

July 1, 2019

***VIA ELECTRONIC MAIL
AND OVERNIGHT DELIVERY***

Fadi Daye
California Public Utilities Commission
Safety Enforcement Division
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**RE: PacifiCorp (U 901 E), General Order 174 Substation Inspection Program Summary
and Annual Report on Completed Substation Inspections**

Dear Mr. Daye,

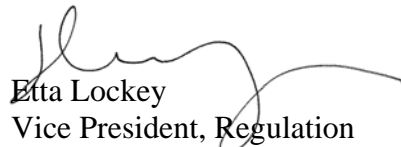
In accordance with General Order (GO) 174, PacifiCorp, d/b/a Pacific Power (PacifiCorp or Company) submits its Substation Inspection Program Summary and the annual report on Completed Substation Inspections.

Section 40.1 of GO-174 provides that no later than July 1, each electric utility shall submit an Inspection Program Summary. In addition, changes to the program summary are required to be reflected in the Inspection Program Summary. The Company's Substation Inspection Program Policy is provided as Appendix A. Appendix B provides the Substation Inspection Form, Appendix C provides the Substation Security Inspection Form (3274S), and Appendix D provides the Substation Inspection Intervals.¹ Since the last GO-174 report was submitted for calendar year 2014, there have been no changes to the Substation Inspection Program Policy.

GO-174, Section 40.2, requires each electric utility to provide a report summarizing the number of completed and past due substation inspections. Please refer to Appendix E. There are no past due inspections from 2018.

If you have any questions concerning this report, please contact Pooja Kishore, Regulatory Affairs Manager, at (503) 813-7314.

Sincerely,


Etta Lockey
Vice President, Regulation

Enclosure

¹ This is an excerpt from Policy 001 (Rev 27) and is provided to show the intervals for substation inspections in California.

Appendix A
Substation Inspection Program Policy

Substation Inspection

Asset Management Policy 034

Author:	Jack Vranish
Approval:	Rick Vail
Authoring department:	Asset Strategy
Approved location:	J:\Publications\FPP\SUB\POL
File number-name:	034-Substation Inspection Rev 2.docx
Revision number:	3
Revision date:	11/1/12

Revision Log		
1	1/6/2005	
2	2/6/2012	Reformat – revise interval reference.
3	11/1/2012	Clarify field load reading requirements

Document Security Category			
	Confidential		External
	Restricted		Critical Infrastructure Information (CII)
X	Internal		

Substation Inspection

Asset Management Policy 034

1 Purpose

This policy provides the general requirements and objectives for the performance of physical inspections of substation facilities associated with the transmission and distribution system owned by PacifiCorp.

2 References

- PacifiCorp Policy No. [001](#), *Maintenance Intervals for Apparatus, Relay and Communication Equipment*
- PacifiCorp Policy No. [166](#), *Maintenance and Inspection Records*
- Substation Inspection Form [3274F](#)

3 Objective

Substation inspections include a visual inspection of substation components, performance of minor testing or operational tasks, performance of minor housekeeping tasks and the recording of various equipment readings and measurements. The purpose of these tasks is to check the security of the substation, note obvious defects in equipment installation or performance, verify the physical operation of certain equipment and record data that is utilized by others for load planning or maintenance planning purposes. Discrepancies or issues found during the performance of inspections may be corrected on site immediately, or noted on the inspection documentation and prioritized for later repair.

- 3.1** Intervals: Substations shall be inspected on a periodic basis per the intervals and requirements listed in Policy 001, *Maintenance Intervals for Apparatus, Relay and Communication Equipment*.
- 3.2** Scope: The requirements for the scope of substation inspections are as listed on form 3274. Field offices may utilize this form, or its functional equivalent, which may be customized for each individual substation. The scope of a substation inspection includes the following, however, the interval between individual tasks will vary per the requirements of form 3274F and Policy 001.
 1. Substation security inspection
 2. Substation physical inspection / operational tests
 3. Recording operational counters and load readings
- 3.3** Documentation : Inspection records shall be stored and retained per the requirements of Policy 166, *Maintenance and Inspection Records*.
- 3.4** Use of SCHOOL System: It is preferred that load readings be recorded with the use of SCHOOL handheld computers. The readings are then uploaded to the SCHOOL system. As an alternative, readings may be taken manually and then entered into SCHOOL using the Manual Logger PC Software. For stations with SCADA where readings are entered into school directly from the SCADA system, field readings need not be taken.

