,375	282,375	282,375	282,375	2,259,001
non-labor	-	-	2,130,000	2,130,000	2,130,000	2,130,000	2,130,000	2,130,000	2,130,000	2,130,000	17,040,000

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5.
Assumes total of 12 hours per year per site by technician for each RCV, including travel time, for routine checks, troubleshooting/repair and occasional parts replacement. Non-labor assumes misc travel expenses associate with site visits.
Table 5 computed by taking each cumulative number of units installed in a year and multiplying by the Table 4 O&M per-unit costs.
It is assumed each unit will receive one O&M check and troubleshooting in the first year of installation as part of non-capital commissioning.

Workpaper: Valves_5a-BF-T-SL_RCVs

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_5a-BF-T-SL_RCVs

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.** (Cost to maintiain on unit each year)

O&M Costs/per unit	Rates/hrs or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Union labor - troubleshoot/rep	$ 44.13	5	$ 220.65	sr inst tech
Mgmt Labor -prog mgmt	$ 52.88	2	$ 105.77	
Union labor - routine maint	$ 44.13	5	$ 220.65	
Non-labor	$ 200.00	1	$ 200.00	
Location Fee	$ -	0	$ -	
electric power	$ 10.00	12	$ 120.00	50% of locations employ mlv power service
comm	$ -	0	$ -	included in scada costs
Other 2	$ -	0		
TOTAL			**$ 867.07**	
			$ 547.07	labor
			$ 320.00	non-labor

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 **Operating and Maintenance Cost by Year - Direct**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
	-	-	4,335	8,671	13,006	17,341	21,677	26,012	30,347	34,683	**156,072**
Labor	-	-	2,735	5,471	8,206	10,941	13,677	16,412	19,147	21,883	**98,472**
Non-labor	-	-	1,600	3,200	4,800	6,400	8,000	9,600	11,200	12,800	**57,600**

Summary of Cost Allocation Method/Rationale

Method: Table 6 allocations below are taken by multiplying total costs from Tables 3 and 5 above for Capital and O&M, respectively, for each year by the percentages shown in Table 7 below to arrive at the specific company cost and FERC account (dist/trans) for each year. **Allocation Rationale:** All valves under this Element are distribution pipeline assets. Accordingly all system costs are allocated to under FERC distribution accounts 376 for Capital and 874.4 for O&M. Allocation to each company is based on the relative miles of transmission pipeline in each company served by these back-flow prevention valves under the VEP, resulting in a split of 14.65% of total costs to SDG&E and a 85.35% assignment to SoCalGas as shown in Table 7. Relative transmission pipelines 12" and greater in Class 3/HCA locations served by these valves as part of this plan: SDGE-126 miles, SoCalGas-736 miles.

Workpaper: Valves_5a-BF-T-SL_RCVs

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_5a-BF-T-SL_RCVs

Table 6 Allocation of Costs to Company and FERC Accounts

Year Capital	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	-	-	41,354	41,354	41,354	41,354	41,354	41,354	41,354	41,354	**330,831**
SDGE Dist - non lab	-	-	311,939	311,939	311,939	311,939	311,939	311,939	311,939	311,939	**2,495,511**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist lab	-	-	241,021	241,021	241,021	241,021	241,021	241,021	241,021	241,021	**1,928,170**
SCG Dist non-lab	-	-	1,818,061	1,818,061	1,818,061	1,818,061	1,818,061	1,818,061	1,818,061	1,818,061	**14,544,489**
Total Plan	-	-	2,412,375	2,412,375	2,412,375	2,412,375	2,412,375	2,412,375	2,412,375	2,412,375	**19,299,001**

Year O&M	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	-	-	401	801	1,202	1,602	2,003	2,404	2,804	3,205	**14,421**
SDGE Dist - non lab	-	-	234	469	703	937	1,172	1,406	1,640	1,875	**8,436**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist lab	-	-	2,335	4,670	7,004	9,339	11,674	14,009	16,343	18,678	**84,051**
SCG Dist non-lab	-	-	1,366	2,731	4,097	5,463	6,828	8,194	9,560	10,925	**49,164**
Total Plan	**-**	**-**	**4,335**	**8,671**	**13,006**	**17,341**	**21,677**	**26,012**	**30,347**	**34,683**	**156,072**

Table 7 Utility Allocation

	SDGE	SCG
Relative transmission pipeline miles under plan as of June	126.36	736.49
% of utility total (allocation)	14.65%	85.35%
Distribution allocation	100%	100%
Transmission allocation	0%	0%

Note on related work papers: Each of the line elements in Table 6 above are added to the appropriate summary work papers entitled "Valves_Cap_SCG_Trans", "Valves_Cap_SCG_Dist", "Valves Cap_SDGE_Trans" and "Valves_Cap_SDGE_Dist" to compute total Valve Enhancement Plan allocaton by company and Distribution and Transmssion. Similar addition occurs for O&M under Workpapers entitled "Valves_O&M_SCG_trans", Valves_O&M_SCG_Dist", Valves_O&M_SDGE_trans", and Valves_O&M_SDGE_Dist".

Workpaper: Valves_5b-BF-T-Reg pilots

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	*Valves_5b_BF-T-SL_Reg pilots*

Technology Description:	Install control piping components at district regulator stations to prevent back-flow to transmission system in the event of transmission system linebreak.
Technology Purpose:	Prevent back flow to broken section of large diameter pipe, minimize service loss to customers in the event of a pipeline rupture on a major transmission pipeline. Work will prevent distribution pipelines from losing gas pressure associated with backfeeding of a pipeline rupture. Most distribution lines are fed from more than one transmission pipeline section and can hold service if not cross routing gas to a rupture section.
Techology Scope of Installation:	Control piping and pilot regulators-mechanical installation in exsting vaults.

Unit / Device definition	n/a									
Device Description Model / Mfg.	n/a									
Base Device Cost:	n/a									
Communications device:	n/a				**Polling System**	n/a				

TABLE 1 CAPITAL INSTALLATION SCHEDULE

Installation Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Units installed in year	-	-	10	10	10	10	10	10	10	10
Cumulative units		-	10	20	30	40	50	60	70	80

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: Install minor control piping equipment at larger regulator stations to prevent flow of gas in reverse direction. Hardware includes control piping check valves, manifolds and/or new pilot regulators. Include technician labor to plan, execute and test/commission upgraded facility based on standardized designs. Specific location list has not yet been finalized for this work. Interim location list available upon request. Equipment cost based on pilot regulator, check valve and misc component pricing. Labor estimate is for all planning and retrofit execution.

