

16.2.2 C-AD Substations Inspection Procedure

1. Procedure

1.1 This procedure provides instructions to C-A personnel and the Plant Engineering Line Crew who perform substation inspections and record ground fault readings (Attachment 8.2). Specifically it describes the general process to perform the inspection, how to record the inspection results and who to inform if an unexpected condition or unexpected parameter exists at a substation.

2. Responsibility

2.1 Staff performing substation inspections shall be knowledgeable with the requirements of this procedure, the proper use of required PPE and understand the details of the inspection process for each substation.

2.2 If an unexpected condition or parameter is found at a substation, the assigned inspector shall immediately inform the C-AD Chief Electrical Engineer (CEE) or C-AD Power Distribution Group Leader¹ or designee.

2.3 The Power Distribution Group Leader or designee shall be responsible to maintain this procedure and associated Substation Checklists current with substation “as-built” conditions.

2.4 The Power Distribution Group Leader shall assign substation inspections to the BNL Plant Engineering Line Crew or a C-AD Electrical staff based upon his personal knowledge of the C-AD individuals experience and knowledge.

2.5 Upon completion of Substation Checklists and Ground Fault Readings (Attachment 8.2), the Power Distribution Group Leader shall review the results as soon as possible and inform the CEE of any concerns that need to be addressed.

2.6 The C-AD CEE makes the final determination as to the priority given to actions at substations needing correction.

3. Prerequisites

3.1 BNL Line Crew or C-AD Electrical Staff assigned to perform substation inspections shall be assigned by the Power Distribution Group Leader and shall be knowledgeable with this procedure, electrical safe working practices and the proper use of PPE.

¹ Collider-Accelerator Department, Experimental Support and Facilities Division, Facilities and Experimental Support Section, Power Distribution Group.

4. **Precautions**

- 4.1 Substations are normally energized while inspections are performed. Adhere to all postings and wear proper PPE while performing inspections.
 - 4.1.1 Inspections of transformer yards with exposed live parts shall not be performed when it is raining.
- 4.2 The inspector is responsible to ensure that the substation gates are fully locked at the completion of the inspection and the substation key is returned to the PE Line Crew or the Power Distribution Group Leader at the completion of the inspection. The Line Crew carries their personal key.

5. **Procedure**

- 5.1 Obtain substation key from the Line Crew Supervisor or the Power Distribution Group Leader.
- 5.2 Read all postings at substation and comply with them.
- 5.3 Prior to entering the substation, wear required PPE and wear it properly. Specific PPE requirements are specified in Table 1 (Attachment 8.1), and on each checklist.

CAUTION:

Not wearing PPE or wearing PPE improperly may result in injury or death in the event of an arc flash. Consult [BNL Handbook on Personal Protective Equipment \(PPE\) Selection and Use](#) for more information.

- 5.4 Open Gate, conduct inspection, or record readings using guidance given in Table 1 (Attachment 8.1).
- 5.5 Record inspection results on appropriate checklist in Attachment 8.2. Include date of inspection and your name.
- 5.6 Immediately inform PE Line Crew Supervisor, Power Distribution Group Leader and CEE of any unexpected conditions or parameters. Record these unexpected conditions or parameters in the “Comments” section of the form.

CAUTION:

Failure to inform managers and supervisors about unexpected conditions or parameters may result in injury or death to others in the event of ground fault.

6. Documentation

- 6.1 Completed Substation Checklists and Ground Fault Readings (Attachment 8.2), shall be maintained by the ESSHQ QA Group for five years.
- 6.2 Corrective actions for a substation shall be documented on or attached to the completed Substation Inspection Form.

7. References

- 7.1 NFPA 70B, Recommended Practice for Electrical Equipment Maintenance.

