



ISSUING DEPARTMENT: **Gas Distribution**

EFFECTIVE DATE: **2-00**

DCS SPONSOR: **VP - E&P**

REVIEW DATE: **2-05**

PAGE NO.: **1** OF **2**

TITLE: CPA Assessment/Resurvey Procedures

Purpose This standard describes the steps that must be taken to review the adequacy of cathodic protection systems, as required by PG&E Gas Standard O-16.

It supersedes DCS Guideline D-G0050, "CPA Assessment/Resurvey Guidelines," effective 4-98.

Implementation Responsibilities The vice president of Engineering and Planning (E&P) is responsible for authorizing, approving, revising and distributing this standard.

This standard is to be implemented by including it as part of the *Gas Distribution Maintenance Manual* and by distributing this standard to all managers with responsibilities for gas distribution system cathodic protection systems: area OM&C managers. This standard is also published on the DCS Intranet at: <http://www/dcsstandards/>

OM&C managers are responsible for implementing the procedures detailed in this standard.

As CPA reviews are required by O-16 to be done at least once each five years, the supervisor (i.e., gas operating supervisor) of the field office's corrosion mechanics is responsible to implement the procedures contained in this standard.

Compliance Implementation and effectiveness are measured by the responsible managers/superintendents. In addition, periodic audits can be conducted by internal company departments. The CPUC also conducts compliance reviews on the requirements in this standard. Cathodic protection resurveys revealing the need for corrective actions will be reviewed and acted upon by the responsible supervisors.

Contacts Gas Distribution – Senior Gas Engineer (223-8180)

Policy Each gas distribution cathodic protection area (CPA) is reviewed at least once every five years, not to exceed 63 months, using the procedures described in this standard.

Procedures The details of the CPA assessment/resurvey procedures appear in Attachment 1. Attachments 2, 3 and 4 contain worksheets and checklists to be used in completing the reviews, resurveys and documentation requirements contained herein.

The manager of Gas Distribution is authorized to modify these detailed procedures, forms or instructions as needed, or to approve variances from this procedure on an exception basis.

Definition of Terms CPA refers to cathodic protection areas that consist of segments of steel pipe that are electrically bonded. The segments are protected by common rectifiers or galvanic anodes and monitored using common monitoring points.

Date Issued/Updated

Effective: February 29, 2000

Review Date: February 28, 2005

Signed,

Shan Bhattacharya
Vice President
Engineering & Planning

Reference Documents

- 49 CFR 192.465 External Corrosion Control: Monitoring
- DCS Policy 3-7 Gas and Electric Maintenance and Operation
- *Gas Standards and Specifications* O-16: Corrosion Control of Gas Facilities
- USP 22 Safety and Health Program
- *Code of Safe Practices* Basic Safety Requirements, Sections 1, 2, 3, 13 and 15

DCS Standard

February 15, 2000

Attachment 1 - Procedures

A. General

CPAs shall be reviewed at least once in every five-year period, not to exceed 63 months, using the procedures as described in this standard. The procedures are described in the following attachments to this standard.

Attachment	Title	Description
2	PG&E Initial CPA Assessment Worksheet	Checklist used to conduct a CPA review. It describes how to review a CPA to determine if further field work is required (a CPA resurvey).
3	PG&E CPA Field Resurvey Checklist	A checklist to assist corrosion mechanics conducting a detailed field resurvey of the CPA to ensure proper cathodic protection. To be done only if a CPA assessment worksheet indicates the need to do a field resurvey.
4	PG&E CPA File Review Checklist	A checklist to ensure that each CPA file has proper documentation.

B. CPA Review

A CPA Review must be conducted using the *PG&E Initial CPA Assessment Worksheet* (Attachment 2). To fill out this worksheet, this initial information must be obtained:

1. Corrosion leakage repairs on protected facilities for the past 12 years by CPA
2. CPA maintenance record
3. CPA pipe-to-soil sheet
4. Total present electrical current requirements for the CPA (in amperes)
5. Total square footage of steel pipe including main and services
6. Total number of non-isolated copper services

This information can be used to answer the four initial criteria in the *PG&E Initial CPA Assessment Worksheet*. If the CPA does not meet any one of the four criteria, some field work will be necessary to correct the situation before continuing with the assessment, or a full resurvey will be required.

