

Application of Southern California Gas Company
for authority to update its gas revenue requirement
and base rates effective on January 1, 2012.
(U904G)

Application No. 10-12-____
Exhibit No.: (SCG-04-CWP)

CAPITAL WORKPAPERS TO
PREPARED DIRECT TESTIMONY
OF JAMES D. MANSDORFER
ON BEHALF OF SOUTHERN CALIFORNIA GAS COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

DECEMBER 2010



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CAPITAL PROJECT WORKPAPER

PROJECT TITLE Gas Transmission – Storage – Compressor Stations - Blanket	BUDGET NO. 00411-00
WITNESS James Mansdorfer	IN SERVICE DATE Blanket

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR		415	246	388	444		1493
DIRECT NONLABOR		7,074	2,736	4,462	4,071		18,343
TOTAL DIRECT CAPITAL		7,489	2,982	4,850	4,515		19,836
COLLECTIBLE		0	0	0	0		0
NET CAPITAL		7,489	2,982	4,850	4,515		19,836
FTE		4.3	2.6	4.2	4.8		15.9

Business Purpose

This Budget Code includes the costs for the installation, repair, replacement and upgrades of compressor station equipment and components used primarily to raise the pressure of natural gas for injection to underground storage facilities. Examples of the type of equipment that would be included in this area are natural gas reciprocating and turbine engines and associated components, high-pressure industrial gas compressors and associated components, compressed air system equipment, equipment foundations, cooling systems, emissions control equipment, and instruments needed to control the compressor station equipment.

Recorded and estimated costs in this work paper include costs in budget categories 401, 411, 421 and 431.

Physical Description

Perform necessary replacements, installations and upgrades at the various storage fields to ensure safety, maintain or improve reliability, meet regulatory and environmental requirements, and to meet the required injection capacities of the main compressor units.

Individual jobs in this budget code will vary from under \$10,000 to as high as several hundred thousands of dollars.

Project Justification

Recent levels of activity in this category are expected to continue in the near future. However, costs associated with this type of work are expected to continue to increase due to high energy costs, high costs of raw materials like steel and copper, high global demand for equipment, shortage of skilled workers, lack of available replacement parts due to the age of the equipment, and increasing safety and environmental requirements.

Forecast Methodology

Forecast for 2010 is based on the 2010 budget for these Budget Categories. Forecasts here for 2011 and 2012 are the difference between known specific projects and the average of five years of recorded costs in this budget category between years 2005 and 2009.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Gas Transmission – Storage – Compressor Stations - Blanket	BUDGET NO. 00411-00
WITNESS James Mansdorfer	IN SERVICE DATE Blanket

Schedule

This is a blanket budget.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Aliso Canyon – Turbine Driven Compressor Capital Upgrades	BUDGET NO. 00411.01
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2012

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR			33	118	236	0	387
DIRECT NONLABOR			369	1,320	2,100	0	3,789
TOTAL DIRECT CAPITAL			402	1,438	2,336	0	4,176
COLLECTIBLE			0	0	0	0	0
NET CAPITAL			402	1,438	2,336	0	4,176
FTE			0.4	1.3	2.5	0	4.2

Business Purpose

Delay in the issuance of the Aliso Canyon Turbine Replacement CPCN will necessitate additional capital expenditures in order to keep the TDC’s reliable and in service until replacement. These significant projects result from the replacement delay of at least 1 year due to the EIR requirement.

Physical Description

Capital refurbishment, repair and replacements (000s): new annulus (\$320), upgrade MCCs (\$800), upgrade fuel gas regulators (\$300), upgrade mode change valves (\$800), replace controls (\$1,500).

Project Justification

Delays in TDC replacement have necessitated change in capital maintenance and upgrade schedules in order to keep the units reliable. Projects had been on hold anticipating replacement of all 3 units.

Forecast Methodology

Cost based on similar projects in the past and actual vendor quotes.