8. Attachments

- 8.1 Table 1 - C-AD Substation Inspection Guidance
- 8.2 C-AD Substation Inspection Checklists and Ground Fault Readings

Attachment 8.1

Table 1 – Substation Inspection Guidance

DANGER: 1

Injury or death may result if you are not aware that the following substations have exposed equipment. Proper safe electrical practices and appropriate PPE MUST be worn properly when performing inspections at substation:

Booster Substation Transformers & STAR 1, 2, 3, & 4:

DANGER 2:

Exposed live parts on top of transformers located approximately 6'-0" above grade. Prohibited Approach Boundary (PAB) is 0'-7".
Restricted Approach Boundary (RAB) is 2'-2" (includes 1'-0" for inadvertent movement)
The temperature gauges are less than 2'-2" from live parts but greater than 1'-2" from live parts.
RAB will be established at 1'-2". Note: inadvertent movement would be down and away from live part.
Conductive materials that might inadvertently make contact with live parts, for example, conduit or pipes, shall not be brought into yard.
In general, no work is to be accomplished and no PPE is required.
If one has to open the controls terminal box, for example to test fans, safety glasses with side shields are required.
If control terminal box to be entered is within the 2'-2" from live part, one must wear Class 2 gloves and insulated tools.
No arc flash hazard exists in control terminal box. 120 volts does exist within the terminal box and one needs to avoid contact with internal live parts.

CAUTION 1:

Not all of this guidance applies to each substation. It depends upon the configuration of the substation.

CAUTION 2:

The Plant Engineering Line Crew Supervisor and the Power Distribution Group Leader are BOTH responsible to provide properly trained Line Crew and proper PPE for safely conducting these inspections.

Substations 1000P2, 1000P3, & H3, MG Test and Trafo:

CAUTION 3:

Exposed live parts on top of transformers located over 8'-0" above grade.

Prohibited Approach Boundary (PAB) is 0'-7".

Restricted Approach Boundary (RAB) is 2'-2" (includes 1'-0" for inadvertent movement)

To cross the RAB, Class 2 voltage rated PPE required.

Conductive materials that might inadvertently make contact with live parts, for example, conduit or pipes, shall not be brought into yard.

In general, no work is to be accomplished and no PPE is required.

If one has to open the controls terminal box, for example to test fans, safety glasses with side shields are required.

No arc flash hazard exists in control terminal box. 120 volts does exist and one needs to avoid contact.

NOTE:

In general each inspection is recorded by circling the left or right status listed on each line of the inspection sheet. The left side indicates a satisfactory result and is denoted by "Sat". The right side is either a Y or N which shall be circled indicating a failed inspection check. In all cases, failed inspection checks shall be described in the "comments" section of the checklist and the line supervisors indicated in this OPM shall be notified of the problem as soon as practicable.

For Transformers:

- Check that the transformer case grounding connection is tightly connected and clean and in good condition, indicating a solid, low resistance ground connection.
- Walk around the transformer and visually check for any transformer oil leakage from tanks, valves, fittings, cooling tubes (if present) and bushings.
- Also check the surroundings to see if there is evidence of oil on the concrete, asphalt or soil.
 - If there is a small leak shown on a concrete or asphalt surface or an obvious leak from the transformer, notify the Supervisor to clean it up as soon as possible. Contact C-AD Power Distribution Group Leader.
 - If there is any evidence oil leakage on or to soil, call x2222 for emergency cleanup response and notify the C-AD ECR, C-AD Environmental Coordinator, or the C-AD Power Distribution Group Leader.
- Record the nitrogen gas pressure from the gage if present. This pressure will vary as a function of ambient air and of winding temperatures which vary with the load. A reading that is less than 0 or greater than 0 is acceptable.
 - This pressure shows that the transformer has a nitrogen cover gas in the sealed tank, which precludes the entry of moisture from humidified ambient air.
 - If the pressure is at 0, there may be a leak or a faulty relief system.

- Retake the pressure in about an hour to see if a temperature change has changed the reading from 0 to vacuum or pressure and record this new reading.
 - If not, the transformer casing may have lost its seal or there is a faulty relief and the nitrogen cover gas has been lost. Record this problem on the inspection sheet and contact the C-AD Power Distribution Group Leader.
- Check that the transformer oil level is within the indicated minimum and maximum marks on the oil level gauge.
- Record the oil temperature reading and the maximum oil temperature reading indicated by the two pointers on the gauge. Reset the oil temperature drag pointer. This will be evaluated when the Power Distribution Group Leader or designee reviews the inspection sheet results.
- Record the winding temperature reading and the maximum winding temperature reading indicated by the two pointers on the gage. Reset the winding temperature drag pointer. This will be evaluated when the Power Distribution Group Leader or designee reviews the inspection sheet results.
- If a transformer cooling fan is present, test that it can operate. Ensure that the fan switch is returned to “Auto” so fans will operate as designed. For Non-Line Crew staff, if test switch is not accessible, note on sheet.