Appendix B
Substation Inspection Form 3274F

PACIFICORP T&D SUBSTATION INSPECTION

Author: Brandon Prescott
Approval: Jack Vranish
Authoring Department: Asset Management
Approved Location: PacifiCorp.us\Dfs\Pdxco\Shr04\Eng\Publications\FPP\SUB\FORMS
File Number-Name: 3274F-FORM-PacifiCorp T and D Substation Inspection.xlsx
Revision Number: R10
Revision Date: 3/9/2015

[http://idoc.pacifiCorp.us/content/dam/intranet/doc/ap/policies_and_procedures/eamp/sc/fpp/\[3274F.xlsx\]](http://idoc.pacifiCorp.us/content/dam/intranet/doc/ap/policies_and_procedures/eamp/sc/fpp/[3274F.xlsx])

The most current version of this document is posted to PacifiCorp's engineering websites.

Modification of this document must be authorized by engineering publications, (503) 813-5096.

Form # 3274F
Rev 10 3/9/15

PACIFICORP T&D SUBSTATION INSPECTION

Substation Name:

Date:

/ /

Inspector:

Work Order #:

Type of inspection conducted: Minor Inspection Major Inspection

Instructions:

- Complete a Substation Security Inspection Form for **all** inspections.
- For **Minor Inspections** complete the Substation Security Inspection Form and all fields except those labeled "only required for Major Inspections".
- For **Major Inspections** complete the entire packet.
- All completed inspection forms shall be given to the local substation manager.
- See Policy 001 for inspection interval requirements.

Substation Operations Manager Review

Manager:

Date:

/ /

Signature:

SUBSTATION INSPECTION FORM

For Results use A = Acceptable, D = Deficiency Noted, C = Corrected, and N/A = Not Applicable

For any items marked "D" or "C", a detailed explanation shall be provided in the comments section.

EMERGENCY GENERATORS

		RESULTS	COMMENTS
1	Block heater functioning properly	A D C N/A	
2	Check room heaters	A D C N/A	
3	Check air louver operation		
4	a. Closed if unit is off	A D C N/A	
5	b. Open if unit is running (do not start generator)	A D C N/A	
6	Check for any alarms	A D C N/A	
7	Record level of fuel in tank (indicate Gallons or Inches)		
8	Check engine oil level	A D C N/A	
9	Check radiator fluid level	A D C N/A	
10	Check for oil and water leaks	A D C N/A	
11	Check battery water level	A D C N/A	
12	Sweep / clean area and perform any necessary housekeeping		

STATION and SELF-CONTAINED BREAKER BATTERY BANKS

	Company ID	Company ID	Company ID
13	Visual Bank Inspection (leaks / corrosion)	A D C N/A	A D C N/A
14	Record Bank Voltage		
15	Record Charger Current (if available)		

***** Remainder of page only required for **Major Inspections** *****

BATTERY BANK TESTING

Note: On 125V banks, if voltage drops below 111V at any time turn charger on immediately. On 48V banks, if voltage drops below 44V at any time turn charger on immediately. Contact manager for further testing instructions if battery drops below these threshold voltages. Ensure voltage has returned to normal for each bank prior to leaving substation.

	Company ID	Company ID	Company ID
16	Turn Off Charger	<input type="checkbox"/>	<input type="checkbox"/>
17	Record Bank Voltage		
18	Leave Charger Off For 15 Minutes	<input type="checkbox"/>	<input type="checkbox"/>
19	Record Bank Voltage		
20	Turn On Charger	<input type="checkbox"/>	<input type="checkbox"/>
21	Record Charger Voltage		
22	Record Charger Current		
23	Battery water levels	A D C N/A	A D C N/A
24	Scan battery/connections with IR device	A D C N/A	A D C N/A
25	Alarms clear	A D C N/A	A D C N/A
26	Battery Ground Present	Yes No	Yes No

COMMENTS:

SUBSTATION INSPECTION FORM

For Results use A = Acceptable, D = Deficiency Noted, C = Corrected, and N/A = Not Applicable

For any items marked "D" or "C", a detailed explanation shall be provided in the comments section.

