

## STATION PROCEDURE OR FORM CHANGE

## A. IDENTIFICATION

PROCEDURE OR FORM NUMBER OP2347 B REV. 4 CHANGE NO. 2  
(Circle One)PROCEDURE OR FORM TITLE Normal Station Service Transformer  
(Circle One) 156-25 (N.S.S.T.)INITIATED BY K.D. Deslantis

## B. CHANGE

as per attached sheet

## C. REASON FOR CHANGE

In response to Edward Mrozyka  
note on Control Posting 0484-02 close-out.

## D. NON-INTENT CHANGE AUTHORIZATION (N/A for Intent Changes)

TITLE

SIGNATURE

DATE

Shift Supervisor (on duty)

## E. REVIEWED

Department Head

John S. Keenan 8/15/84

Unreviewed Safety Question Evaluation Documentation Required:

(Significant change in procedure method or scope  
as described in FSAR)☐ YES ☒ NO

(If yes, document in PORC/SORC meeting minutes)

ENVIRONMENTAL IMPACT

(Adverse environmental impact)

☐ YES ☒ NO

(If yes, document in PORC/SORC meeting minutes)

## F. PORC/SORC RECOMMENDS APPROVAL (or confirmation of interim change within 14 days)

PORC/SORC Meeting Number 2-84-70

## G. APPROVAL AND IMPLEMENTATION

The change is hereby implemented and is effective this date, except for interim  
changes which were implemented and effective per the Authorization of D above.John S. Keenan  
Station Superintendent/Unit Superintendent8/30/84  
Date

STATION PROCEDURE OR FORM CHANGE

A. IDENTIFICATION

PROCEDURE OR FORM NUMBER OP2347B REV. 4 CHANGE NO. 1  
(Circle One)

PROCEDURE OR FORM TITLE Normal Station Service Transformer  
(Circle One)

INITIATED BY K.D. Deslauris 156-25 (N.S.S.T.)

B. CHANGE

as per attached sheet

C. REASON FOR CHANGE

In response to CR 0484-02 "Operating a Nuclear Power Plant at Voltage Level Lower Than Analyzed". attached is a proposed change to OP2347B for Regulated Grid Voltage Procedure.

D. NON-INTENT CHANGE AUTHORIZATION (N/A for Intent Changes)

TITLE	SIGNATURE	DATE
Shift Supervisor (on duty)		

E. REVIEWED

Department Head John S. Kuman 6/8/84

Unreviewed Safety Question Evaluation Documentation Required:  
(Significant change in procedure method or scope as described in FSAR) ☐ YES ☒ NO  
(If yes, document in PORC/SORC meeting minutes)

ENVIRONMENTAL IMPACT  
(Adverse environmental impact) ☐ YES ☒ NO  
(If yes, document in PORC/SORC meeting minutes)

F. PORC/SORC RECOMMENDS APPROVAL (or confirmation of intent change within 74 days)

PORC/SORC Meeting Number 2-84-56

G. APPROVAL AND IMPLEMENTATION

The change is hereby implemented and is effective this date, except for intent changes which were implemented and effective per the Authorization of B above.

[Signature] 6/21/84  
Station Superintendent/Unit Superintendent Date

PROPOSED REVISION TO OP2347B

1. Change item, "8.2 N.S.S.T. Undervoltage", to item 8.2(b)
2. Add new item 8.2(a) to read as follows:

8.2(a) N.S.S.T. Degraded Voltage      C04L      CA-8

Initiating DeviceSet Point

Computer Print  
EE032  
Bus 24 A/B (4.16KV)

3620 V

ActionAuto

1. None

Initial

1. Verify proper operation of the turbine generator and its exciter per Procedure OP3234A.
2. Verify actual degraded voltage condition by observation of bus voltmeters.

Bus 24A, B, C, D, & E	3620V
Bus 22E & F	424V

3. If possible reduce affected busses loads to increase voltage.
- 4.(a) Call Convex to raise 24KV Generator Voltage/Increase VAR output.
- 4.(b) Call Convex to raise system voltage.
5. Inform Duty Officer if Degraded Voltage persists.