Schedule

Some purchase orders with long lead times to be processed in 2010 with 2011 delivery. Engineering and some purchase orders in 2011 for work to be completed in 2011 and 2012.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Honor Rancho – Overhaul Main Unit #5	BUDGET NO. 00411.02
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2011

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR			104	56	0	0	159
DIRECT NONLABOR			943	508	0	0	1,450
TOTAL DIRECT CAPITAL			1,046	563	0	0	1,609
COLLECTIBLE			0	0	0	0	0
NET CAPITAL			1,046	563	0	0	1,609
FTE			1.1	0.6	0	0	1.7

Business Purpose

Extend life and reliability of main unit compressor by performing 10 year overhaul of Main Unit #5 engine and compressor.
 (Each main unit injects approx 50mmcf/d gas into Honor Rancho Storage Field (20% of total injection rate)).

Physical Description

Perform overhaul of engine and compressor. Remove and install the following components: pistons, rings and rods; cylinder liners and new ss inserts; main bearings; camshaft and bearings; critical fasteners, timing and auxiliary chain; cylinder heads; intercooler; bundles and jacket water header; gaskets; thermocouples and thermostats; compressor: piston rings/packers/rider bands, cylinder liners.

Project Justification

10 year overhauls for engine and compressor scheduled each year. (From 2006 to 2010, units 1-4 were rebuilt).

Forecast Methodology

Overhaul of MU 5 based on cost of overhauls performed in previous years (e.g. MU2 in 09/10).

Schedule

Work to be performed over winter withdrawal season (Nov 1, 2010 to April 1, 2011).

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Gas Storage – Wells -Blanket	BUDGET NO. 00412.00
WITNESS James Mansdorfer	IN SERVICE DATE Blanket

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR		126	47	14	14		201
DIRECT NONLABOR		5,525	1,946	583	583		8,637
TOTAL DIRECT CAPITAL		5,651	1,993	597	597		8,838
COLLECTIBLE		0	0	0	0	0	0
NET CAPITAL		5,651	1,993	597	597		8,838
FTE		1.6	0.5	0.2	0.2		2.5

Business Purpose

This Budget Code includes costs associated with drilling and work-over of storage wells used for the injection and withdrawal of natural gas from underground storage facilities, including wells used for liquid production and observation. Some of the costs covered in this Budget Code are for drilling and work-over of rig services, cementing and gravel packing, services, packers, casing, tubing, safety valves, and well control systems.

Physical Description

Perform necessary capital well restorations at the various storage fields to ensure safety, improve reliability and maintain the required capacities at each storage field.

Recorded and planned costs in this work paper include those in budget codes 402, 412 and 422. Individual projects in this budget code will vary from as low as \$10,000 to as high as several hundreds of thousands of dollars.

Project Justification

Repair well leakage and replace lost capacity due to the ongoing decline in deliverability. Ongoing improvements and repairs are required to maintain withdrawal and injection capacity.

Forecast Methodology

Forecast costs shown here for year 2010 are based on the budget for these Budget Categories in 2010 less specific amounts for large projects shown on other work papers. Costs shown here forecast for years 2011 and 2012 are based on five-year averages for these budget categories, less costs for the cushion gas initiative, less costs for large projects shown on other work papers.

Schedule

This is a blanket budget.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Storage Wells – Leaking Wellhead Replacements/Upgrades	BUDGET NO. 00412.01
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2010

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR			32	0	0	0	32
DIRECT NONLABOR			1,109	0	0	0	1,109
TOTAL DIRECT CAPITAL			1,141	0	0	0	1,141
COLLECTIBLE			0	0	0	0	0
NET CAPITAL			1,141	0	0	0	1,141
FTE			0.3	0	0	0	0.3

Business Purpose

Typically three to four storage wells will require leaking wellhead equipment replacements and upgrades in a given calendar year. These wellhead replacements or upgrades are required on the existing 200+ aging injection/withdrawal wells throughout the storage fields. In the leaking condition, the wells pose a safety and environmental risk and have to be removed from service and thus will reduce the deliverability of the field until the wellhead equipment replacement/upgrade is performed.

Physical Description

The cost of the wellhead equipment replacement and upgrade include; the new wellhead equipment and all the services involved to secure the well temporarily in addition to the equipment and the well services required for the wellhead dismantling and reassembly operations.