CONTROL HOUSE

		RESULTS	COMMENTS
1	Annunciator alarms (Document alarms and notify dispatcher and local manager. Clear alarms if possible.)	A D C N/A	
2	Abnormal condition log book available (If not, tag and log conditions and notify dispatcher and local manager)	A D C N/A	
3	Check SCADA alarms prior to leaving (Contact dispatch to check for SCADA alarms)	A D C N/A	
5	Hot Stick inspection current	A D C N/A	
6	Security Inspection forms completed and filed (dispose after 7 years)	A D C N/A	
7	Heater / Air Conditioner function (heater set at 70°, A/C set at 78°) Temperature should be 60°F - 80°F.	A D C N/A	

***** Remainder of page only required for **Major Inspections** *****

8	Telephone function	A D C N/A	
9	Doors / Windows locked and in good condition	A D C N/A	
10	Painting (Inside and outside) condition	A D C N/A	
11	Roof condition	A D C N/A	
12	Lighting condition / spare bulbs available	<input type="checkbox"/>	
13	Spare transformer fuse(s) condition Fuse Types:	A D C N/A	
14	Spare PT fuse(s) condition Fuse Types:	A D C N/A	
15	One-line diagram available (Revision #)	A D C N/A	
16	Entry log book available / used properly	A D C N/A	
17	SPCC Inspection form completed	A D C N/A	
18	Clearance tags available	<input type="checkbox"/>	
19	1-Year switching order history stored onsite (discard older orders)	A D C N/A	
20	AC and DC panels – No tripped breakers	A D C N/A	
21	Panel meters functioning	A D C N/A	
22	Circuit breaker/switch indication lights working (Red or Green)	A D C N/A	
23	Hot line indication lights	A D C N/A	
24	Panel switches in normal position or tagged Reclosing, ground, SCADA Control, etc.	A D C N/A	
25	Spare lamps available for control lights (red, green amber, white)	A D C N/A	
26	Electronic meters alarm lights cleared	A D C N/A	
27	Relays alarm lights cleared and recorded	A D C N/A	
28	Relay targets logged and cleared	A D C N/A	
29	Communication equipment alarms (note if present only)	A D C N/A	
30	Update relay cards (Pacific Power only) Note Any Targets Without Associated Breaker counts	A D C N/A	
31	Trip coil indicator lights	A D C N/A	

COMMENTS:

SUBSTATION INSPECTION FORM

CIRCUIT BREAKERS / CIRCUIT SWITCHERS / TRANSRUPTERS

For Results use A = Acceptable, D = Deficiency Noted, C = Corrected, and N/A = Not Applicable

For any items marked "D" or "C", a detailed explanation shall be provided in the comments section.

*** Meter readings required only if they have not been recorded using Subview or other data collection methods. Inspectors may use alternate data collection sheets if available.**

	Company ID	Company ID	Company ID	Comments
1	READINGS (reset drag hands after readings)			
1	Record/Reset Relay Targets			
2	* Amp Demand - A Phase			
3	* Amp Demand - B Phase			
4	* Amp Demand - C Phase			
5	* Amp Demand Multiplier			
6	* MegaWatt Max Demand			
7	* MegaVAr Max Demand (+/-)			
8	A D C N/A	A D C N/A	A D C N/A	
9	A D C N/A	A D C N/A	A D C N/A	
10	A D C N/A	A D C N/A	A D C N/A	