NOTE: THE SHORT DEGRADATION VOLTAGE FOR SAFETY RELATED MOTORS IS 85% OF RATED VOLTAGE. THE TIME LIMIT AT THIS VOLTAGE BEFORE PERMANENT DAMAGE IS APPROXIMATELY 4 HOURS.

Subsequent

1. Determine cause of degraded voltage condition and log reason, action taken, and time period taken to restore normal voltage.

NTT/psn

5/17/84



STATION PROCEDURE COVER SHEET

A. IDENTIFICATION

Number OP 2347B

Rev. 4

Title Normal Station Service Transformer 15G-2S (N.S.S.T.)

Prepared By R. Burnside

B. REVIEW

I have reviewed the above procedure and have found it to be satisfactory.

<u>TITLE</u>	<u>SIGNATURE</u>	<u>DATE</u>
DEPARTMENT HEAD _____	<u>[Signature]</u>	<u>1/6/83</u>
_____	_____	_____
_____	_____	_____

C. UNREVIEWED SAFETY QUESTION EVALUATION DOCUMENTATION REQUIRED:

(Significant change in procedure method or scope  
as described in FSAR)  
(If yes, document in PORC/SORC meeting minutes)

YES [ ] NO ☒

ENVIRONMENTAL IMPACT

(Adverse environmental impact)  
(If yes, document in PORC/SORC meeting minutes)

YES [ ] NO ☒

D. PORC/SORC APPROVAL

PORC/SORC Meeting Number 2-83-1

E. APPROVAL AND IMPLEMENTATION

The attached procedure is hereby approved, and effective on the date below:

[Signature]  
Station/Service/Unit Superintendent

1/20/83  
Effective Date

UNIT 2

NORMAL STATION SERVICE TRANSFORMER 15G-2S (N.S.S.T.)

PAGE NO.

1-13

EFF. REV.

4

PROCEDURE TABLE OF CONTENTS

		<u>PAGE</u>
7.1 Energizing N.S.S.T.	15G-2S	5
7.2 De-energizing N.S.S.T.	15G-2S	5

1. OBJECTIVE

- 1.1 To provide a procedure for startup, shutdown, normal and casualty operations of the Normal Station Service Transformer (N.S.S.T.).

2. LICENSE REQUIREMENTS

- 2.1 Refer to Technical Specifications 3/4.7.

3. REFERENCES

- 3.1 F.S.A.R. Chapter 8.

4. PLANT OPERATING REQUIREMENTS

- 4.1 The N.S.S.T. is the preferred source of 6.9-KV and 4.16-KV power during Turbine Generator at power operations.

5. PREREQUISITES

- 5.1 125 VDC control power in service.  
5.2 Station relaying available as required.  
5.3 Telephone communications as required.  
5.4 Cooling Supply Power from MCC 22-2A and MCC 22-1DA is available and Cooling Control in Automatic.  
5.5 Data Logger Computer in service (desired).  
5.6 N.S.S.T. N2 Gas bottles pressure between 500 psig and 2000 psig and gas system in service. Normal tank pressure range 1.0 psig to 1.5 psig.  
5.7 Verify Transformer Deluge System available for service.

6. PRECAUTIONS

- 6.1 Before racking out any low side breaker, check to make sure the breaker is open.  
6.2 Do not close breakers locally without contacting Control Room Operator.  
6.3 Check switching and tagging log to assure clearance of all tags on equipment to be energized.



- 6.4 Before energizing any equipment following maintenance, a visual inspection will be made to ensure that all portable grounds have been removed, all bus compartment panels have been replaced, all breakers on the equipment are open, all foreign objects from in and around the equipment have been removed, all protective relay targets are reset, potential transformer fuses are installed and all compartment doors are closed.
- 6.5 N.S.S.T. will be energized anytime the turbine generator is energized, except whenever the isolated phase links between the generator terminals and N.S.S.T. terminals have been removed.
- 6.6 For forced-oil-cooled (FOA or FOW) transformers with all pumps or fans or both inoperative, the following operating conditions are assumed to occur infrequently and without undue damage to the transformer:

1. Rated load may be maintained for approximately 1 (one) hour following normal operation at nameplate rating at 30°C ambient.
2. Rated load may be carried for approximately 2 (two) hours if started with the windings and oil at 30°C ambient.
3. Rated voltage may be maintained for 6 (six) hours at no load, following continuous operation at nameplate rating at 30°C ambient with cooling equipment in operation.
4. Rated voltage may be maintained for 12 hours at no load starting with the windings and oil at 30°C ambient.