Workpaper: Valves_5b-BF-T-Reg pilots

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_5b_BF-T-SL_Reg pilots

Table 2 Single Unit Capital Costs (Installed and Commissioned)

Element	Rates/hr or qnty.	hours or qtny.	Sub total	Assumptions/notes:
Labor Project Planning/Admin.	$ -	0	$ -	
Permit and/or siting	$ -	0	$ -	
Labor union install/config.	$ 41.36	48	$ 1,985	Dist M&R Lead
Contract Services	$ -	0	$ -	
Labor QA/test/ config:	$ -	0	$ -	
Electronic Components	$ -	1	$ -	
Other Materials/encl/mount.	$ 2,500.00	1	$ 2,500	control components-pilot regulators and/or pilot check valve installation plus misc tubing/fittings.
Communication Devices	$ -	0	$ -	
Host system confirmation	$ -	1	$ -	
Electrical Power	$ -	1	$ -	
TOTAL			$ 4,485	
			$ 1,985	labor
			$ 2,500	non-labor

Table 3: Cost Computation Method: (Table 2 single unit cost multiplied by units shown in Table 1 for each year.

Table 3 Capital Cost by Year - Direct

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTALS
Capital Cost	-	-	44,853	44,853	44,853	44,853	44,853	44,853	44,853	44,853	**358,822**
Labor	-	-	19,853	19,853	19,853	19,853	19,853	19,853	19,853	19,853	158,822
non-labor	-	-	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	200,000

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5.

Assumes total of 4 hours per year per site by technician for each station, including travel time, for routine checks, troubleshooting/repair and occasional module replacement. Non-labor assumes misc travel expenses associate with site visits. Table 5 computed by taking each cumulative number of units installed in a year and multiplying by the Table 4 O&M per-unit costs. It is assumed each unit will receive one O&M check and troubleshooting in the first year of installation as part of non-capital commissioning.

Workpaper: Valves_5b-BF-T-Reg pilots

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	*Valves_5b_BF-T-SL_Reg pilots*

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.** (Cost to maintiain on unit each year)

O&M/per unit	Rates/hrs or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Union labor - troubleshoot/	$ 41.36	2	$ 82.72	M&R technician time
Mgmt Labor -prog mgmt	$ -	0	$ -	
Union labor - routine maint	$ 41.36	2	$ 82.72	M&R technician time
Non-labor	$ 80.00	1	$ 80.00	inspection and testing, misc parts replacement.
Location Fee	$ -	0	$ -	
electric power	$ -	0	$ -	
comm	$ -	0	$ -	
Other 2	$ -	0		
TOTAL			**$ 245.44**	

$ 165.44 labor
$ 80.00 non-labor

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 **Operating and Maintenance Cost by Year - Direct**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
	-	-	2,454	4,909	7,363	9,818	12,272	14,726	17,181	19,635	**88,358**
Labor	-	-	1,654	3,309	4,963	6,618	8,272	9,926	11,581	13,235	59,558
Non-labor	-	-	800	1,600	2,400	3,200	4,000	4,800	5,600	6,400	28,800

Summary of Cost Allocation Method/Rationale

Method: Table 6 allocations below are taken by multiplying total costs from Tables 3 and 5 above for Capital and O&M, respectively, for each year by the percentages shown in Table 7 below to arrive at the specific company cost and FERC account (dist/trans) for each year. **Allocation Rationale:** All valves under this Element are distribution pipeline assets. Accordingly, all system costs are allocated to under FERC distribution accounts 376 for Capital and 874.4 for O&M. Allocation to each company is based on the relative miles of transmission pipeline in each company served by these back-flow prevention valves under the VEP, resulting in a split of 14.65% of total costs to SDG&E and a 85.35% assignment to SoCalGas as shown in Table 7. Relative post-1950 construction transmission pipelines 12" and greater in Class 3/HCA locations served by meters as part of this plan: SDGE-126 miles, SoCalGas-736 miles.

Workpaper: Valves_5b-BF-T-Reg pilots

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_5b_BF-T-SL_Reg pilots

Table 6 Allocation of Costs to Company and FERC Accounts

Year Capital	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	-
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	-
SDGE Dist - Lab	-	-	2,907	2,907	2,907	2,907	2,907	2,907	2,907	2,907	**23,260**
SDGE Dist - non lab	-	-	3,661	3,661	3,661	3,661	3,661	3,661	3,661	3,661	**29,290**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	-
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	-
SCG Dist lab	-	-	16,945	16,945	16,945	16,945	16,945	16,945	16,945	16,945	**135,563**
SCG Dist non-lab	-	-	21,339	21,339	21,339	21,339	21,339	21,339	21,339	21,339	**170,710**
Total Plan	-	-	44,853	44,853	44,853	44,853	44,853	44,853	44,853	44,853	**358,822**

Year O&M	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	-
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	-
SDGE Dist - Lab	-	-	242	485	727	969	1,211	1,454	1,696	1,938	**8,722**
SDGE Dist - non lab	-	-	117	234	351	469	586	703	820	937	**4,218**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	-
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	-
SCG Dist lab	-	-	1,412	2,824	4,236	5,648	7,061	8,473	9,885	11,297	**50,836**
SCG Dist non-lab	-	-	683	1,366	2,049	2,731	3,414	4,097	4,780	5,463	**24,582**
Total Plan	**-**	**-**	**2,454**	**4,909**	**7,363**	**9,818**	**12,272**	**14,726**	**17,181**	**19,635**	**88,358**

Table 7 Utility Allocation

	SDGE	SCG
Relative transmission pipeline miles under plan as of	126.36	736.49
% of utility total (allocation)	14.65%	85.35%
Distribution allocation	100%	100%
Transmission allocation	0%	

Workpaper: Valves_5c_BF-T-chk valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	*Valves_5c_BF-T-S-check valves*

Technology Description:	Install 40 check valves on distribution supply pipelines and district reg stations.										
Technology Purpose:	Prevent backflow into ruptured transmission lines, minimize customer service loss.										
Techology Scope of Installation:	40 locations: including taps, crossovers and bridle assemblies.										
Unit/Device definition											
Device Description Model/Mfg.	n/a										
Base Device Cost:	n/a										
Communications device:	n/a				**Polling System**	n/a					

TABLE 1 CAPITAL INSTALLATION SCHEDULE

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTALS
Units installed in year	4	4	4	4	4	4	4	4	4	4	40
cumulative units		8	12	16	20	24	28	32	36	40	

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: install check valves at 40 locations to prevent backflow from smaller pipeline into major distribution and transmission lines around bridles, from direct taps. Install bypass around stations. Include differential pressure remote monitors and pressure sensors to provide exception alarming on check valve condition via radio system. Units to be located in new vault. Size ranges 8-12".