***** Remainder of page only required for Major Inspections *****

11	Operations counter			
12	Fault operations (Pacific Power only)			
13	Air compressor hours			
14	A D C N/A	A D C N/A	A D C N/A	
15	Lube compressor air intake			<input type="checkbox"/>
16	Drain water from air tank (only when average temperature is above freezing)			Yes No Yes No Yes No
17	SF6 compressor hours			
18	A D C N/A	A D C N/A	A D C N/A	
19	A D C N/A	A D C N/A	A D C N/A	
20	Hydraulic pump hours			
21	Hydraulic pump starts			
22	High Ok Low	High Ok Low	High Ok Low	
23	A D C N/A	A D C N/A	A D C N/A	
24	A D C N/A	A D C N/A	A D C N/A	
25	A D C N/A	A D C N/A	A D C N/A	
26	A D C N/A	A D C N/A	A D C N/A	
27	A D C NA	A D C NA	A D C NA	A D C NA
28	High Ok Low	High Ok Low	High Ok Low	
29	A D C N/A	A D C N/A	A D C N/A	
30	A D C N/A	A D C N/A	A D C N/A	
31	High Ok Low	High Ok Low	High Ok Low	

COMMENTS:

SUBSTATION INSPECTION FORM

TRANSFORMERS / REGULATORS / LTC'S / REACTORS

For Results use A = Acceptable, D = Deficiency Noted, C = Corrected, and N/A = Not Applicable

For any items marked "D" or "C", a detailed explanation shall be provided in the comments section.

*** Meter readings required only if they have not been recorded using Subview or other data collection methods. Inspectors may use alternate data collection sheets if available.**

READINGS (reset drag hands after readings)	Company ID	Company ID	Company ID	Company ID
1 LTC counter				
2 Average daily counts (note 1)				
3 Drag hands - Max Raise (reset after reading)				
4 Drag hands - Max Lower (reset after reading)				
5 Main tank infrared temp				
6 LTC tank infrared temp				
7 Main tank - LTC Tank (note 2)				
8 Winding temp. max (reset after reading)				
9 Oil temp. max (reset after reading)				
10 * Amp Demand - A Phase				
11 * Amp Demand - B Phase				
12 * Amp Demand - C Phase				
13 * Amp Demand Multiplier				
14 * KWHr				
15 * MegaWatt Max Demand				
16 * MegaVAr Max Demand (+/-)				
17 * MegaVAr Min Demand				
18 Visual inspection for oil leaks, contamination and corrosion	A D C N/A	A D C N/A	A D C N/A	A D C N/A
19 Nitrogen bottles above 200 psi (less than 200 requires replacement)	A D C N/A	A D C N/A	A D C N/A	A D C N/A

Note 1 - Calculate the average daily counts since the previous inspection, notify manager if above 30 per day.

Note 2 - Temperature differential = main tank temp - LTC tank temp in °C. Notify manager if much lower than previous reading

COMMENTS:

***** Page 2 only required for **Major Inspections** *****

SUBSTATION INSPECTION FORM

TRANSFORMERS / REGULATORS / LTC'S / REACTORS

***** This page only required for **Major Inspections** *****

For Results use A = Acceptable, D = Deficiency Noted, C = Corrected, and N/A = Not Applicable

For any items marked "D" or "C", a detailed explanation shall be provided in the comments section.

	Company ID	Company ID	Company ID	Company ID
20	LTC present position			
21	Test raise controls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Test lower controls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	LTC ran through neutral manually (if acceptable voltage can be maintained)	Y N N/A	Y N N/A	Y N N/A
24	LTC desiccant	A D C NA	A D C NA	A D C NA
25	LTC oil filter pressure			
26	Oil temperature max			
27	Condition of gauges	A D C NA	A D C NA	A D C NA
28	Test fans / pumps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	Record xfmr tank N2 blanket pressure			
30	Gas monitor	A D C NA	A D C NA	A D C NA
31	Cabinet vents clear	A D C NA	A D C NA	A D C NA
32	Cabinet heaters operable	A D C NA	A D C NA	A D C NA
33	Cabinet door seal / operation	A D C NA	A D C NA	A D C NA
34	No inappropriate CT shorts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35	Bushing condition	A D C NA	A D C NA	A D C NA
36	Bushing oil level	A D C NA	A D C NA	A D C NA
37	Main oil tank level	A D C NA	A D C NA	A D C NA
38	LTC oil level	A D C NA	A D C NA	A D C NA
39	Lightning arrestors	A D C NA	A D C NA	A D C NA
40	Oil leaks present	A D C NA	A D C NA	A D C NA
41	Tank grounded	A D C NA	A D C NA	A D C NA
42	Paint condition	A D C NA	A D C NA	A D C NA

COMMENTS:

SUBSTATION INSPECTION FORM

***** This page only required for **Major Inspections** *****

For Results use A = Acceptable, D = Deficiency Noted, C = Corrected, and N/A = Not Applicable

For any items marked "D" or "C", a detailed explanation shall be provided in the comments section.