For Substation Switch Gear:

- Check that the lights in the switchgear enclosure are functioning.
 - Record any that need to be replaced in the Comments section of the checklist.
- Verify that the space heater functions by using a remote laser or infrared temperature sensor.
- Check the grounding conditions by visually checking the voltages on each phase’s voltmeter of the switchgear if available.
 - If the voltage between the 3 phases differs by more than 100 volts, indicating a soft ground, immediately inform the C-AD Power Distribution Group Leader or the CEE, and the PE Line Supervisor.
- If voltmeters do not exist and there are 3 indicating lights, then inspect the lights for an uneven brightness; record the indication on this system.
 - If the lights are uneven indicating a ground, inform the C-AD Power Distribution Group Leader or the CEE, and the PE Line Supervisor.

Other General Checks:

- Record any problems with the following in the Comments section of the checklist:
 - Area cleanliness. Nothing except equipment related to the substation shall be stored in the fenced area or the enclosed switchgear cabinets.
 - Check for excessive condensation within enclosed switchgear cabinets.
 - Check for evidence of animal intrusion.
 - Fence in good shape including barbed wire.
 - Fence grounded.
 - Gate operation and locking problems.
 - Excessive grass or weeds that need to be removed.

Attachment 8.2

Substation Inspection Checklists

<u>Substation</u>	<u>Page</u>
Booster Yard	10
1002'S, 1010, 1012	12
1004's	13
1005's	14
A, SB2, 911N, E. Q	15
925, C, J3, B, 913R	16
L's, BAF's, D	17
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SUBSTATION INSPECTION – BOOSTER YARD

Booster Substation Transformers

DANGER

Exposed live parts on top of transformers located approximately 6'-0" above grade.

Prohibited Approach Boundary (PAB) is 0'-7".

Restricted Approach Boundary (RAB) is 2'-2" (includes 1'-0" for inadvertent movement)

The temperature gauges are less than 2'-2" from live parts but greater than 1'-2" from live parts.

RAB will be established at 1'-2". Note: inadvertent movement would be down and away from live part.

Conductive materials that might inadvertently make contact with live parts, for example, conduit or pipes, shall not be brought into yard.

In general, no work is to be accomplished and no PPE is required.

If one has to open the controls terminal box, for example to test fans, safety glasses with side shields are required.

If control terminal box to be entered is within the 2'-2" from live part, one must wear Class 2 gloves and insulated tools.

No arc flash hazard exists in control terminal box. 120 volts does exist within the terminal box and one needs to avoid contact with internal live parts.

Date: _____

Inspector: _____

Key: _____

Exposed 13.8kV

Position	PE Number	Oil Leak	Gas Press.	Oil Level	Liquid Temp.	Wind'g Temp
1	520	N / Y		Sat / N	/	/
2	521	N / Y		Sat / N	/	/
3	522	N / Y		Sat / N	/	/
4	90-0229	N / Y		Sat / N	/	/
5	524	N / Y		Sat / N	/	/
6	525	N / Y		Sat / N	/	/
7	526	N / Y		Sat / N	/	/
8	527	N / Y		Sat / N	/	/
9	528	N / Y		Sat / N	/	/
10	529	N / Y		Sat / N	/	/
11	530	N / Y		Sat / N	/	/
12	531	N / Y		Sat / N	/	/
13	532	N / Y		Sat / N	/	/
14	533	N / Y		Sat / N	/	/
15	534	N / Y		Sat / N	/	/
16	535	N / Y		Sat / N	/	/
17	536	N / Y		Sat / N	/	/
18	90-0221	N / Y		Sat / N	/	/
19	538	N / Y		Sat / N	/	/
20	539	N / Y		Sat / N	/	/
21	540	N / Y		Sat / N	/	/
22	541	N / Y		Sat / N	/	/
23	542	N / Y		Sat / N	/	/
24	543	N / Y		Sat / N	/	/
25	544	N / Y		Sat / N	/	/
26	545	N / Y		Sat / N	/	/
27	546	N / Y		Sat / N	/	/
28	547	N / Y		Sat / N	/	/
29	548	N / Y		Sat / N	/	/
30	tc172	N / Y		Sat / N	/	/