If the CPA meets all the criteria in the first four questions, then the following gas documents shall be reviewed to determine if there is any need to field check any main installations that

might have an impact on the CPA:

1. Job orders with any main installations, replacements, or abandonments in the CPA
2. Leak reports (A forms)
3. Main condition reports

Plastic main installations that could potentially isolate a section of steel main or steel services from the CPA rectifier should be scrutinized closely. Those local areas within the CPA shall be field resurveyed to ensure that isolations did not occur.

If the review process shows the CPA either cannot meet any one of the criteria in the first four questions or has experienced significant main installations, replacements, or abandonments that might have the capability of affecting cathodic protection in the CPA, then a field resurvey shall be conducted as detailed in the *CPA Field Resurvey Checklist* (Attachment 3).

If the review process shows that the CPA meets **all** the criteria questions and has **not** had any significant facility changes in the CPA, then a field resurvey is not required. The next step should be to ensure that the CPA files are complete by completing the *CPA File Review Checklist*, as described in Paragraph D below.

Each step completed on the *PG&E Initial CPA Assessment Worksheet* shall be filled out completely with the observed or documented result, the source of information, any conclusion, the initials of the person completing the step, and the date the step was completed. The PG&E gas supervisor shall indicate his/her approval of the review.

C. CPA Field Resurvey

If the *PG&E Initial CPA Assessment Worksheet* shows the need to field resurvey a CPA, such a resurvey shall be conducted using the *PG&E CPA Field Resurvey Checklist* (Attachment 3).

Each step completed on the *PG&E CPA Field Resurvey Checklist* shall be filled out completely with the initials of the person completing the step, and the date the step was completed.

D. CPA File Review

After completing the *PG&E Initial CPA Assessment Worksheet* and/or the *PG&E CPA Field Resurvey Checklist*, as needed, the *PG&E CPA File Review Checklist* (Attachment 4) shall be completed to ensure that the CPA file has all required information in the folder.

Each step completed on the *PG&E CPA File Review Checklist* should be filled out completely with the observed or documented result, the source of information, any conclusion, the initials of the person completing the step, and the date the step was completed. The PG&E gas supervisor should indicate his/her approval of the review.

E. Recordkeeping

All checklists/worksheets completed as part of this standard shall be filed within the appropriate CPA file folder and kept until two subsequent reviews have been completed.

ATTACHMENT 2 - Page 1 of 3

I. PG&E INITIAL CPA ASSESSMENT WORKSHEET

CPA # _____ CPA Description _____

OBJECTIVE: Use this worksheet to determine if a CPA is under adequate cathodic protection and has adequate "records of each test, survey, or inspection required by this subpart, in sufficient detail to demonstrate the adequacy of corrosion control measures or that a corrosive condition does not exist."¹

#	SOURCE DOCUMENT	REFERENCE PARAGRAPH	STEPS	OBSERVED OR DOCUMENTED RESULT	SOURCE OF INFORMATION	CONCLUSION	INITIALS	DATE
			CPA PERFORMANCE ASSESSMENT					
			Review the following questions for the CPA. If the criteria cannot be met, and cannot be adequately explained to ensure that the CPA is providing adequate protection, a complete field resurvey may be required to ensure that adequate cathodic protection is being achieved in the CPA. All the below questions need to have a YES answer, or be able to be explained adequately to ensure that the CPA is performing adequately.					
			Does the CPA meet all of the following criteria?					
1	49 CFR 192	192.463(e)	1. The lowest pipe-to-soil on-potential in the CPA is at least as negative as 850 millivolts with reference to a saturated copper-copper sulfate electrode.					
2	O-16	2.1	2. The number of pipe-to-soil on-potential readings on the most recent saturated P/S potential map are a minimum of one per block, or as deemed necessary by the PG&E corrosion supervisor.					
			<i>Acceptable correction without a full resurvey: Take extra pipe-to-soils at the end of the system or as needed.</i>					
3	Gas Compliance Review	4.5	3. All pipe-to-soil potentials of routine bimonthly monitoring points in the CPA are within +/- 200 millivolts of their readings of the last resurvey date as measured on a similar month to month basis (e.g., compare winter readings with winter readings, summer readings with summer readings).					
4	Suggested PG&E Best Management Practice		4. Corrosion leakage (as measured by corrosion leak repairs per mile of protected main and services per year) has not increased in the CPA from the previous CPA Review, or the CPA has a corrosion leakage rate below two leaks per 100 miles over the past five years.					
			GAS FACILITIES DOCUMENT REVIEW					