Table 2 Single Unit Capital Costs (Installed and Commissioned)

Element	Rates/hr or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Labor Project Planning/Admin.	$ 44	400	$ 17,652	
Permit and/or siting	$ 1,000	1	$ 1,000	
Labor union install/config.	$ 44	50	$ 2,207	Sr Trans Inst tech.
Contract Services	$ 30,000	1	$ 30,000	
Labor QA/test/ config:	$ 39	0	$ -	MR tech equivalent
Electronic Components	$ 1,800	0	$ -	pressure alarm RTU with Solar
Other Materials/encl/mount/n	$ 40,000	1	$ 40,000	
Communication Devices	$ -	0	$ -	include in Other material costs.
Host system confirmation	$ 46	0	$ -	
Electrical Power	$ -	0	$ -	
TOTAL			**$ 90,859**	
			$ 19,859	labor
			$ 71,000	non-labor

Workpaper: Valves_5c_BF-T-chk valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_5c_BF-T-S-check valves

Table 3: Cost Computation Method: (Table 2 single unit cost multiplied by units shown in Table 1 for each year.

Table 3 Capital Cost by Year - Direct

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTALS
Capital Cost	363,434	363,434	363,434	363,434	363,434	363,434	363,434	363,434	363,434	363,434	**3,634,340**
Labor	79,434	79,434	79,434	79,434	79,434	79,434	79,434	79,434	79,434	79,434	794,340
non-labor	284,000	284,000	284,000	284,000	284,000	284,000	284,000	284,000	284,000	284,000	2,840,000

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5.
Assumes total of 3 hours per year per site by technician for each check valve location, including travel time, for routine RTU and differential Press checks, troubleshooting/repair and occasional module replacement. Non-labor assumes misc travel expenses associate with site visits. Table 5 computed by taking each cumulative number of units installed in a year and multiplying by the Table 4 O&M per-unit costs. It is assumed each unit will receive one O&M check and troubleshooting each year, including in the first year of installation as part of non-capital commissioning.

Table 4 UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.

(Cost to maintiain on unit each year)

O&M costs/per unit	Rates/hrs or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Union labor - troubleshoot/rep	$ 44.13	2	$ 88.26	M&R tech
Mgmt Labor -prog mgmt	$ -	0	$ -	
Union labor - routine maint	$ 44.13	1	$ 44.13	
Non-labor	$ 60.00	1	$ 60.00	
Location Fee	$ -	0	$ -	
electric power	$ -	0	$ -	
comm	$ -	0	$ -	
Other 2	$ -	0		
TOTAL			**$ 192.39**	
			$ 132.39	labor
			$ 60.00	non-labor

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 Operating and Maintenance Cost by Year Direct

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL
	770	1,539	2,309	3,078	3,848	4,617	5,387	6,156	6,926	7,696	**42,326**
Labor	530	1,059	1,589	2,118	2,648	3,177	3,707	4,236	4,766	5,296	29,126
Non-labor	240	480	720	960	1,200	1,440	1,680	1,920	2,160	2,400	13,200

Workpaper: Valves_5c_BF-T-chk valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	*Valves_5c_BF-T-S-check valves*

Method: Table 6 allocations below are taken by multiplying total costs from Tables 3 and 5 above for Capital and O&M, respectively, for each year by the percentages shown in Table 7 below to arrive at the specific company cost and FERC account (dist/trans) for each year. **Allocation Rationale:** All valves under this Element are distribution pipeline assets. Accordingly, all system costs are allocated to under FERC distribution accounts 376 for Capital and 874.4 for O&M. Allocation to each company is based on the relative miles of transmission pipeline in each company served by these back-flow prevention valves under the VEP, resulting in a split of 14.65% of total costs to SDG&E and a 85.35% assignment to SoCalGas as shown in Table 7. Relative transmission pipelines 12" and greater in Class 3/HCA locations served by meters as part of this plan: SDGE-126 miles, SoCalGas-736 miles.

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year **Capital**	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Total**
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	11,633	11,633	11,633	11,633	11,633	11,633	11,633	11,633	11,633	11,633	**116,331**
SDGE Dist - non lab	41,592	41,592	41,592	41,592	41,592	41,592	41,592	41,592	41,592	41,592	**415,918**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist lab	67,801	67,801	67,801	67,801	67,801	67,801	67,801	67,801	67,801	67,801	**678,009**
SCG Dist non-lab	242,408	242,408	242,408	242,408	242,408	242,408	242,408	242,408	242,408	242,408	**2,424,082**
Total Plan	363,434	363,434	363,434	363,434	363,434	363,434	363,434	363,434	363,434	363,434	**3,634,340**

Year **O&M**	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Total**
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	78	155	233	310	388	465	543	620	698	776	**4,265**
SDGE Dist - non lab	35	70	105	141	176	211	246	281	316	351	**1,933**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist lab	452	904	1,356	1,808	2,260	2,712	3,164	3,616	4,068	4,520	**24,860**
SCG Dist non-lab	205	410	615	819	1,024	1,229	1,434	1,639	1,844	2,049	**11,267**
Total Plan	**770**	**1,539**	**2,309**	**3,078**	**3,848**	**4,617**	**5,387**	**6,156**	**6,926**	**7,696**	**42,326**

Workpaper: Valves_5c_BF-T-chk valves

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	*Valves_5c_BF-T-S-check valves*

Table 7 Utility Allocation

	SDGE	SoCalGas
pipeline miles CL III gt 12", 200+ psig	126.36	736.49
% of utility total	14.6%	85.4%

Valves_6-small meters

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	*Valves_6-small meters*

Technology Description:	**Install gas measurement stations on 40 supply line and reg stations fed from within sections of HP transmission subject to remote and automatic isolation.**
Technology Purpose:	Help operators evaluate the effects of valve closures and related pipeline pressure excursions; and support improved pipeline system visibility to better identify and manage a pipeline rupture incident. Support the proper routing of gas to both mitigate pipeline presssures following a rupture while retaining service to customers. Provide operators insight on whether a pressure drop and rupture is truly on a major tranmsission line, or a secondary pipeline directly served by the major pipeline.
Techology Scope of Installation:	A total of 40 metering stations to be installed on significant pipelines connected to major transmission pipelines, and especially where such pipelines serve major customer loads from multiple transmission pipeline feeds.
Unit / Device definition	n/a
Device Description Model / Mfg.	n/a
Base Device Cost:	
Communications device:	Radio and SCADA telecomm circuit — **Polling System**: Operations Control SCADA at 5 minutes and by alarm exception reporting in real-time.

TABLE 1 **CAPITAL INSTALLATION SCHEDULE**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Units installed in year	-	-	8	8	8	8	8	-	-	-	**40**
Cumulative		-	8	16	24	32	40	40	40	40	

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: New small ultrasonic metering station in size ranges 8" to 12". Locations to be at/near RCV locations where possible. Non-AGA compliant measurmement. Includes single meter (vaulted in-line, clamp on or retractible probe). Add commercial flow computer with pressure/temp compensation.) Installation of byass valves piping added where needed to support service reliability to customers during maintenance.