Position	PE Number	Oil Leak	Gas Press.	Oil Level	Liquid Temp.	Wind'g Temp
Spare 1	549	N / Y		Sat / N	/	/
Spare 2	537	N / Y		Sat / N	/	/
Spare 3	4472c-1	N / Y		Sat / N	/	/
Spare 4	4472b-1	N / Y		Sat / N	/	/
TC 179	523	N / Y		Sat / N	/	/
		N / Y		Sat / N	/	/
Star	S30763	N / Y		Sat / N	/	/
		N / Y		Sat / N	/	/
1000P sp	629	N / Y		Sat / N	/	/
15 kV Switchgear		Lights	Y / N		Heat	Y / N

Comments:

SUBSTATION INSPECTION – 1002's. 1010, 1012

Date: _____

Inspector: _____

Substation	1008B	1008A	1010A	1012A	1002A	1002B		
Gate Key	PE9	UEB	PE9	PE9	PE9	PE9		

OUT OF SERVICE

Transformer								
PE No.	173	403	609	610	400	391		
Grounding	Sat / N							
Oil Leak Evidence	Sat / Y							
Pressure Reading								
Oil Level Acceptable	Sat / N							
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fans	Sat / N							

Switchgear								
Interior Light functional	Sat / N		Sat / N	Sat / N				
Space Heater Functional	Sat / N		Sat / N	Sat / N				
Grounding	Sat / N		Sat / N	Sat / N				
Ground Fault Indication	Sat / Y		Sat / Y	Sat / Y				
Phase A (voltage)								
Phase B (voltage)								
Phase C (voltage)								

Comments: _____

SUBSTATION INSPECTION –1004’s

Date: _____

Inspector: _____

Substation	1004A	1004B	1004C	1004D	1006A	1006B	1006C	1006C
Gate Key	PE9	PE9	PE9	PE9	UEB	PE9	PE9	PE9

Transformer

PE No.	401	616	617	631	402	397	183	
Grounding	Sat / N							
Oil Leak Evidence	Sat / Y							
Pressure Reading								
Oil Level Acceptable	Sat / N							
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fans	Sat / N							

Switchgear

							Bus 1	Bus 2
Interior Light functional	Sat / N							
Space Heater Functional	Sat / N							
Grounding	Sat / N							
Ground Fault Indication	Sat / Y							
Phase A (voltage)								
Phase B (voltage)								
Phase C (voltage)								

Comments: _____

SUBSTATION INSPECTION –1005s

Date: _____

Inspector: _____

Substation	1005E	1005F	1005F	1005G	1005G	1005H		
Gate Key	PE9	PE9	PE9	PE9	PE9	PE9		

Transformer

PE No.	398	283		284		399		
Grounding	Sat / N							
Oil Leak Evidence	Sat / Y							
Pressure Reading								
Oil Level Acceptable	Sat / N	Sat / N		Sat / N		Sat / N	Sat / N	Sat / N
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fans	Sat / N							

Switchgear

		13.8 kV	4.16 kV	13.8 kV	4.16 kV			
Interior Light functional	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Space Heater Functional	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Grounding	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Ground Fault Indication	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y

Comments: _____

SUBSTATION INSPECTION – A, SB’s, 911N, E, Q

Date: _____

Inspector: _____

out of service

Substation	A	SB1	SB2	911N	E	Q	
Gate Key	UEB	PE9	PE9	PE9	PE9	n/a	
Transformer							
PE No.	643	644	645	392	051	156	
Grounding	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Oil Leak Evidence	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y
Pressure Reading							
Oil Level Acceptable	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N		Sat / N
Liquid Temperature							
Liquid Max Temp							
Winding Temperature							
Winding Max Temp							
Fans	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Switchgear		13.8 kV	4.16 kV	13.8 kV	4.16 kV		
Interior Light functional	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Space Heater Functional	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Grounding	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Ground Fault Indication	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y
Phase A (voltage)							
Phase B (voltage)							
Phase C (voltage)							

Comments: _____

SUBSTATION INSPECTION – 925, C, J3, B, 913R

Date: _____

Inspector: _____

Substation	925	C	J3	B	R-913			
Gate Key	PE9	PE9	PE9	PE9	PE9			

Transformer

PE No.	386	673	396	646	30			
Grounding	Sat / N							
Oil Leak Evidence	Sat / Y							
Pressure Reading								
Oil Level Acceptable	Sat / N							
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fans	Sat / N							