MOABS / AIR BREAK SWITCHES

	Company ID	Company ID	Company ID	Comments
1 Blade engaged properly	A D C N/A	A D C N/A	A D C N/A	
2 Handle mechanism grounded	A D C N/A	A D C N/A	A D C N/A	
3 Locked	A D C N/A	A D C N/A	A D C N/A	
4 Visual inspection of motor operator	A D C N/A	A D C N/A	A D C N/A	
5 Broken or chipped insulator skirts	A D C N/A	A D C N/A	A D C N/A	
6 Insulator contamination / corrosion	A D C N/A	A D C N/A	A D C N/A	
7 Switch arcing horns / bottles / whips	A D C N/A	A D C N/A	A D C N/A	

CAPACITOR BANKS

	Company ID	Company ID	Company ID	Comments
8 Control in auto mode (PP only)	Y N N/A	Y N N/A	Y N N/A	
9 Fuse condition	A D C N/A	A D C N/A	A D C N/A	
10 Spare cap fuses available	Y N N/A	Y N N/A	Y N N/A	
11 Spare bank fuses on site	Y N N/A	Y N N/A	Y N N/A	
Spare cap cans on site (note quantity in comments)	Y N N/A	Y N N/A	Y N N/A	
12 Bulging / leaking cans present	Y N N/A	Y N N/A	Y N N/A	
13 Bushing condition	A D C N/A	A D C N/A	A D C N/A	
14 Barriers and DANGER signs on gates of energized racks	A D C N/A	A D C N/A	A D C N/A	
15 Visual inspection of capacitor bank	A D C N/A	A D C N/A	A D C N/A	
16 Broke or chipped insulator skirts	A D C N/A	A D C N/A	A D C N/A	
17 Insulator contamination or corrosion present	A D C N/A	A D C N/A	A D C N/A	

COMMENTS:

SUBSTATION INSPECTION FORM

***** This page only required for **Major Inspections** *****

For Results use A = Acceptable, D = Deficiency Noted, C = Corrected, and N/A = Not Applicable

For any items marked "D" or "C", a detailed explanation shall be provided in the comments section.

SUBSTATION YARD and BUSWORK

		Results				Comments
1	Equipment and structure grounds in place and tight	A	D	C	N/A	
2	Signs of over-heating or arcing. No excessive corona noise	A	D	C	N/A	
3	Broken or chipped insulator skirts	A	D	C	N/A	
4	Insulator contamination / corrosion present	A	D	C	N/A	
5	PCB labels attached as needed	A	D	C	N/A	
6	High voltage cable condition	A	D	C	N/A	
7	Ground grid exposed	A	D	C	N/A	
8	Lightning arrestors	A	D	C	N/A	
9	Cable terminations free of leaks, damage or signs of heating	A	D	C	N/A	
10	Free of nests (i.e. Insects, Birds, Snakes, Squirrels)	A	D	C	N/A	
11	Wood structures – connection hardware tight	A	D	C	N/A	
12	Wood structures – timber sound	A	D	C	N/A	
13	Steel structures - visual inspection	A	D	C	N/A	
14	Concrete foundations - major cracks / spalling	A	D	C	N/A	

COMMENTS:

Appendix C
Substation Security Inspection Form 3274S

SUBSTATION SECURITY INSPECTION

Author: Brandon Prescott
Approval: Jack Vranish
Authoring Department Asset Management
Approved Location: PacifiCorp.us\Dfs\Pdxco\Shr04\Eng\Publications\FPP\SUB\FORMS
File Number-Name: 3274S-FORM-Substation Security Inspection.xlsx
Revision Number: R0
Revision Date: 3/9/2015

[http://idoc.pacifcorp.us/content/dam/intranet/doc/ap/policies_and_procedures/eamp/sc/fpp/\[3274S.xlsx\]Cover Sheet](http://idoc.pacifcorp.us/content/dam/intranet/doc/ap/policies_and_procedures/eamp/sc/fpp/[3274S.xlsx]Cover Sheet)

The most current version of this document is posted to PacifiCorp's engineering websites.