Project Justification

The project to perform the leaking wellhead equipment replacement and upgrades in 2010 will upgrade the existing aging, mechanically unsound storage wells. These older wells typically are in the age range of 40-70+yrs old and the wellhead seals and equipment have exceeded their useful life. As this wellhead equipment fails, it creates gas and or oil leaks at the surface which require the well to be removed from service and the wellhead equipment replaced and/or upgraded. Aside from the safety and environmental risk, the leak can typically cause deliverability constraints while the well is out of service.

Forecast Methodology

The total costs of the leaking wellhead equipment replacement or upgrade are based on the recent estimates from current and previous year wellhead replacement projects as well as current quotes from various suppliers.

Schedule

Based on the current 2010 well work over schedule in Storage Engineering, it is anticipated that the required leaking wellhead equipment and upgrade work will be completed by the end of the 2010 calendar year.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Storage Wells – Two Well Replacements	BUDGET NO. 00412.02
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2012

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR			272	272	272		816
DIRECT NONLABOR			6,747	6,747	6,747		20,241
TOTAL DIRECT CAPITAL			7,019	7,019	7,019		21,057
COLLECTIBLE			0	0	0	0	0
NET CAPITAL			7,019	7,019	7,019		21,057
FTE			2.9	2.9	2.9		8.7

Business Purpose

Due to aging, problematic wells which cause field deliverability constraints over time, two replacement storage wells per year will be drilled as replacements for two existing aging, mechanically unsound, high operating cost injection/withdrawal wells. In 2010, 2 wells that are frequently out of service at the Aliso Canyon Storage Field will be replaced by 2 new wells. The well replacement program in 2011 and 2012 includes 4 additional wells – 2 at Aliso Canyon and 2 at Goleta in years 2011 and 2012. This program of replacing wells will continue at 2 wells/year for at least 7 additional years.

Physical Description

The cost of the new storage wells includes the well pad preparation, all the services involved during the drilling and completion operations, the well head equipment, the well casing, the well tubulars, the completion equipment, and the surface piping tie-ins to the existing gathering system.

Project Justification

The justification for drilling the new replacement wells at the Aliso Canyon Storage facility in 2010 is to replace two of the existing aging, mechanically unsound, high operating cost storage wells. These older wells typically require high cost casing repairs (\$700k+) per occurrence as well as repeated re-gravel packs of the wells due to highly erosive sand production. The gravel packs of these aging wells typically cost from \$1.6 million - \$2.2 million each occurrence. The phasing in of these new replacement wells and eliminating the high cost of aging wells over time, will reduce the company's long term operating cost by eliminating the frequent, high cost, casing repairs and gravel pack capital projects. 2 wells at Goleta will replace 3 wells adjacent to UCSB, outside of the main facility boundary. This will reduce the need to continually test the pipelines due to being in a high consequence area, improve operations and maintenance access and reduce potential liability exposure.

Forecast Methodology

The direct costs of each well are based on the recent estimates from current and previous years drilling projects as well as current quotes from various suppliers.

Schedule

Based on the current 2010 well drilling and work-over schedule in Storage Engineering, it is anticipated that all new wells will be drilled and completed by the end of each calendar year. These costs will continue annually for the foreseeable future.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Storage Wells – Expended Tubing Replacement	BUDGET NO. 00412.03
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2010

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR			25	0	0	0	25
DIRECT NONLABOR			876	0	0	0	876
TOTAL DIRECT CAPITAL			901	0	0	0	901
COLLECTIBLE			0	0	0	0	0
NET CAPITAL			901	0	0	0	901
FTE			0.3	0	0	0	0.3

Business Purpose

Typically three to four storage wells will require expended well production tubing replacements in a given calendar year. These tubing replacements are required on the existing 200+ aging injection/withdrawal wells throughout the storage fields. The wells can pose a safety and environmental risk in this condition and have to be removed from service and thus will reduce the deliverability of the storage field until the tubing replacement is performed.

Physical Description

The cost of the expended well tubing replacement projects include; the new tubing and all the services involved to secure the well temporarily in addition to the equipment and the well services required for the well tubing removal and reinstallation operations.

Project Justification

The project to perform the expended tubing replacements in 2010 will upgrade the existing aging, mechanically unsound storage wells. These older wells typically are in the age range of 40-70+yrs old and the well tubing has exceeded its useful life. As this well tubing fails, it can create gas and oil leaks in the aging wells which require the well to be removed from service and the tubing replaced and/or upgraded. Aside from the safety and environmental risk, the expended tubing can typically can cause deliverability constraints while the well is out of service.