Valves_6-small meters

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_6-small meters

Table 2 **Single Unit Capital Costs (Installed and Commissioned)**

Element	Rates/hr or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
				leverage vault work from control valves work where possible
Labor Project Planning/Admin.	$ 53	160	$ 8,462	proj mgr.
Permit and/or siting	$ 500	1	$ 500	
Labor union install/config.	$ 44	40	$ 1,765	Trans senior instrument spacialist
Contract Services	$ 20,000	1	$ 20,000	Electrical panel fab, vault core, actuator power-up and test.
Labor QA/test/ config:	$ 44	80	$ 3,530	
Electronic Components	$ 10,000	1	$ 10,000	
Other Materials/encl/mount.	$ 50,000	1	$ 50,000	
Communication Devices	$ 2,000	1	$ 2,000	
Host system confirmation	$ 60	1	$ 60	
Electrical Power	$ 5,000	1	$ 5,000	solar or employ power from MLVs and tap valve installations
TOTAL			**$ 101,317**	
			$ 13,817	labor
			$ 87,500	non-labor

Table 3: Cost Computation Method: (Table 2 single unit cost multiplied by units shown in Table 1 for each year.

Table 3 **Capital Cost by Year - Direct**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital Cost	-	-	810,537	810,537	810,537	810,537	810,537	-	-	-	**4,052,686**
Labor	-	-	110,537	110,537	110,537	110,537	110,537	-	-	-	552,686
non-labor	-	-	700,000	700,000	700,000	700,000	700,000	-	-	-	3,500,000

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5.
Assumes total of 10 hours per year per site by technician for each metering site, including travel time, for routine checks, troubleshooting/repair and occasional module replacement. Non-labor assumes misc travel expenses associate with site visits. Table 5 computed by taking each cumulative number of units installed in a year and multiplying by the Table 4 O&M per-unit costs. It is assumed each unit will receive one O&M check and troubleshooting in the first year of installation as part of non-capital commissioning and integrity follow-up. Electric power is assumed to be provided from either an existing valve station or Solar/battery. No utility power costs included.

Valves_6-small meters

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data | ***Valves_6-small meters***

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.** (Cost to maintiain one unit each year)

O&M costs ($/per meter)	Rates/hrs or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Union labor - troubleshoot/rep	$ 44.13	4	$ 176.52	sr inst tech
Mgmt Labor -prog mgmt	$ 52.88	2	$ 105.77	
Union labor - routine maint	$ 44.13	4	$ 176.52	
Non-labor	$ 200.00	1	$ 200.00	mileage/misc parts/exppenses.
Location Fee	$ -	0	$ -	
electric power	$ -	12	$ -	assume power from mlv and shutoff valve service or solar/batt.
comm	$ -	0	$ -	included in AMI system costs
Other 2	$ -	0		
TOTAL			**$ 658.81**	

$ 458.81 labor
$ 200.00 non-labor

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 **Operating and Maintenance Cost by Year - Direct**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
	-	-	5,270	10,541	15,811	21,082	26,352	26,352	26,352	**26,352**	**158,114**
Labor	-	-	3,670	7,341	11,011	14,682	18,352	18,352	18,352	18,352	**110,114**
Non-labor	-	-	1,600	3,200	4,800	6,400	8,000	8,000	8,000	8,000	**48,000**

Summary of Cost Allocation Method/Rationale

Method: Table 6 allocations below are taken by multiplying total costs from Tables 3 and 5 above for Capital and O&M, respectively, for each year by the percentages shown below to arrive at the specific company cost by year and FERC account (dist/trans) for each year. **Allocation Rationale:** All meters under this Element are distribution pipeline assets. Thus, all system costs are allocated to SoCalGas under FERC 376 for Capital and 874.4 for O&M. Allocation to each company is based on the relative miles of transmission pipeline in each company served by these meters under the VEP, resulting in a split of 14.65% of total costs to SDG&E and a 85.35% assignment to SoCalGas. Relative transmission pipelines 12" and greater in Class 3/HCA locations served by meters as part of this plan. SDGE-126 miles, SoCalGas-736 miles.

Valves_6-small meters

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_6-small meters

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Total**
Capital											
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	-	-	16,188	16,188	16,188	16,188	16,188	-	-	-	**80,941**
SDGE Dist - non lab	-	-	102,515	102,515	102,515	102,515	102,515	-	-	-	**512,576**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist lab	-	-	94,349	94,349	94,349	94,349	94,349	-	-	-	**471,745**
SCG Dist non-lab	-	-	597,485	597,485	597,485	597,485	597,485	-	-	-	**2,987,424**
Total Plan	-	-	810,537	810,537	810,537	810,537	810,537	-	-	-	**4,052,686**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Total**
O&M											
SDGE trans -Labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE trans Non-labor	-	-	-	-	-	-	-	-	-	-	**-**
SDGE Dist - Lab	-	-	538	1,075	1,613	2,150	2,688	2,688	2,688	2,688	**16,126**
SDGE Dist - non lab	-	-	234	469	703	937	1,172	1,172	1,172	1,172	**7,030**
SCG Trans - Lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Trans non-lab	-	-	-	-	-	-	-	-	-	-	**-**
SCG Dist lab	-	-	3,133	6,266	9,399	12,532	15,665	15,665	15,665	15,665	**93,988**
SCG Dist non-lab	-	-	1,366	2,731	4,097	5,463	6,828	6,828	6,828	6,828	**40,970**
Total Plan	**-**	**-**	**5,270**	**10,541**	**15,811**	**21,082**	**26,352**	**26,352**	**26,352**	**26,352**	**158,114**

Table 7 Utility Allocation

	SDGE	SoCalGas
niles CL III gt 12", 200+ psig transmissior	126.36	736.49
% of utility total	0.1465	0.8535

WorkPaper: Valves_7-base-SCADA system exp

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_7-Base SCADA System exp

Technology Description:	**Base SCADA System Enhancement: Modify central SCADA system to accommodate 600 new monitoring and control locations for volume measurement and valve control, and to link 100 added linebreak locations. Total of 9000 new data fields and monitoring parameters.**
Technology Purpose:	Control additional valves to isolate class III pipeline locations when ruptures occur; monitor additional pressure, flow and rate of change in both parameters to better manage through and major pipeline incident.
Techology Scope of Installation:	367 remote control valves to be added to SCADA system for real time control. 60 additional volume locations. Data from 194 existing linebreak controls to be added to system.
Unit / Device definition	One complete SCADA system upgrade capable of managing 9000 new data parameters with maximum 30 second control data latency.
Device Description Model / Mfg.	Complete central SCADA upgrade. Include Control room labor and system maintenance cost for Gas Control Center and monthly communications cost to field devices.
Base Device Cost:	$ 3,300,000 — **field locations** 500
Communications device:	Employ common carrier for primary data comm. Employ SCG and SDGE AMI radio systems for communications back-up. Modem costs included in radio system up

TABLE 1 **CAPITAL INSTALLATION SCHEDULE**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
system % installed			0.5	0.5						

WorkPaper: Valves_7-base-SCADA system exp

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data

Valves_7-Base SCADA System exp

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: Capital cost for SCADA system expansion is based upon SCADA vendor discsussion and prior system upgrade/expansion costs. Capital costs includes all hardware, required software and integration costs. Capital includes 2 FTE for 2 years at Operations control to manage this system expansion and help integrate over 600 new telemetry and control sites into continuing critical operations. System to be upgraded over period 2014 and 2015.

