



Asset Type: **Gas Transmission and Distribution**

Date Issued/Updated: **October 2008**

Function: **Maintenance**

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Title: Cathodic Protection Area Assessment/Resurvey Procedures for Gas Distribution

- Overview** This work procedure describes the steps that Pacific Gas and Electric Company (Company) Numbered Document O-16, “Corrosion Control of Gas Facilities,” requires to review the adequacy of cathodic protection systems.
- Governing Document** Utility Standard S4133, “Gas T&D Corrosion Control Requirements”
– *Expected publication 2009*
- Safety** Perform all cathodic protection assessment/resurvey work safely and in accordance with all applicable safety rules, the Code of Safe Practices, and Utility Standard Practice (USP) 22, “Safety and Health Program.”

Cathodic Protection Area Assessment/ Resurvey Procedures

Maintenance and construction (M&C) directors and supervisors of corrosion mechanics are responsible for implementing the procedures in this document.

Cathodic protection resurveys revealing the need for corrective actions are reviewed and acted upon by the responsible supervisors.

The division resurveys a minimum of 12% of the total subject cathodic protection areas (CPAs) each year, with a goal of 17% per year. The divisions have until December 31, 2011 to complete the resurveys for the additional distribution of CPAs containing transmission facilities that were added to the scope of this work procedure in 2005.

Attachments 1, 2, and 3 to this work procedure contain worksheets, forms, and checklists to complete the reviews and resurveys. Documentation requirements are also included in the attachments.

1. General

Review CPAs, as defined in this work procedure, at least once every 6 nominal years. The resurvey procedures are described in the following attachments:

Table 1. Attachments to Work Procedure WP4133-02

Attachment	Title	Description
1	Initial CPA Assessment Worksheet	The checklist used to conduct a CPA review. It describes how to review a CPA to determine if further field work is required (a CPA long, modified short, or short resurvey).
2	CPA Field Resurvey Checklist (only required when a complete survey, i.e., a long resurvey, is performed)	A checklist to assist corrosion mechanics conducting a detailed CPA field resurvey to ensure proper cathodic protection. The resurvey should be performed only if a CPA assessment worksheet indicates the need for a long resurvey.
3	CPA Resurvey File Review Form	The form used to document a file review of a CPA resurvey.

2. CPA Assessment

Conduct the initial CPA assessment and subsequent assessments using the “Initial CPA Assessment Worksheet” (Attachment 1). To complete this worksheet, first obtain the following information:

- External corrosion leakage repairs on protected facilities for the past 5 years by the CPA.
- CPA maintenance record.
- CPA pipe-to-soil sheets.
- Total present electrical current requirements for the CPA (in amperes).
- Total linear footage of steel main, by size, tied to the CPA and the number of copper services and steel services tied to the CPA. (The footage of services can be determined by applying a division average service length factor to the number of services.)

Inventory services by material. Complete current requirement sheets for each CPA.

Use the above information to evaluate the four initial criteria in the “Initial CPA Assessment Worksheet (Attachment 1).” If the CPA does not meet any one of the four criteria, conduct field work to clarify the situation before continuing with the assessment, or a long resurvey will be required.

If the CPA meets the first four criteria, review the following gas documents to determine if there is any need to conduct field investigations within the CPA:

- Job orders with significant steel main installations, steel main replacements with plastic or with steel with significantly different and impactful current requirements, significant service replacements, deactivations, or abandonments in the CPA.
- The Tangible Property List (TPL) system can be the source of a listing of steel installations and abandonments by job, by plat sheet. Use this data to identify the scope of cathodic protection plant changes within the CPA.

Examine plastic main installations that could potentially isolate a section of steel main or steel services from the CPA rectifier. Those local areas within the CPA must be interrupted to ensure that isolations did not occur.

If the review process shows the CPA either cannot meet any one of the first four criteria or has experienced significant main installations, replacements, deactivations, or abandonments that will likely significantly affect the cathodic protection in the CPA, conduct a long resurvey, as detailed in the “CPA Field Resurvey Checklist” (Attachment 2).