¹ from US federal Code, section 49 CFR 192.491 (b) (2)

ATTACHMENT 2 - Page 2 of 3
I. PG&E INITIAL CPA ASSESSMENT WORKSHEET

CPA # _____ CPA Description _____

#	SOURCE DOCUMENT	REFERENCE PARAGRAPH	STEPS	OBSERVED OR DOCUMENTED RESULT	SOURCE OF INFORMATION	CONCLUSION	INITIALS	DATE
			Review the following questions for the CPA. If the related gas facilities documents for the CPA indicate significant changes to the CPA since the last assessment/review, which have not been addressed to ensure the CPA is adequately protecting all pipe, then a complete or a partial field resurvey may be required to ensure that adequate cathodic protection is being achieved in the CPA.					
			Does the CPA meet all of the following conditions:					
5	O-16	Par. 7	1. Does a review of the most recent plat sheets for the CPA indicate no jobs involving main installations or replacements occurring in the time period since the last CPA resurvey of the area? (Ensure all current requirement changes caused by plastic main installations are accounted for and take pipe-to-soil on-potential readings on potentially isolated sections of steel.)					
6	O-16	Par. 7	2. Does a review of the leak repair records in the CPA indicate that no jobs involving main replacements have occurred in the time period since the last CPA resurvey? (Ensure all current requirement changes caused by plastic main installations are accounted for and take pipe-to-soil on-potential readings on potentially isolated sections of steel.)					

ATTACHMENT 2 - Page 3 of 3
I. PG&E INITIAL CPA ASSESSMENT WORKSHEET

CPA # _____

CPA Description _____

#	SOURCE DOCUMENT	REFERENCE PARAGRAPH	STEPS	OBSERVED OR DOCUMENTED RESULT	SOURCE OF INFORMATION	CONCLUSION	INITIALS	DATE
7	O-16		PG&E MANAGEMENT REVIEW AND APPROVAL Does the PG&E corrosion supervisor concur with this assessment? Indicate if CPA needs to be field resurveyed. Use <i>PG&E CPA Field Resurvey Checklist</i> to help conduct field resurvey. If Initial CPA Assessment indicates that CPA is providing adequate levels of cathodic protection, conduct a CPA file review, using <i>PG&E CPA File Review Checklist</i> .					

Comments: (Include any comments about work done, observations, things to check in the next Assessment/Resurvey)

ATTACHMENT 3 - Page 1 of 2
II. PG&E CPA FIELD RESURVEY CHECKLIST

CPA # _____ CPA Description _____

OBJECTIVE: Use this checklist to determine if a CPA is under adequate cathodic protection and has adequate "records of each test, survey, or inspection required by this subpart, in sufficient detail to demonstrate the adequacy of corrosion control measures or that a corrosive condition does not exist."²

#	Task	Reference	Who? (Initial when complete)	Date Completed
1	Ensure that the CPA has been assessed for performance using the <i>PG&E Initial CPA Assessment Worksheet</i> . Ensure that CPA needs a complete field resurvey.	PG&E Initial Assessment Worksheet	Corrosion Supervisor	
2	Review updated code requirements.	49 CFR 192, Subpart I	CM	
3	Review updated PG&E requirements.	(GS&S O-16)	CM	
4	Obtain new set of full size plat sheets for CPA as needed.	Maps	Mapping	
5	Color code new maps.		Mapping/ CM	
6	Verify all CPA boundaries in field.		CM	
7	Verify that the CPA boundaries in the field match the CPA boundaries shown in the CPA file and the CPA boundaries on the CPA map file records used by the Mapping Department.		CM	
8	Recalculate current requirements based on all substantial changes to CPA, including new boundaries, newly installed or reconstructed piping and services.		Estimating/ Engineering CM	
9	Field test (e.g., PCM spanning, field measurements, etc.) and clear all contacts in the CPA.		CM	
10	Compare actual rectifier current output with current requirements as calculated in Step 8. Investigate and clear any significant discrepancies.		CM	
11	Take all final P/S reads (one per block or less if deemed appropriate by the corrosion supervisor).		CM	
12	Take all final spans, noting measurements on plats.		CM	
13	Identify all interference problems in the area.		CM	
14	Identify all steel mains in the CPA that are not protected.		CM	
15	Investigate feasibility of protecting unprotected steel mains		Engineering	