Table 2 **Single Unit Capital Costs (Installed and Commissioned)**

Element	Rates/hr or qnty.	hours or qtny.	Sub total	Assumptions/notes on line item
Labor Project Planning/Admin.	$ 400,000.00	1	$ 400,000.00	company Labor 2 IT/Professionals @ $100k/yr for 2 years
Permit and/or citing	$ -	0	$ -	
Labor union install/config.	$ -	0	$ -	
Contracting costs	$ 50,000	1	$ 50,000	contract labor and technical support
Labor QA/test/ config:	$ -	16	$ -	
Unit purchase inc tax/ship/hndl	$ 3,300,000.00	1	$ 3,300,000.00	base SCADA system upgrade costs
Other Materials/encl/mount.			$ -	
Communication Device	$ -	1	$ -	included in base SCADA estimate
Other 1	$ -	4	$ -	
Other 2	$ -	1	$ -	
TOTAL			**$ 3,750,000.00**	
			$ 400,000.00	labor
			$ 3,350,000.00	non-labor

Table 3: Cost Computation Method: (Table 2 single unit cost multiplied by units shown in Table 1 for each year.

Table 3 **Capital Cost by Year - Direct**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Totals
Capital Cost	-	-	1,875,000	1,875,000	-	-	-	-	-	-	3,750,000
Labor	-	-	200,000	200,000	-	-	-	-	-	-	400,000
non-labor	-	-	1,675,000	1,675,000	-	-	-	-	-	-	3,350,000
Remote sites commissioned each year	0	70	70	70	70	70	70	70	70	70	630

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5. The dominant costs below are the addition of one employee added to each of five Gas Control shifts to provide oversight of 600 different control and monitoring points on the SCADA system. One systems maintenance employee added to support SCADA technical support to help manage communication devices, data collecton and storage activities. Communictions to 315 locations to be provided by commercial data circuits at $150 per month per site. No cost included for radio back-up and exception reporting from some field devices. Those costs included in the field device and radio expansion Elements.

WorkPaper: Valves_7-base-SCADA system exp

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_7-Base SCADA System exp

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.**

O&M Costs/per unit (control locations)	Rates/hrs or qnty.	qty	Sub total		Assumptions/notes on line item
Control room labor	$ 450,000.00	1	$ 450,000.00	*2015*	One added position on control shift (5 man rotating shifts). Includes labor to handle new control and monitoring points and cross ref cp, fiber and ROW alarm monitoring. Start 2015
Mgmt Labor: system support SCADA	$ 105,000.00	1	$ 105,000.00		one added position to SCADA support team at Gas control start 2013
Union labor - troubleshoot/rep	$ -	0	$ -		Field labor include in valve and linebreak costs
Non-labor (contract/parts/exp)	$ 50,000.00	1	$ 50,000.00	*2017*	support contract, misc parts and expenses-start 2014
Location Fee	$ -	0	$ -		
utility power	$ 50.00	12	$ 600.00		incremental scada system power at ops control
Comm cost utility (at completion)	$ 94,500.00	12	$ 1,134,000.00		$150 per month per endpoint continuous polling
Other 2		0	$ -		Ultimately assume 1/2 the points covered via radio as primary coverage 315 points at full $150 per mo
TOTAL			**$ 1,739,600.00**		
			$ 555,000.00	labor	
			$ 1,184,600.00	non labor	

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 **Operating and Maintenance Cost by Year - Direct**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL
O&M costs	-	118,311	686,622	752,433	818,244	884,056	949,867	1,015,678	1,081,489	1,147,300	**7,454,000**
Labor	-	52,500	555,000	555,000	555,000	555,000	555,000	555,000	555,000	555,000	**4,492,500**
Non-labor	-	65,811	131,622	197,433	263,244	329,056	394,867	460,678	526,489	592,300	**2,961,500**

Summary of Cost Allocation Method/Rationale

Method: Table 6 allocations below are taken by multiplying total costs from Tables 3 and 5 above for Capital and O&M, respectively, for each year by the percentages shown below to arrive at the specific company cost by year and FERC account (dist/trans) for each year. **Allocation Rationale:** The shared service central SCADA system for the Utilities is categrorized as a gas transmission asset . Thus, all system costs are allocated to SoCalGas under FERC 367 for Capital and 859.1 for O&M. Allocation to each company is based on the relative miles of transmission pipeline in each company served by the Valve Enhancement Plan, resulting in a split of 14.65% of total costs to SDG&E and a 85.35% assignment to SoCalGas. Relative transmission pipelines 12" and greater in Class 3/HCA locations served by this plan: SDGE-126 miles, SoCalGas-736 miles.

WorkPaper: Valves_7-base-SCADA system exp

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_7-Base SCADA System exp

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year Capital	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	-	-	29,290	29,290	-	-	-	-	-	-	58,580
SDGE trans Non-labor	-	-	245,304	245,304	-	-	-	-	-	-	490,608
SDGE Dist - Lab	-	-	-	-	-	-	-	-	-	-	-
SDGE Dist - non lab	-	-	-	-	-	-	-	-	-	-	-
SCG Trans - Lab	-	-	170,710	170,710	-	-	-	-	-	-	341,420
SCG Trans non-lab	-	-	1,429,696	1,429,696	-	-	-	-	-	-	2,859,392
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	-
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	-
total Plan 20" 20%	**-**	**-**	**1,875,000**	**1,875,000**	**-**	**-**	**-**	**-**	**-**	**-**	**3,750,000**

Year O&M	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
SDGE trans -Labor	-	7,689	81,280	81,280	81,280	81,280	81,280	81,280	81,280	81,280	657,927
SDGE trans Non-labor	-	9,638	19,276	28,914	38,552	48,190	57,828	67,466	77,104	86,742	433,712
SDGE Dist - Lab	-	-	-	-	-	-	-	-	-	-	-
SDGE Dist - non lab	-	-	-	-	-	-	-	-	-	-	-
SCG Trans - Lab	-	44,811	473,720	473,720	473,720	473,720	473,720	473,720	473,720	473,720	3,834,573
SCG Trans non-lab	-	56,173	112,346	168,519	224,692	280,865	337,038	393,211	449,385	505,558	2,527,788
SCG Dist lab	-	-	-	-	-	-	-	-	-	-	-
SCG Dist non-lab	-	-	-	-	-	-	-	-	-	-	-
total Plan 20" 20%	**-**	**118,311**	**686,622**	**752,433**	**818,244**	**884,056**	**949,867**	**1,015,678**	**1,081,489**	**1,147,300**	**7,454,000**

1,091,639
6,362,361
1,091,639

Table 7 Utility Allocation

	SDGE	SCG
pipeline miles CL III gt 12", 200+ psig	126.36	736.49
% of utility total	0.1465	0.8535