- 6.7 For forced-oil-cooled transformers (FOA or FOW) ratings with part of coolers in operation, use the following:

Table 92.01 - 244

% of Total Coolers in Operation	Permissible Load in % of Nameplate Rating
100	100
80	90
60	78

50	70
40	60
33	50

- 6.8 Do not exceed the low side rates of X-Wdy 6.9KV 30MVA 2513 amps, Y-Wdy 4.16KV 15MVA 2084 amps.
- 6.9 When racking a 4160 or 6900V breaker up and down, stand off to the side of the compartment, use only the left hand for racking operation, and turn your face away.
- 6.10 Whenever opening or closing a 4160 or 6900V breaker locally, stand to the side of the compartment, extend only one arm across the front of it and turn your face away.

## 7. PROCEDURE

### 7.1 Energizing N.S.S.T. 15G-2S.

- 7.1.1 Verify N.S.S.T. low side breakers, 2S2-25A-2, 2S2-25B-2, 2S3-24A-2 and 2S3-24B-2 are open.
- 7.1.2 Refer to OP2324A for Turbine Generator Excitations operations which will energize the N.S.S.T.

### 7.2 De-energizing N.S.S.T. 15G-2S.

- NOTE: In order to de-energize the N.S.S.T. during normal conditions, the Turbine Generator must be removed from service and its excitation de-energized.
- 7.2.1 Refer to OP2342 for 6.9-KV breakers and OP2343 for 4.16-KV breakers operations.
  - 7.2.2 Refer to OP2324A for Turbine Generator Excitations removal from service.

## 8. ALARMS AND MALFUNCTIONS

### 8.1 N.S.S.T. Lockout Channel I Initiating Device

86T1 or 86T2  
15G-2S 15G-2S

Transformer Differential

C08 A1

Set Point

- -

(87T-A) (87T-B) (87T-C)

15G-2S

N.S.S.T. Lockout Channel II  
Initiating Device

C08 B1  
Set Point

87T3 or 86T4  
15G-2S 15G-2S

- -

High Voltage Overcurrent

50/51T-A, (B), (C)  
15G-2S

Grounding Transformer Overcurrent

50/51T-A, (B), (C)  
15G-2S3

Low Voltage Ground Fault 6.9KV

51N-1A  
15G-2S2

Low Voltage Ground Fault 4.16KV

51N-2A  
15G-2S3

Action

Auto

1. Trips Turbine Generator.
2. Trips Auto Transfer Trip Channel I & II of Main Transformer, which trip 15G-8T-2 and 15G-9T-2.
3. Trips 2S2-25A-2 and 2S2-25B-2, 6.9-KV breakers.
4. Trips and lockouts 2S3-24A-2 and 2S3-24B-2, 4.16-KV breakers.
5. Trips and lockouts of the Generator Field Breaker.
6. Initiates transfer of stations service loads to the Reserve Station Service Transformer.

Initial

1. Verify all auto actions take place.
2. Initiate OP2502 Emergency Shutdown Procedure if plant load was greater than 15% F.P. at time of trip.

Subsequent

1. Determine cause of trip by observation of relay targets, record targets and relay drops.
2. Notify CONVEX, and Maintenance Department of problem.
3. After problem has been corrected, reset targets and relays.

4. Reset Lockout relays 86T1, 86T2, 86T3 and 86T4.
5. Restore system to normal as per OP2347B.

NOTE: For operation without the N.S.S.T.  
If the N.S.S.T. cannot be restored to service, it may be isolated by removing the removable links in the isolated phase bus. This would need a special maintenance procedure and operating procedure.