Forecast Methodology

The total costs of the expended well tubing replacement projects are based on the recent estimates from current and previous year expended tubing replacement projects as well as recent quotes from various suppliers.

Schedule

Based on the current 2010 well work over schedule in Storage Engineering, it is anticipated that the required expended tubing replacement work will be completed by the end of the 2010 calendar year.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Gas Storage – Pipelines - Blanket	BUDGET NO. 00413.00
WITNESS James Mansdorfer	IN SERVICE DATE Blanket

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR		350	81	124	124		679
DIRECT NONLABOR		3,953	828	1,253	1,253		7,287
TOTAL DIRECT CAPITAL		4,303	909	1,377	1,377		7,966
COLLECTIBLE		0	0	0	0	0	0
NET CAPITAL		4,303	909	1,377	1,377		7,966
FTE		3.4	0.9	1.3	1.3		6.9

Business Purpose

This Budget Code includes costs of pipelines used in the underground storage fields. Included are the costs associated with the pipe, valves, actuators, fittings, vaults, supports, cathodic protection equipment, and related instrumentation and controls for these components.

Physical Description

Perform necessary pipeline replacements, installations, relocations, abandonment and upgrades at the various storage fields to ensure safety, maintain or improve reliability, meet regulatory and environmental requirements and to meet the required capacities of the various piping system.

Estimated and recorded costs in this work paper include those in budget codes 403, 413 and 423.

Project Justification

This series of budget categories provides funding to perform necessary pipeline maintenance, replacements, relocations and upgrades at the various storage fields to ensure safety, to maintain or improve reliability, and to meet the required capacities of the various piping systems.

Forecast Methodology

Forecast costs shown here for year 2010 are based on the budget for these Budget Categories in 2010 less specific amounts for large projects shown on other work papers. Costs shown here forecast for years 2011 and 2012 are based on five-year averages for these budget categories, less costs for large projects shown on other work papers

Schedule

This is a blanket project.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Aliso Canyon – Valve Replacement Program	BUDGET NO. 00413.01
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2012

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR			118	118	118	0	354
DIRECT NONLABOR			780	780	780	0	2,340
TOTAL DIRECT CAPITAL			898	898	898	0	2,694
COLLECTIBLE			0	0	0	0	0
NET CAPITAL			898	898	898	0	2,694
FTE			1.3	1.3	1.3	0	3.9

Business Purpose

Many valves (block, well site, safety, etc) in the Storage Field are leaking and new ones are equal to or less than the cost of repair. This project will replace approximately 5% of the larger field valves every year (e.g. replace valves approximately every 20 years). This project will continue in each year after the GRC cycle.

Physical Description

Various sized valves 2 inches and larger of varying pressure ratings for use at the well sites and plants. Estimate an average cost of \$20,000/valve. (Valves 2” to 16” vary in cost from approx. \$1k to \$65k each).

Project Justification

Field safety and general process health and safety requires valves that work as intended. Leakage compromises field integrity and prevents adequate safety shutdowns in the event of emergency events or routine maintenance needs.

Forecast Methodology

Cost based on previous years’ material costs.

Schedule

Purchase orders to be written in the 2nd quarter with valves received in the 3rd and 4th quarters. Some valves will be installed as received and others to be kept as emergency stock.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Honor Rancho High Pressure Production Pipeline	BUDGET NO. 00413.02
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2010

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR		45	148	0	0	0	193
DIRECT NONLABOR		217	2,267	0	0	0	2,484
TOTAL DIRECT CAPITAL		262	2,415	0	0	0	2,677
COLLECTIBLE		0	0	0	0	0	0
NET CAPITAL		262	2,415	0	0	0	2,677
FTE		.5	1.6	0	0	0	2.1

Business Purpose

The new pipeline will replace an existing line that was de-rated due to corrosion. The new line will effectively utilize six existing wells located in the west field. Gas, oil and brine water will be carried from these six wells, through the new pipeline, to the existing dehydration facility.