Workpaper: Valves_8 -SDGE radio system

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_8-SDGE Radio System

Technology Description:	Expand SDGE radio system coverage to areas where large pipelines are routed; to support polling of field sensors and back-up communications to 70+ valve control locations and 20 pressure and flow site sites installed as part of the Valve Enhancement Plan.
Technology Purpose:	Provide the ability for 2-way communications on the system to provide basic polling of operational data, provide ability to communicate with valve stations for emergency operations (back-up to commercial carrier data circuits), and support the polling of pressure alarm devices and gas meters used for operations and defined in the Valve Enhancement Plan. Support exception polling of methane detection and fiber optic alarms from the Pipeline Infrastructure Monitoring system, support the future monitoring of remote cathodic protection devices and acoustiic pipleine right of way sensors.
Techology Scope of Installation:	Install Data collector radios and related relay stations at 480 sites within the service territory. "Head-end" collection assets to support Radio monitoring and emergency control of pipeline assets and collection of Pipeline Infrastructure Monitoring data. Detailed SDGE radio system cost estimate available as a supplemental electronic document.
Unit/Device definition	Complete system expansion
Device Description Model/Mfg.	
Base Device Cost:	field locations
Communications device:	

TABLE 1 CAPITAL INSTALLATION SCHEDULE

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
system % installed		0.33	0.33	0.33						

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: A detailed cost estimate was prepared by the SDGE IT Comm Staff to forecast the assets required to provide two-way communicatons system wide and extent this feature to areas where SDGE has large pipelines, but no radio coverage planned as part of its SMart Meter program - so that pipeline assets could be monitored and, in an emergency, controlled. This expansion is not overlapping or duplicative with any assets approved by the commission under SDGE's Smart meter and Decision. Table 3 below provides an excerpt of capital costs identified in this detailed study, which is available upon request. System build-out to occur 2013 thru 2015, as SDG&E's Valve Engancement Plan progresses to pipelines without pre-planned radio coverage. Note that the cost below do not include radio modules/modems for field devices and valve stations. Those costs are included in the valve and field sensor monitoring cost associated with the Valve Enhancement Plan.

Workpaper: Valves_8 -SDGE radio system

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_8-SDGE Radio System

Table 2 UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.

Values based on a detailed IT cost estimate.

Table 3: Cost Computation Method: (Table 2 single unit cost multiplied by units shown in Table 1 for each year.

Table 3 Capital Cost by Year - Direct

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital Cost	$ -	$ 1,024,597	$ 1,024,597	$ 1,024,597	$ -	$ -	$ -	$ -	$ -	$ -	**3,073,791**
Labor	$ -	$ 130,197	$ 130,197	$ 130,197	$ -	$ -	$ -	$ -	$ -	$ -	**390,591**
non-labor	$ -	$ 894,400	$ 894,400	$ 894,400	$ -	$ -	$ -	$ -	$ -	$ -	**2,683,200**

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5. System O&M cost include technical Staff to maintain the expanded radio assets, and to manage software interfaces and security-related to use of the new system to poll field devices and to serve emergency back-up control. These cost assume efficiencies associated with expanding an existing radio system, as opposed to managing a completely new and different system from that currently employed by SDG&E.

Table 4 UNIT OPERATING AND MAINTENANCE COSTS PER YEAR. (Cost to maintiain on unit each year)

Values based on a detailed IT cost estimate.

Table 5 Cost Computation Method: Table 4 unit operating cost multiplied by Table 1 cumulative units installed for each Plan Year.

Table 5 Operating and Maintenance Cost by Year - Direct

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
	-	62,304	124,608	122,538	100,938	100,938	100,938	100,938	100,938	100,938	915,075
Labor		$ 40,704	$ 81,408	$ 81,408	$ 81,408	$ 81,408	$ 81,408	$ 81,408	$ 81,408	$ 81,408	**$ 691,968**
Non-labor		$ 21,600	$ 43,200	$ 41,130	$ 19,530	$ 19,530	$ 19,530	$ 19,530	$ 19,530	$ 19,530	**$ 223,107**

Workpaper: Valves_8 -SDGE radio system

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_8-SDGE Radio System

Summary of Cost Allocation Method/Rationale

Method: This system is fully allocated to SDGE as a Distribution asset. Table 6 Below reflects this allocation. This cost has been assigned to FERC account 376 for Capital and 874.4 for O&M.

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital											
SDGE trans -Labor											-
SDGE trans Non-labor											-
SDGE Dist - Lab	-	130,197	130,197	130,197	-	-	-	-	-	-	390,591
SDGE Dist - non lab	-	894,400	894,400	894,400	-	-	-	-	-	-	2,683,200
SCG Trans - Lab											
SCG Trans non-lab											
SCG Dist lab											
SCG Dist non-lab											
Total Plan	-	1,024,597	1,024,597	1,024,597	-	-	-	-	-	-	**3,073,791**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
O&M											
SDGE trans -Labor											
SDGE trans Non-labor											
SDGE Dist - Lab	-	40,704	81,408	81,408	81,408	81,408	81,408	81,408	81,408	81,408	**691,968**
SDGE Dist - non lab	-	21,600	43,200	41,130	19,530	19,530	19,530	19,530	19,530	19,530	**223,107**
SCG Trans - Lab											
SCG Trans non-lab											
SCG Dist lab											
SCG Dist non-lab											
Total Plan	**-**	**62,304**	**124,608**	**122,538**	**100,938**	**100,938**	**100,938**	**100,938**	**100,938**	**100,938**	**915,075**

Workpaper: SCG RAdio Estimate

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_9-SCG radio system

Technology Description:	Expand SoCalGas AMI radio system coverage to areas where large pipelines are routed; to support polling of field sensors and back-up communications to 300+ valve control locations and 200 pressure and flow sites installed as part of the Valve Enhancement Plan.
Technology Purpose:	Provide the ability for two-way communications on the system to provide basic polling of operational data for use in emergency situations, provide ability to communicate with valve stations for emergency operations (back-up to commercial carrier data circuits), support the polling of pressure alarm devices and gas meters used for operations and defined in the Valve Enhancement Plan. Support exception polling of methane detection and fiber optic alarms from the Pipeline Infrastructure Monitoring system, support the future monitoring of remote cathodic protection devices and acoustiic pipeline right of way sensors.
Techology Scope of Installation:	Install 300 new Data collector radios and 30 new T1 communication lines and "Head-end" collection assets to support Radio monitoring and emergency control of pipeline assets and collection of Pipeline Infrastructure Monitoring data.
Unit/Device definition	Complete system expansion
Device Description Model/Mfg.	AMI system expansion or alternative radio system
Base Device Cost:	**field locations**
Communications device:	Employ common carrier for primary data comm. Employ SCG and SDGE AMI radio systems for communications back-up.