8.2 N.S.S.T. Undervoltage	C08 C1
<u>Initiating Device</u>	<u>Set Point</u>
<u>27X-1</u> and <u>27X-1</u> (6.9KV)	< 70% of normal
<u>15G-2S2</u> <u>15G-2S2</u>	
<u>27X-1</u> and <u>27X-1</u> (4.16KV)	< 70% of normal
<u>15G-2S3</u> <u>15G-2S3</u>	

#### Action

##### Auto

1. Blocks closing of the following breakers:  
2S3-24A-2, N.S.S.T. to Bus 24A  
2S3-24B-2, N.S.S.T. to Bus 24B  
2S2-25A-2, N.S.S.T. to Bus 25A  
2S2-25B-2, N.S.S.T. to Bus 25B

##### Initial

1. Verify proper operation of the turbine generator and its exciter.
2. Verify actual undervoltage condition by observation of bus voltmeters.
3. If possible reduced affected buses loads to restore voltage to normal.

##### Subsequent

1. Determine cause of undervoltage and correct.

8.3 N.S.S.T. Trouble	C08 D-1
<u>Initiating Device</u>	<u>Set Point</u>
N.S.S.T. Local Panel	Common Alarm Light



Action

Auto

1. None.

Initial

1. Monitor main control board indication of voltage, current, KW, etc., or other alarms to determine if a fault exists on the N.S.S.T.
2. Monitor N.S.S.T. temperature and other parameters on the plant Data Logger.
3. Dispatch an operator to the N.S.S.T. local common alarm light panel to determine what the alarm is.

Subsequent

1. Refer to Subsequent action under individual N.S.S.T. alarms.

8.3.1	N.S.S.T. cooler Power Auto Transfer	Local Panel
	<u>Initiating Device</u>	<u>Set Point</u>
	Transfer Device	Loss of selected power supply

Action

Auto

1. Automatic transfer of power to the alternate source.

Initial

1. Reset local alarm to enable future N.S.S.T. alarms to annunciate main control board "N.S.S.T. Trouble".
2. Check closed breakers 8C-2, 8C-3 on local panel.
3. Check for blown fuses, FU-1, on local panel.
4. Check closed power supply breakers on MCC22-2A and MCC22-1DA.
5. Insure fans and pumps are running as applicable.

Subsequent

1. If cause of trouble cannot be determined, notify Maintenance Department.

8.3.2	N.S.S.T.	
	High Combustible Gas	
	<u>Initiating Device</u>	<u>Set Point</u>



Fault Gas Monitor

1%

Action

Auto

1. None.

Initial

1. Reset local alarm to enable future alarms to annunciate Main Control Board "N.S.S.T. Trouble".
2. Observe local fault gas monitor indication.
3. Notify Control Room of indication.

A. \*Classification of Total Combustible Gas Reading

<u>TCG Reading %</u>	<u>Course of Action</u>
0 - 0.5	No Action
0.5 - 1	Caution: Close surveillance for upward Trends
1 - 5	Investigate cause immediately
5 -	Remove transformer from service until cause is located and remedied

Subsequent

1. High fault, gas monitor reading could indicate an internal fault, notify CONVEX of indication.
2. Proceed as directed by CONVEX.

8.3.3 N.S.S.T. Hi-Lo Tank Pressure

Indicating Device	Set Point
Pressure Sensor Hi	3.0 psig
Pressure Sensor Lo	.25 psig

Action

Auto

1. None.

Initial

1. Reset local alarm to enable future alarms to annunciate main control board "N.S.S.T. Trouble".

2. Observe local gas regulator pressure, tank liquid level and winding temp.
3. Notify Control Room.

Subsequent

1. Hi Tank pressure could result from a failed nitrogen regulator or an internal/external fault (normal range is 1.0 psig to 1.5 psig) or from increasing transformer load.
2. If there is an internal or external fault, notify CONVEX and proceed as directed.
3. If N2 regulator has failed, replace same as per General Electric instruction manual for the N.S.S.T. after notifying CONVEX of the malfunction.
4. If tank pressure is low, have Electrical Maintenance carry out the required adjustment. If regulator has failed, repeat subsequent action step (3). If N2 bottle is exhausted, replace same.