Switchgear

Interior Light functional	Sat / N							
Space Heater Functional	Sat / N							
Grounding	Sat / N							
Ground Fault Indication	Sat / Y							
Phase A (voltage)								
Phase B (voltage)								
Phase C (voltage)								

Comments: _____

SUBSTATION INSPECTION –L’s, BAF’s D

Date: _____

Inspector: _____

Substation	L1	L2	L3	L4	BAF1	BAF2	D	
Gate Key	PE9	PE9	PE9		PE9	PE9	PE9	

future

Transformer

PE No.	656	655	654		144	143	47	
Grounding	SAT / N							
Oil Leak Evidence	Sat / Y							
Pressure Reading								
Oil Level Acceptable	SAT / N							
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fan	SAT / N							

Switchgear

Interior Light functional	SAT / N							
Space Heater Functional	SAT / N							
Grounding	SAT / N							
Ground Fault Indication	Sat / Y							
Phase A (voltage)								
Phase B (voltage)								
Phase C (voltage)								

Comments: _____

SUBSTATION INSPECTION – F’s, P’s

Date: _____

Inspector: _____

Substation	F1	F2	F3	P1	P2			
Gate Key	PE9	PE9	PE9	PE9	PE9			

Transformer

PE No.	648	647	611	649	650			
Grounding	Sat / N							
Oil Leak Evidence	Sat / Y							
Pressure Reading								
Oil Level Acceptable	Sat / N							
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fans	Sat / N							

Switchgear

Interior Light functional	Sat / N							
Space Heater Functional	Sat / N							
Grounding	Sat / N							
Ground Fault Indication	Sat / Y							
Phase A (voltage)								
Phase B (voltage)								
Phase C (voltage)								

Comments: _____

SUBSTATION INSPECTION – G’s, K’s

Date: _____

Inspector: _____

Substation	G	G2	K1	K2	K3				
Gate Key	PE9	PE9	PE9	PE9	PE9				

**OUT OF
SERVICE**

Transformer

PE No.	653		651	652	169				
Grounding	Sat / N								
Oil Leak Evidence	Sat / Y								
Pressure Reading									
Oil Level Acceptable	Sat / N								
Liquid Temperature									
Liquid Max Temp									
Winding Temperature									
Winding Max Temp									
Fans	Sat / N								

Switchgear

Interior Light functional	Sat / N								
Space Heater Functional	Sat / N								
Grounding	Sat / N								
Ground Fault Indication	Sat / Y								
Phase A (voltage)									
Phase B (voltage)									
Phase C (voltage)									

Comments: _____

SUBSTATION INSPECTION – H's, N's

Date: _____

Inspector: _____

Substation	H1	H2		N4	N5/6			
Gate Key	PE9	PE9		PE9	PE9			

Transformer

PE No.	672	681		170	174			
Grounding	Sat / N	Sat / N		Sat / N	Sat / N			
Oil Leak Evidence	Sat / Y	Sat / Y		Sat / Y	Sat / Y			
Pressure Reading								
Oil Level Acceptable	Sat / N	Sat / N		Sat / N	Sat / N			
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fans								

Switchgear

Interior Light functional	Sat / N	Sat / N		Sat / N	Sat / N			
Space Heater Functional	Sat / N	Sat / N		Sat / N	Sat / N			
Grounding	Sat / N	Sat / N		Sat / N	Sat / N			
Ground Fault Indication	Sat / Y	Sat / Y		Sat / Y	Sat / Y			
Phase A (voltage)								
Phase B (voltage)								
Phase C (voltage)								

Comments: _____

SUBSTATION INSPECTION – M's

Date: _____

Inspector: _____

Substation	M1	M3	M5	M6			
Gate Key	PE9	PE9	PE9	PE9			

OUT OF SERVICE OUT OF SERVICE

Transformer							
PE No.	663	665	171	172			
Grounding	Sat / N						
Pressure Reading							
Oil Leak Evidence	Sat / Y						
Oil Level Acceptable	Sat / N						
Liquid Temperature							
Liquid Max Temp							
Winding Temperature							
Winding Max Temp							
Fans	Sat / N						