² from US federal Code, section 49 CFR 192.491 (b) (2)

ATTACHMENT 3 - Page 2 of 2
II. PG&E CPA FIELD RESURVEY CHECKLIST

CPA # _____ CPA Description _____

#	Task	Reference	Who? (Initial when complete)	Date Completed
	in an area.		CM	
16	Ensure that the CPA is now adequately protected because all of the following conditions are now met:			
17	1. The lowest pipe-to-soil on-potential in the CPA is at least as negative as 850 millivolts with reference to a saturated copper-copper sulfate electrode.	49 CFR 192.463(a)	CM	
18	2. The number of pipe-to-soil on-potential readings shall be a minimum of one per block as documented on a saturated pipe-to-soil potential map, or as deemed necessary by the PG&E corrosion supervisor.	GS&S O-16 2.1	CM	
19	3. The current flow is accounted for down to 0.2 amps (or less when deemed necessary by the PG&E corrosion supervisor).		CM	
20	Ensure the CPA file folder is complete with all required updated information as listed in the <i>PG&E CPA File Review Checklist</i> .	CPA File Review Checklist	CM	

Comments:

ATTACHMENT 4 - Page 1 of 2
III. PG&E CPA FILE REVIEW CHECKLIST

CPA # _____ CPA Description _____

REQUIRED REVIEWS: At a minimum, a *PG&E Initial CPA Assessment*, and if required, a *PG&E CPA Field Resurvey Checklist* need to be completed in conjunction with this *CPA File Review* to ensure the objective is accomplished.

OBJECTIVE: Use this worksheet to determine if a CPA file folder has adequate "records of each test, survey, or inspection required by this subpart, in sufficient detail to demonstrate the adequacy of corrosion control measures or that a corrosive condition does not exist."³

#	SOURCE DOCUMENT	REFERENCE PARAGRAPH	CRITERIA	OBSERVED OR DOCUMENTED RESULT	SOURCE OF INFORMATION	CONCLUSION	INITIALS	DATE
			CPA FILE REVIEW					
	O-16	Par. 7	Ensure that the file folder contains all updated information. If not in folder, obtain information:					
1	O-16	Par. 7	1. Updated plat sheets (1 to 500) with identified color coding of CPA.					
2	O-16	Par. 7	2. Updated map of CPA with all necessary final spans, P/S readings, boundaries, bondings, key spans (not required if a field resurvey was not done for the CPA Review.)					
3	O-16	Par. 7	3. Completed Cathodic Protection Station Report (Form 62-4932) for each rectifier.					
4	O-16	Par. 7	4. Completed CPA Current Requirement Calculation Worksheet.					
5	O-16	Par. 7	5. Copies of all PG&E Cathodic Protection Reports (Maintenance Records) recording P/S, rectifier reads, and maintenance record from date of CPA installation.					
6	O-16	Par. 7	6. Copies of previous CPA Initial Assessment Worksheets and/or CPA Field Resurvey Checklists for each time the CPA was reviewed.					
7		PG&E Best Management Practice	Verify that the CPA boundaries in the field match the CPA boundaries shown in the CPA file and the CPA boundaries on the CPA map used by the Mapping Department.					

³ from US federal Code, section 49 CFR 192.491 (b) (2)

ATTACHMENT 4 - Page 2 of 2
III. PG&E CPA FILE REVIEW CHECKLIST

CPA # _____ CPA Description _____

#	SOURCE DOCUMENT	REFERENCE PARAGRAPH	CRITERIA	OBSERVED OR DOCUMENTED RESULT	SOURCE OF INFORMATION	CONCLUSION	INITIALS	DATE
8		PG&E Best Management Practice	Enter CPA # into the Work Management System as needing review in the required timeframe per GS&S 0-16.					
9	O-16	Par. 7	PG&E corrosion supervisor's review of the folder.					
10	O-16	Par. 7	Ensure that file is refiled properly.					

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