Physical Description

Install approximately 5,000 feet of new 8" and 12" process pipeline in the west field. The new pipeline will carry gas and liquids from wells C3, C5A, WEZU 23, WEZU 26, WEZU 28 and WEZU 30.

Project Justification

Currently, only three of the six existing liquid wells located in the west field can produce simultaneously. Installation of new, larger process pipeline will allow all six west field wells to produce simultaneously. The existing line is undersized and has been de-rated due to corrosion.

Forecast Methodology

WOA estimate was based on previous experience (used current contractor rates for crew, equipment and expected duration). In addition to Company labor, Contractor construction is estimated at \$1,720,000. Other direct cost (construction inspection, non-destructive testing, etc.) is \$130,000; material cost is estimated at \$633,500.

Schedule

Begin construction no later than March 9, 2010. Phase 1 tie-ins will be March 24 and 25, 2010. Construction will continue from March 25-May 9, 2010. Final tie-ins will be completed May 10 -14, 2010. Costs booked by or before 12/31/2010.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE AC FF-38 Pipe Bridge	BUDGET NO. 00413.03
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2012

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR				118	118	0	236
DIRECT NONLABOR				1,100	1,100	0	2200
TOTAL DIRECT CAPITAL				1,218	1,218	0	2,436
COLLECTIBLE				0	0	0	0
NET CAPITAL				1,218	1,218	0	2,436
FTE				1.3	1.3	0	2.6

Business Purpose

This project will relocate an existing pipe rack out of an area with an active landslide and soil erosion that is threatening several existing pipe supports. The loss of this pipe rack would result in loss of approximately 635 MMSCFD of withdrawal capability, and the impact on injection capability is unknown.

Physical Description

This project will remove existing pipes from a ravine with an active landslide in one area and extensive soil erosion in another area. A new pipe bridge will be installed across the ravine. New pipes will be installed on the bridge and will be connected to existing pipes on each side.

Project Justification

Failure of pipes and supports in this ravine could result in the loss of use of 21 wells in Aliso Canyon's east field. The approximate combined withdrawal capacity of the wells is 635 MMSCFD. The total injection capacity of the wells is unknown. Rupture of pipes in the ravine could result in the release of crude oil and brine water into the flowing stream at the bottom of the ravine.

Forecast Methodology

The project cost was estimated by the engineering team by obtaining budgetary estimates from structural steel fabricators and installation contractors and applying a contingency factor.

Schedule

2011 Major Tasks: Install new caisson supports. Procure/install bridge.
 Expected In-Service Date: 12/31/2011

2012 Major Tasks: Procure/install new piping across bridge and remove old piping from ravine.
 Expected In-Service Date: 12/31/2012

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Gas Storage Purification Equipment - Blanket	BUDGET NO. 00414.00
WITNESS James Mansdorfer	IN SERVICE DATE Blanket

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR		700	175	419	419		1,713
DIRECT NONLABOR		9,315	959	3,772	3,772		17,818
TOTAL DIRECT CAPITAL		10,015	1,134	4,191	4,191		19,531
COLLECTIBLE		0	0	0	0	0	0
NET CAPITAL		10,015	1,134	4,191	4,191		19,531
FTE		5.4	1.9	4.5	4.5		16.3

Business Purpose

This Budget Code includes costs of equipment used primarily for the removal of impurities from, or the conditioning of, natural gas and related liquids removed from underground storage fields during withdrawal operations. Some examples of the type of equipment included in this area are dehydration systems, coolers, vessels, tanks, scrubbers, boilers, pumps, and associated valves, piping, power and instrumentation.

This work paper includes forecasted and recorded costs in budget codes 404, 414, 424 and 434.

Physical Description

Perform necessary installations, replacements, relocations and upgrades at the various storage fields to ensure safety, maintain or improve reliability, meet regulatory and environmental requirements, and to meet the required capacities and specifications of the various purification systems.

Projects in this budget code will vary from as low as under \$10,000 to as high as several hundreds of thousands of dollars.