Switchgear							
Interior Light functional	Sat / N						
Space Heater Functional	Sat / N						
Grounding	Sat / N						
Ground Fault Indication	Sat / Y						
Phase A (voltage)							
Phase B (voltage)							
Phase C (voltage)							

Comments: _____

SUBSTATION INSPECTION – RF

Date: _____

Inspector: _____

Substation	RF B	RF BC	RF C	RF D	RF DE	RF E	RF IJ	RF JK	RF K	RF KL	RF 11
Gate Key	UEB19										

Transformer	568	569	567	566	564	565	563	562	560	561	570
PE No.	Sat / N										
Grounding	Sat / Y										
Oil Leak Evidence											
Pressure Reading											
Oil Level Acceptable	Sat / N										
Liquid Temperature											
Liquid Max Temp											
Winding Temperature											
Winding Max Temp											
Fans	Sat / N										

15 kV Switchgear	Lights	Sat / N	Heat	Sat / N
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Comments:

SUBSTATION INSPECTION – MG, R, MG Test

Substations MG Test and Trafo:

CAUTION

Exposed live parts on top of transformers located over 8'-0" above grade.

Prohibited Approach Boundary (PAB) is 0'-7".

**Restricted Approach Boundary (RAB) is 2'-2" (includes 1'-0" for inadvertent movement)
To cross the RAB, Class 2 voltage rated PPE required.**

Conductive materials that might inadvertently make contact with live parts, for example, conduit or pipes, shall not be brought into yard.

In general, no work is to be accomplished and no PPE is required.

If one has to open the controls terminal box, for example to test fans, safety glasses with side shields are required.

No arc flash hazard exists in control terminal box. 120 volts does exist and one needs to avoid contact.

Date: _____

Inspector: _____

Substation	MG	R	MG-TEST	TRAFO				
Gate Key	PE9			Heavy Ion				

Exposed 13.8

Transformer tc240

PE No.	149	155	63					
Grounding	Sat / N	Sat / N	Sat / N	Sat / N				
Oil Leak Evidence	Sat / Y	Sat / Y	Sat / Y	Sat / Y				
Pressure Reading								
Oil Level Acceptable	Sat / N							
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fans	Sat / N	Sat / N	Sat / N	Sat / N				

Switchgear

Interior Light Functional	Sat / N	Sat / N	Y / N	Y / N	Y / N			
Space Heater Functional	Sat / N	Sat / N	Y / N	Y / N	Y / N			
Grounding	Sat / Y	Sat / Y						
Ground Fault Indication	Sat / N	Sat / N	Y / N	Y / N	Y / N			
Phase A (voltage)								
Phase B (voltage)								
Phase C (voltage)								

Comments: _____

SUBSTATION INSPECTION – H3, 1000P, Star

Substations 1000P2 & 1000P3

CAUTION

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Substation Transformers STAR 1, 2, 3, & 4

DANGER

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The temperature gauges are less than 2'-2" from live parts but greater than 1'-2" from live parts.

RAB will be established at 1'-2". Note: inadvertent movement would be down and away from live part.

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In general, no work is to be accomplished and no PPE is required.

If one has to open the controls terminal box, for example to test fans, safety glasses with side shields are required.

If control terminal box to be entered is within the 2'-2" from live part, one must wear Class 2 gloves and insulated tools.

No arc flash hazard exists in control terminal box. 120 volts does exist within the terminal box and one needs to avoid contact with internal live parts.

Date: _____

Inspector: _____

Substation	H3	1000P1	1000P2	1000P3	Star 1	Star 2	Star 3	Star 4
Gate Key					UEB	UEB	UEB	UEB
Transformer	Exposed I3.8							
PE No.	405	TC-178	630	676	677	678	679	
Grounding	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Oil Leak Evidence	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y	Sat / Y
Pressure Reading								
Oil Level Acceptable	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N
Liquid Temperature								
Liquid Max Temp								
Winding Temperature								
Winding Max Temp								
Fans	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N	Sat / N

Switchgear								
Interior Light functional	Y / N	Sat / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Space Heater Functional	Y / N	Sat / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Grounding	Sat / N							
Ground Fault Indication	Y / N	Sat / Y	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Phase A (voltage)								
Phase B (voltage)								
Phase C (voltage)								

Comments: _____