TABLE 1 **CAPITAL INSTALLATION SCHEDULE**

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
system % installed	-	0.2	0.2	0.2	0.2	0.2				

1

Workpaper: SCG RAdio Estimate

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_9-SCG radio system

Overview of Basic Assumptions and factors used for capital cost estimations used in Table 2 and 3: A detailed cost estimate was prepared by the SoCalGas AMI program staff to estimate the assets required to provide two-way communicatons system-wide and extent this feature to areas where SoCalGas has large pipelines, but no radio coverage planned as part of its AMI program - so that pipeline assets could be monitored and, in an emergency, controlled. This expansion is not overlapping or duplicative with any assets approved by the commission under SoCalGas AMI filing and Decision. Capital and O&M costs were obtained from a detailed IT study. Those capital and O&M costs by year are summarized in Table 3 and Table 6 below. System build-out to occur 2012 thru 2017, as SoCalGas valve Plan progresses to pipelines without pre-planned radio coverage. Note that the cost below do not include radio modules/modems for field devices and valve stations. Those costs are included in the valve and field sensor monitoring cost associated with the Valve Enhancement Plan.

Table 2 **Omitted in leiu of detailed analysis better presented electronically upon request.**

Table 3 **Capital Cost by Year - Direct**

Table 3: Cost Computation Method: Cost taken from an IT study

Installation Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital Cost	$ 1,938,081	$ 1,938,081	$ 1,765,581	$ 2,368,131	$ 2,970,681	$ 2,300,631	$ -	$ -	$ -	$ -	**13,281,187**
Labor	$ 598,094	598,094	598,094	598,094	598,094	598,094	-	-	-	-	**3,588,566**
non-labor	$ 1,339,987	1,339,987	1,167,487	1,770,037	2,372,587	1,702,537	-	-	-	-	**9,692,621**

Overview of Basic Assumptions for O&M cost computation for single units in Table 4 and annual costs in Table 5. System O&M cost include technical Staff to maintain the expanded radio assets, and to manage software interfaces and security related to use of the new system to poll field devices and to serve emergency back-up control.

Table 4 **UNIT OPERATING AND MAINTENANCE COSTS PER YEAR.**

Omitted: Values were taken from Table 7.

Table 5 **Operating and Maintenance Cost by Year - Direct**

Table 5 Cost Computation Method based on an IT study

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
	-	-	13,129	131,412	359,950	952,292	952,292	866,200	866,200	866,200	**5,007,676**
Labor	-	-	-	70,000	70,000	70,000	70,000	70,000	70,000	70,000	**490,000**
Non-labor	-	-	13,129	61,412	289,950	882,292	882,292	796,200	796,200	796,200	**4,517,676**

Workpaper: SCG RAdio Estimate

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data	Valves_9-SCG radio system

Summary of Cost Allocation Method/Rationale

Method: This system is fully allocated to SoCalGas as a Distribution asset. Table 6 Below reflects this allocation. This cost has been assigned to FERC account 376 for Capital and 874.4 for O&M.

Table 6 **Allocation of Costs to Company and FERC Accounts**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Capital											
SDGE trans -Labor											-
SDGE trans Non-labor											-
SDGE Dist - Lab											-
SDGE Dist - non lab											-
SCG Trans - Lab											-
SCG Trans non-lab											-
SCG Dist lab	598,094	598,094	598,094	598,094	598,094	598,094	-	-	-	-	**3,588,566**
SCG Dist non-lab	1,339,987	1,339,987	1,167,487	1,770,037	2,372,587	1,702,537	-	-	-	-	**9,692,621**
Total Plan	1,938,081	1,938,081	1,765,581	2,368,131	2,970,681	2,300,631	-	-	-	-	**13,281,187**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
O&M											
SDGE trans -Labor											-
SDGE trans Non-labor											-
SDGE Dist - Lab											-
SDGE Dist - non lab											-
SCG Trans - Lab											-
SCG Trans non-lab											-
SCG Dist lab	-	-	-	70,000	70,000	70,000	70,000	70,000	70,000	70,000	**490,000**
SCG Dist non-lab	-	-	13,129	61,412	289,950	882,292	882,292	796,200	796,200	796,200	**4,517,676**
Total Plan	**-**	**-**	**13,129**	**131,412**	**359,950**	**952,292**	**952,292**	**866,200**	**866,200**	**866,200**	**5,007,676**

Workpaper: SCG RAdio Estimate

PSEP - Valve Enhancement Plan Capital and O&M Detailed Data | **Valves_9-SCG radio system**

Table 7 **Sample of detailed Cost Estimate prepared for SoCalGas Radio System expansion.**

(SEE ATTACHMENT VALVES_CAP_xx) for full Printout)

NETWORK TECHNOLOGY BUDGET - Gas Infrastructure Program

Date: **1/13/2011**

Ln No	O&M/CAP	L/NL/C	SCG/ Vendor	DBRT Phase	Description	Ref Tab	2012 to 2021 Labor	2012 to 2021 N/Labor	2012 to 2021 Contract	2017	2012 to 2021 Total	2012 Labor	2012 N/Labor	2012 Contract	2012 Total	2013 Labor
	CAPITAL															
6	CAP	Lab	SCG	All	System Engineering, Network Deployment, Systems Operations	Tab 2, Row 130	$ 2,109,022	$ -	$ -		$ 2,109,022	$ 351,504			$ 351,504	$ 351,504
7	CAP	Lab	SCG	All	Support Labor from Ot	Tab 2, Row 134	$ 881,450	$ -	$ -		$ 881,450	$ 146,908			$ 146,908	$ 146,908
8	CAP	Contr	Aclara	All	Design, Build, Run/Transfer DBRT Professional Services	Tab 4: Row 73	$ -	$ -	$ 5,383,939		$ 5,383,939			$ 897,323	$ 897,323	
9	CAP	Contr	Aclara	All	Design and Build of NCC modifications to support new requirements (Tier 3)	n/a	$ -	$ -	$ 350,000		$ 350,000			$ 175,000		
10	CAP	Contr	Aclara	All	Incremental Design and Build of NCC modifications to enhance to Tier 1	n/a	$ -	$ -	$ 50,000		$ 50,000			$ 25,000		
11	CAP	Contr	TBD	Build	Land Rights and QA services for Network Deployment	Tab 5: Row 8	$ -	$ -	$ 168,750		$ 168,750			$ -	$ -	
12	CAP	NL	Aclara	Inst	Gas Communication N	Tab 6: Row 11	$ -	$ -	$ -		$ -		$ -		$ -	
13	CAP	NL	Aclara	Build	Installation Hardware (DCU, Fiberglass Poles, 10% Tax & Shipping)	Tab 6: Row 16	$ -	$ 1,287,000	$ -		$ 1,287,000		$ -		$ -	
14	CAP	NL	SCG	Build	Pole App Fee, Permits, Network Switches, Fac Inv Maps, Pole Changeout Cost	Tab 6: Row 27	$ -	$ 721,500	$ -		$ 721,500		$ -		$ -	
15	CAP	NL	SCG	All	N/Lab assoc w/ Labor - Cell, Reimb, Stationery, Misc	Tab 6, Row 32	$ -	$ 115,995	$ -		$ 115,995		$ 19,333		$ 19,333	
16					***Total Capital Costs***		***$ 2,990,472***	***$ 2,124,495***	***$ 5,952,689***		***$ 11,067,656***	***$ 498,412***	***$ 19,333***	***$ 1,097,323***	***$ 1,415,068***	***$ 498,412***
17																
18	O&M AND CLEARING															
19	O&M	Lab	SCG	Run	Network System Oper	Assumptions Cell C34	$ 490,000	$ -	$ -		$ 490,000	$ -			$ -	
20	O&M	NL	SCG	Build	AC Power, Site/Pole Lease, Backhaul Lease Circuits	Tab 3: Row 12	$ -	$ 4,117,200	$ -		$ 4,117,200		$ -		$ -	
21	O&M	NL	SCG	All	N/Lab assoc w/ Lab - Cell, Reimb, Stationery, Misc	Tab 3: Row 16	$ -	$ 172,184	$ -		$ 172,184		$ -		$ -	
22					***Total O&M Costs***		***$ 490,000***	***$ 4,289,384***	***$ -***	***$ -***	***$ 4,779,384***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***
23																
24					**GRAND TOTAL - CAPITAL & O&M COSTS**		$ 3,480,472	$ 6,413,879	$ 5,952,689	$ -	$ 15,847,040	$ 498,412	$ 998,333	$ 1,097,323	$ 2,594,068	$ 498,412
25					**GRAND TOTAL - WITH CONTINGENCY**		$ 4,002,543	$ 7,375,961	$ 6,845,593	$ -	$ 18,224,096	$ -	$ -	$ -	$ -	$ -