Project Justification

This series of budget codes provide for expenditures associated with the costs of equipment used primarily for the removal of impurities from, or the conditioning of, natural gas delivered to or removed from underground storage fields. Some examples of the type of equipment included in this area are dehydrators, coolers, scrubbers, boilers, pumps, valves, piping, power and instrumentation

Forecast Methodology

Forecast costs shown here for year 2010 are based on the budget for these Budget Categories in 2010 less specific amounts for large projects shown on other work papers. Costs shown here forecast for years 2011 and 2012 are based on five-year averages for these budget categories in years 2005-2009.

Schedule

This is a blanket budget.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE PDR Dehy Unit Installation	BUDGET NO. 00414.01
WITNESS James Mansdorfer	IN SERVICE DATE 06/30/2010

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR		555	162	0	0	0	717
DIRECT NONLABOR		6,367	735	0	0	0	7,102
TOTAL DIRECT CAPITAL		6,922	897	0	0	0	7,819
COLLECTIBLE		0	0	0	0	0	0
NET CAPITAL		6,922	897	0	0	0	7,819
FTE		6.0	1.7	0	0	0	7.7

Business Purpose

This project provides the necessary process system to reduce the water content of the gas withdrawn from the PDR storage field to necessary levels.

Physical Description

This project consists of the installation of a tri-ethylene glycol (TEG) dehydration system for the removal of water from natural gas. The main equipment consists of two 6 ft diameter x 30 ft tall contactor vessels, one 5 MMBTU and one 2 MMBTU hot oil heaters, a glycol regeneration skid for removing the water from the glycol, and various pumps, filters, etc.

Project Justification

The new dehy system will allow the PDR storage field to comply with federal, state and local codes and standards for water content in pipeline-quality natural gas.

Forecast Methodology

The estimating methodology used is a combination of actual costs to-date, balance of bids received for construction work and historic costs used for estimating any unknown costs.

Schedule

The most recent schedule has the dehy system operational by the April 1, 2010. Work on the controls and instrumentation will continue into mid - 2010.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Gas Storage Auxiliary Equipment & Infrastructure - Blanket	BUDGET NO. 00419.00
WITNESS James Mansdorfer	IN SERVICE DATE Blanket

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR		529	674	673	673		2,549
DIRECT NONLABOR		5,630	5,249	5,972	5,972		22,823
TOTAL DIRECT CAPITAL		6,159	5,923	6,645	6,645		25,372
COLLECTIBLE		0	0	0	0	0	0
NET CAPITAL		6,159	5,923	6,645	6,645		25,372
FTE		5.5	7.2	7.2	7.2		27.1

Business Purpose

This Budget Code includes costs of miscellaneous capital work in the storage fields – maintain, replace, relocate and upgrade the various systems throughout the storage fields.

Physical Description

Perform necessary replacements, installations, relocations and upgrades at the various storage fields to ensure safety, maintain or improve reliability, meet regulatory and environmental requirements and to meet the required functions of the various systems. Includes work on various types of field equipment not captured under budget categories 401, 402, or 404 such as instrumentation, controls, auxiliary equipment, generators, air compressors, odorization systems, electrical, drainage, infrastructure, transportation, safety and communications systems.

Forecasted amounts do not include several line-item projects shown on other work papers in this budget code.

Project Justification

These Budget Categories provide funding for work on various types of field equipment not captured in other Storage Budget categories such as instrumentation, measurement, control systems, electrical power supply, drainage, infrastructure, transportation, safety and communications systems.

Forecast Methodology

Forecast costs shown here for year 2010 are based on the budget for these Budget Categories in 2010 less specific amounts for large projects shown on other work papers. Costs shown here forecast for years 2011 and 2012 are based on five-year averages for these budget categories in years 2005-2009 less specific amounts for large projects shown on other work papers.

Schedule

This is a blanket budget.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Aliso Canyon – Overhead Elect System revamp for fire prevention – GO-95	BUDGET NO. 00419.01
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2012

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR				180	180		360
DIRECT NONLABOR				1,620	1,620		3,240
TOTAL DIRECT CAPITAL				1,800	1,800		3,600
COLLECTIBLE							0
NET CAPITAL				1,800	1,800		3,600
FTE				1.9	1.9		3.8

Business Purpose

Bring the Aliso Canyon storage field utility poles and overhead wiring up to compliance with General Order 95 and provide for wild fire mitigation measures. G.O. 95 establishes minimum construction, operation, and maintenance standards for our overhead electrical system at Aliso Canyon. Because these facilities do not provide electric service to customers, prior to 2009, they did not fall under regulations for electric utilities. However, changes in regulations that took effect in August 2009 now require these systems to be maintained in compliance with General Order 95 “Rules for Overhead Electric Line Construction”.