8.3.4 N.S.S.T. Liquid Temp

N.S.S.T. Winding Temp (Y) Local Panel

N.S.S.T. winding Temp (X)

<u>Initiating Device</u>	<u>Set Point</u>
1. Oil Temp. Detector	90°C
2. Winding Temp. Detectors	105°C

Action

Auto

1. None.

Initial

1. Reset local alarm to enable future alarms to annunciate Main Control Board "N.S.S.T. Trouble".
2. Check local temperature indicators.
3. Check cooling fans and oil pumps operating select "hand" operation for cooling fans and oil pumps at local panel, if necessary.
4. Check closed cooling fan and oil pumps CKT Bkrs. at local panel 8C-4, 8C-5, 8C-6, 8C-7.

Subsequent

1. If temperature control cannot be regained, notify CONVEX.
2. If temperature exceeds 105°C on NSST 6.9 KV windings, monitor temperature. If temperature exceeds 115°C, transfer one 6.9 KV bus to the reserve station service transformer.

8.3.5 N.S.S.T. Pressure Relief

Indicating Device

Set Point

Pressure Relief Value (red light)  $\geq$  5psi

Action

Auto

1. Relieve overpressure condition in the tank.

Initial

1. Reset local alarm to enable future alarms to annunciate Main Control Board "N.S.S.T. Trouble".
2. Observe which relief value has lifted, verify overpressure condition has been corrected and check that relief valve has reset.
3. Notify Control Room.

Subsequent

1. Follow applicable portions of OP Procedure, Section 8.3.3.1 and 8.3.3.2 initial and subsequent action as to causes, and corrective action for tank overpressure.

8.3.6 N.S.S.T. Liquid Level

Local Panel

Initiating Device

Set Point

Liquid level gauge

Low Mark

Action

Auto

1. None.

Initial

1. Reset local alarm to enable future alarms to annunciate Main Control Board "N.S.S.T. Trouble".
2. Check local level indications.
3. Check N.S.S.T. for oil leaks.

Subsequent

1. On a major oil leak where the transformer windings will be uncovered, notify CONVEX and proceed to remove the N.S.S.T. from service.
2. On a minor oil leak, notify CONVEX and closely observe oil level until corrective action has been taken.

8.3.7 N.S.S.T. loss of liquid flow Local Panel

Initiating Device

Set Point

Liquid flow gauge

Less than 90% normal

Action

Auto

1. None.

Initial

1. Reset local alarm to enable future alarm to annunciate Main Control Board "N.S.S.T. Trouble".
2. Check oil pumps operating.
3. Check breakers 8C-6, 8C-7 on local panel closed.
4. Check oil pump overloads reset.
5. Check oil level.

Subsequent

1. Place oil pumps in manual, if oil pumps will not run or flow alarm will not clear, notify Maintenance Department.
2. Notify CONVEX.

8.3.8 N.S.S.T. Loss of Control Power Local Panel

Initiating Device

Set Point

Control Power Undervoltage

Less than 70% normal

Action

Auto

1. Loss of N.S.S.T. Cooling fans and oil pumps.
2. Loss of fault gas monitor.
3. Loss of local panel heaters, lights and convenience outlets.

Initial

1. Reset local alarm to enable future alarms to annunciate Main Control Board "N.S.S.T. Trouble".

2. Check closed circuit breakers 8C-1, 8C-2 and 8C-3 on the local panel.
3. Check for blown fuses, FU-1, on local panel.
4. Check closed power supply breakers on MCC22-2A and MCC22-1DA.

Subsequent

1. If control power cannot be restored, notify CONVEX and proceed as directed to remove the N.S.S.T. from service.

8.3.9	N.S.S.T. Low Gas Cylinder Pressure	Local Panel
	<u>Initiating Device</u>	<u>Set Point</u>
	Pressure Switch 63GC	200psig

Action

Auto

1. None.

Initial

1. Reset local alarm to enable future alarms to annunciate Main Control Board "N.S.S.T. Trouble".
2. Verify N.S.S.T. tank pressure as normal.
3. Verify low pressure condition of the N2 gas cylinder.

Subsequent

1. Notify Control Room of indications.
2. Replace the spent N2 gas cylinder with a full one.
3. Check system for leaks.

RB:jlc