Modification of this document must be authorized by engineering publications, (503) 813-5096.

Form # 3274S Rev 0 - 3/9/15	SUBSTATION SECURITY INSPECTION		
Substation Name:	Date: / /	Inspector:	Work Order #:

For Results use A = Acceptable, D = Deficiency Noted, C = Corrected, and N/A = Not Applicable
 For any items marked "D" or "C", a detailed explanation shall be provided in the comments section.

SIGNAGE - EXTERIOR FENCE

	RESULTS	COMMENTS
1 WARNING Sign(s) Installed and Readable	A D C NA	
2 WARNING Sign(s) Location Signs should be every 65 ft. on all sides and on each gate	A D C NA	
3 Substation ID Sign with address installed and readable	A D C NA	

GATES

	RESULTS	COMMENTS
4 Electrical Grounds Condition	A D C NA	
5 Gap between gate and finished grade (2 inch max in Oregon)	A D C NA	
6 Chain and Lock Condition	A D C NA	

FENCE

	RESULTS	COMMENTS
7 Electrical Grounds Condition	A D C NA	
8 Height of Fence Fabric should be at least 6 ft. and a total height of 7 ft.	A D C NA	
9 Gap between fabric and finished grade (2 inch max in Oregon)	A D C NA	
10 Fabric Condition	A D C NA	
11 Masonry Wall or Other Barrier Condition	A D C NA	
12 Bottom Tension Wire Condition	A D C NA	
13 Barbed Wire Condition	A D C NA	
14 Fence Isolation All neighboring/adjoining fences within 10 feet electrically isolated	A D C NA	
15 Fence Clearance No objects that would allow access to the substation shall be within 5 ft.	A D C NA	
16 Vegetation Clearance No overhanging limbs or climbable vegetation	A D C NA	

YARD

	RESULTS	COMMENTS
17 Yard Condition Free of broken glass/porcelain, weeds, nests, and debris	A D C NA	
18 Substation Lighting Condition	A D C NA	
19 Stored Materials Only substation spare equipment shall be stored within the fence	A D C NA	
20 Gravel Condition	A D C NA	
21 Drainage Condition	A D C NA	
22 Oil Containment Condition	A D C NA	

COMMENTS:

Substation Operations Manager Review

Manager:	Date: / /	Signature:
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Appendix D
Substation Inspection Intervals

**MAINTENANCE INTERVAL LIST
Apparatus Equipment**

Equipment Type	Equipment Description	Equipment Use	Equipment Model or Manufacturer	Operating Ratings	Maintenance Task	Equip. Code	Maintenance ID	Interval Years (Mths)	Interval Months	Man Hours	Ops Counter	Fault Operations	Notes
Substation	Substations or FII				Sub Safety / operational inspection		XXX-SBIN-001-XXX	MTHLY see note 1	1	DIST 2 LOC 3 MGT 4			Periodic substation security and operational inspection, load and counter reads / minor / major scope performed periodically

1) Work orders are generated on a monthly basis - however for substations associated with WECC critical paths (WECC - FAC-501) a minimum of 10 monthly inspections shall be performed with 3 of these monthly being the more detailed "major" shall be performed annually. The maximum interval between the monthly inspections shall be 65 days with 180 days the maximum interval between a major inspection. For all other substations assigned this maintenance ID Company policy requires a minimum of 7 inspections be performed annually with no more than 120 days between consecutive monthly or 180 days between the more detailed major inspections.

Appendix E
Completed and Past Due Substation Inspections

PacifiCorp
General Order 174
Substation Inspections
2018
Annual Report

The total completed and past due substation inspections performed in the State of California for calendar year 2018 is as follows:

Inspection Type	2018 Completed Inspections*	2018 Past Due Inspections**
GO-174 Substation Inspections	444	0

*Completed Inspections – Actual number of GO 174 inspections performed for the reporting period. Does not include outstanding inspections from prior reporting periods.

**Past Due Inspections – The number of GO 174 inspections not performed for the reporting period. Does not include outstanding inspections form prior reporting periods.