Physical Description

Reengineer the electric distribution facilities at the storage field to reduce fire risk and to comply with G.O. 95: The precise scope of work is still in the planning stage as of the preparation of this work paper but will probably include some combination of all of the following:

- Removal of wooden poles and installation of steel poles set in concrete bases
- Installation of reinforced overhead wiring capable of withstanding high wind loads
- Undergrounding of portions of the electrical distribution system
- Installation of distributed generation throughout the field to reduce longer runs of pole-mounted distribution lines.

Project Justification

The primary justification is compliance with G.O. 95 which now applies to private electrical distribution systems. Secondly this overhaul will enable the Aliso Storage facility to maintain full operation during wind storms, something it presently cannot do. At Aliso, we have had to reduce or disconnect electrical loads during red flag events as wild fire mitigation measures. The current electrical system design does not allow for full station operation during a period of electrical shutdown. This project would reengineer the system to remove higher risk overhead lines and enable the field to remain in full operation and continue with full electrical capacity during a high fire hazard situation commonly called “Red Flag” events.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE Aliso Canyon – Overhead Elect System revamp for fire prevention – GO-95	BUDGET NO. 00419.01
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2012

Forecast Methodology

Planning for the specific steps to be taken in the Aliso Canyon Storage facility remain in the conceptual stage as of the writing of this work paper. The actual work to be done, however, will probably consist of at least the following:

- Engineering Estimated at \$200k, judging by other Engineering projects of similar scope and complexity
- Pole replacement Estimated at \$250k
- Undergrounding of existing overhead lines Estimated at \$200k
- Distributed generation facilities to eliminate portions of the overhead system (also see related “Process improvements”, below) Estimated at \$1.5MM
- Process improvements using waste heat or equipment relocation (directly related to “Distributed generation”, above) Expenditures could be \$1.45MM or more depending on best use of resources and technology

Schedule

Engineering to be completed in 2010/11. Construction in 2011/12 to be complete by 12/31/2012.

CAPITAL PROJECT WORKPAPER

PROJECT TITLE AC - Plant Power System Upgrade	BUDGET NO. 00419.02
WITNESS James Mansdorfer	IN SERVICE DATE 12/31/2011

PROJECT COST (\$000 in 2009\$)	PRIOR YEARS	2009	2010	2011	2012	REMAINING YEARS	TOTAL
DIRECT LABOR				59	0	0	59
DIRECT NONLABOR				950	0	0	950
TOTAL DIRECT CAPITAL				1,009	0	0	1,009
COLLECTIBLE				0	0	0	0
NET CAPITAL				1,009	0	0	1,009
FTE				0.6	0	0	0.6

Business Purpose

This project improves the short circuit rating of MCC-2A, MCC-2B, and MCC-E. A failure of any one of these MCCs would result in the loss of 1.2 MMSCFD of withdrawal capability and 413 MMSCFD of injection capability at (at maximum inventory).

Physical Description

This project will replace MCC-2A, MCC-2B, and MCC-E. New MCCs will be installed outside the generator building to minimize rerouting of conduit. The new MCCs will have short circuit ratings higher than the available fault current (Power Engineers; Electrical Study; April 6, 2010),

Project Justification

A recent electrical system evaluation (Power Engineers; Electrical Study; April 6, 2010) identified three underrated MCCs (MCC-2A, MCC-2B, and MCC-E) in the main plant at Aliso Canyon. A fault of the magnitude identified in the study could completely disable the main plant for several months (no injection, no withdrawal) while repairs are made. Also, these MCCs are several decades old, and spare parts are difficult to find. The new MCCs will be new, industry standard units with spare parts readily available off the shelf.

Forecast Methodology

The estimate for this project was developed by scaling up the cost of a recent project with a similar scope of work.

Schedule

Major Tasks: Specify, procure, and install (3) new MCCs.
 Expected In-Service Date: 12/31/2011.