contingency multiplier capital 1.2
used below in lab and non-lab calc

Workpaper: SCG RAdio Estimate

2013 N/Labor	2013 Contract	2013 Total	2014 Labor	2014 N/Labor	2014 Contract	2014 Total	2015 Labor	2015 N/Labor	2015 Contract	2015 Total	2016 Labor	2016 N/Labor	2016 Contract	2016 Total	2017 Labor	2017 N/Labor	2017 Contract	2017 Total	2018 Labor	2018 N/Labor
		$ 527,255	$ 351,504			$ 351,504	$ 351,504			$ 351,504	$ 351,504			$ 351,504	$ 351,504			$ 351,504		
		$ 146,908	$ 146,908			$ 146,908	$ 146,908			$ 146,908	$ 146,908			$ 146,908	$ 146,908			$ 146,908		
	$ 897,323	$ 897,323			$ 897,323	$ 897,323			$ 897,323	$ 897,323			$ 897,323	$ 897,323			$ 897,323	$ 897,323		
	$ 175,000																			
	$ 25,000																			
	$ -	$ -			$ 56,250	$ 56,250			$ 56,250	$ 56,250			$ 56,250	$ 56,250			$ -	$ -		
$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -				
$ -		$ -		$ -		$ -		$ 321,750		$ 321,750		$ 643,500		$ 643,500		$ 321,750		$ 321,750		$ -
$ -		$ -		$ -		$ -		$ 180,375		$ 180,375		$ 360,750		$ 360,750		$ 180,375		$ 180,375		$ -
$ 19,333		$ 19,333		$ 19,333		$ 19,333		$ 19,333		$ 19,333		$ 19,333		$ 19,333		$ 19,333		$ 19,333		
$ 19,333	***$ 1,097,323***	***$ 1,590,820***	***$ 498,412***	***$ 19,333***	***$ 953,573***	***$ 1,471,318***	***$ 498,412***	***$ 521,458***	***$ 953,573***	***$ 1,973,443***	***$ 498,412***	***$ 1,023,583***	***$ 953,573***	***$ 2,475,568***	***$ 498,412***	***$ 521,458***	***$ 897,323***	***$ 1,917,193***	***$ -***	***$ -***
		$ -				$ -	$ 70,000			$ 70,000	$ 70,000			$ 70,000	$ 70,000			$ 70,000	$ 70,000	
$ -		$ -		$ -		$ -		$ 34,050		$ 34,050		$ 267,150		$ 267,150		$ 631,200		$ 631,200		$ 796,200
$ -		$ -		$ 13,129		$ 13,129		$ 27,362		$ 27,362		$ 22,800		$ 22,800		$ 22,800		$ 22,800		$ 86,092
$ -	***$ -***	***$ -***	***$ -***	***$ 13,129***	***$ -***	***$ 13,129***	***$ 70,000***	***$ 61,412***	***$ -***	***$ 131,412***	***$ 70,000***	***$ 289,950***	***$ -***	***$ 359,950***	***$ 70,000***	***$ 654,000***	***$ -***	***$ 724,000***	***$ 70,000***	***$ 882,292***
$ 998,333	$ 1,097,323	$ 2,594,068	$ 498,412	$ 1,011,462	$ 953,573	$ 2,463,447	$ 568,412	$ 1,561,870	$ 953,573	$ 3,083,855	$ 568,412	$ 2,292,533	$ 953,573	$ 3,814,518	$ 568,412	$ 2,154,458	$ 897,323	$ 3,620,193	$ 70,000	$ 1,861,292
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Workpaper: SCG RAdio Estimate

2018	2018	2019	2019	2019	2019	2020	2020	2020	2020	2021	2021	2021	2021
Contract	Total	Labor	N/Labor	Contract	Total	Labor	N/Labor	Contract	Total	Labor	N/Labor	Contract	Total
	$ -				$ -				$ -				$ -
	$ -				$ -				$ -				$ -
	$ -				$ -				$ -				$ -
$ -	$ -			$ -	$ -			$ -	$ -			$ -	$ -
	$ -		$ -		$ -		$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -		$ -		$ -		$ -
	$ -				$ -				$ -				$ -
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	$ 70,000	$ 70,000			$ 70,000	$ 70,000			$ 70,000	$ 70,000			$ 70,000
	$ 796,200		$ 796,200		$ 796,200		$ 796,200		$ 796,200		$ 796,200		$ 796,200
	$ 86,092		$ -		$ -		$ -		$ -		$ -		$ -
$ -	$ 952,292	$ 70,000	$ 796,200	$ -	$ 866,200	$ 70,000	$ 796,200	$ -	$ 866,200	$ 70,000	$ 796,200	$ -	$ 866,200
$ -	$ 1,931,292	$ 70,000	$ 1,775,200	$ -	$ 1,845,200	$ 70,000	$ 1,775,200	$ -	$ 1,845,200	$ 70,000	$ 1,775,200	$ -	$ 1,845,200
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Total Capital Cost with Contingency	13,281,187.44	contigency
Base O&M costs	$ 4,779,384	0.2

peak O&M number