If the review process shows that the CPA meets **all** the criteria questions and has not had any significant facility changes in the CPA, significant field resurvey work is not required. Ensure that the CPA files are complete by filling out F4133-02-3, “CPA Resurvey File Review Form” (Attachment 3), described in Section 4, “CPA File Reviews.”

3. CPA Field Resurvey Checklist

If the “Initial CPA Assessment Worksheet” (Attachment 1) shows the need to conduct a long resurvey of a CPA, conduct such resurvey with the “CPA Field Resurvey Checklist”(Attachment 2).

Fill out each step on the “CPA Field Resurvey Checklist” completely with the initials of the person carrying out the step and the date the step is completed.

4. CPA File Reviews

After the initial resurvey, use F4133-02-3, “CPA Resurvey File Review Form” (Attachment 3) for subsequent resurveys. If previously filled-out Attachments 1 and 2 are complete and current CPA records indicate that no significant changes have taken place in the CPA since the previous resurvey, only Attachment 3 is required for subsequent resurvey documentation. This form ensures that the CPA file folder contains all of the required resurvey information.

5. Recordkeeping

File all checklists and worksheets completed in the appropriate CPA file folder and keep them until two subsequent reviews are completed. Retain all worksheets associated with the latest “File Review” in the file folder.

Note: If Attachment 3 is completed and reviewed, no additional documented “Reviewed by/Initials” and dates are required on other filed documents.

Definition of Terms

CPA: A cathodic protection area that consists of either of the following materials:

- Segments of steel pipe that are electrically bonded and protected by the use of impressed current.
- More than eight blocks of steel pipe or 1 mile of steel pipe that are/is electrically bonded and protected by the use of galvanic anodes.

Gas distribution CPA: For the purpose of this work procedure, a CPA that is either an impressed current CPA with a rectifier directly tied to the gas distribution facilities or a CPA where 25% or more of the linear footage of the main facilities in the CPA are distribution facilities.

Long resurvey: A complete resurvey where new maps, pipe-to-soil profiles, boundary validation, and other field data is required.

Modified short resurvey: A resurvey where more than 2 hours and less than or equal to 6 hours (see Table 2 below) of field work is required to bring the file to standard.

Table 2. Typical Hour Allocations for Specified Work

Task	Allocated Hours
Record file review	½
Obtain and review leak records	½
One (1) interference test	1
Update the current calculation sheet	2
Update new maps	1
Validate pipeline current map spans	1
Validate pipe-to-soil readings (2-4)	1
Pipe-to-soil saturation	3
Hardwire the CPA	Typically 12 (varies)
Pipeline current map the CPA	Typically 8 (varies)

Nominal year: Any day within the respective calendar year.

Short resurvey: A resurvey where data and records are critically reviewed and it is determined that no more than 2 hours of work (see Table 2 above) is required to bring the file to standard.

Tangible Property List (TPL): See the senior corrosion specialist for information.

Utility Work Procedure WP4133-02

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Recision This work procedure cancels and supersedes Utility Operations Standard S5467, "Cathodic Protection Area Assessment/Resurvey Procedures for Gas Distribution," issued February 2006.

Reference Documents Code of Federal Regulations (CFR) Title 49, Section 192.465, "External corrosion control: Monitoring"
Code of Safe Practices, Basic Safety Requirements, Sections 1, 2, 3, 13, and 15
Numbered Document O-16, "Corrosion Control of Gas Facilities"
UO Policy 3-7, "Gas and Electric Operation, Maintenance, and Construction"
Utility Standard Practice (USP) 22, "Safety and Health Program"

Attachments Attachment 1, "Initial CPA Assessment Worksheet"
Attachment 2 "CPA Field Resurvey Checklist"
Attachment 3, F4133-02-3, "CPA Resurvey File Review Form"

Contact for More Information

Redacted

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Approved by Brian Daubin,
Senior Manager

Revision History

Chg No.	Date	Description	By (LAN ID)
00	October 2008	Issued.	KMA8/YDH1