1	Q.	Please provide electronic documents describing terminal station equipment and
2		relay inspection, testing, and maintenance programs and practices. These
3		documents should describe the activities to be conducted by equipment type, the
4		time period between time-based activities, and what triggers condition-based
5		activities.
6		
7		
8	A.	The documents describing terminal station equipment and relay inspections,
9		testing, and maintenance programs and practices and the description of the
10		activities to be conducted by equipment type and the time period between time-
11		based activities are contained in the attachments to PUB-NLH-082. These
12		documents refer to the following equipment categories:
13		 Air Systems (See PUB-NLH-082 Attachment 1);
14		 Battery Banks (See PUB-NLH-082 Attachment 2);
15		 Terminal Station, Building & Grounds (See PUB-NLH-082 Attachment 3);
16		 Capacitor Banks (See PUB-NLH-082 Attachment 4);
17		 Circuit Breakers (See PUB-NLH-082 Attachment 5);
18		 Circuit Switchers (See PUB-NLH-082 Attachment 6);
19		 Disconnect Switches (See PUB-NLH-082 Attachment 7);
20		Power Transformers and Shunt Reactors (See PUB-NLH-082 Attachment 8)
21		Current Transformers and Potential Transformers (See PUB-NLH-082)
22		Attachment 9); and
23		 Protection and Control (See PUB-NLH-082 Attachment 10).
24		
25		The above is the basis for the terminal station preventative maintenance (PM)
26		program. The PM activities are completed by tradespersons who provide the first
27		level of review and identify deficiencies. A second level review is then completed

Page 2 of 4

1	by the Supervisor and a follow-up review is completed at a point in the future by an
2	Asset Specialist. Each review level can trigger immediate or future work.
3	
4	Other activities that trigger condition inspections are:
5	Equipment malfunctions that require inspection/test prior to restoring to
6	service. Examples include: abnormal operation of a breaker, operation of a
7	protection circuit, or an alarm or trip on a power transformer;
8	Project work that requires inspection/test prior to restoring to service. Some
9	examples include: overhaul work performed on tap changers, refurbishment
10	work performed on transformers such as bushing replacements, and
11	overhaul work performed on breakers; and
12	New equipment installations will require inspection/test prior to placing the
13	equipment into service to confirm the asset's condition, as well as form the
14	baseline for future maintenance.
15	
16	Below is also a summary of other condition based activities completed on Terminal
17	Station assets and the triggers that initiate action.
18	
19	Dissolved Gas Analysis
20	Oil samples are obtained from power transformers on a regular interval and are a
21	form of transformer condition monitoring. Free-breathing transformers are
22	sampled at least annually and sealed transformers are sampled at least every six
23	years during their PM. A transformer is sampled more often if results indicate an
24	abnormal gas generation rate.

Page 3 of 4

Oil Quality Analysis

Oil quality data is obtained from oil samples and is used to determine if oil reclamation will be performed on power transformers. This is a form of oil maintenance which improves the quality of the oil to like-new condition. Hydro has a condition assessment ranking tool which scores transformers based on oil quality and system criticality. Transformers are selected for oil reclamation utilizing this ranking.

Furan Analysis

Furan analysis, which is performed on oil samples obtained via regular oil sampling, is a form of transformer condition monitoring. Furan analysis is an indirect non-destructive method for determining the mechanical strength of a transformer's paper insulation and yields data on the brittleness of the cellulose insulating paper inside the transformer. This level of brittleness, known as the Degree of Polymerization (DP), expresses an oil testing result as a whole number which can range from 200 to 1,000. If the DP level is less than 200, the paper is considered very brittle and is an indication that the transformer is at the end of its service life. Hydro is using a DP number of 400 as the baseline target for end of life with transformers, since this baseline gives a suitable lead time to procure a replacement transformer. Furan analysis is performed every four years on transformers whose DP is >649 and annually on transformers whose DP is <649.

Radiator Condition Assessment

Hydro has a condition assessment tool which scores transformer radiators based on their condition which is assessed via a detailed visual inspection by an Asset Specialist. Most were assessed in 2006 with the remainder either assessed in 2013 or planned for assessment in 2014. Those assessed in 2006 are planned for

Island Interconnected System Supply Issues and Power Outages

Page 4 of 4

reassessment in 2014. Transformers are selected from amongst the worst scored transformers for radiator replacement.

On-Load Tap Changer Condition Assessment

Condition monitoring performed on power transformer on load tap changers (OLTCs) consists of oil sampling. An oil sample is taken from an OLTC every four years except those whose condition (as indicated by oil sampling) warrants biannual sampling. The oil samples are analyzed by a certified lab using a proprietary analysis technique which considers gas levels, oil quality, and solid particle counts. The analysis result is a condition score between one and four with four being the worst. On load tap changers that score three or higher are planned for overhaul and are sampled twice annually until overhauled.

Air Systems

INSPECTION (Bi-Monthly)

- 1 Compressor/ Air Receiver:
 - 0.1 Check crank case oil level. Add oil as required and record do not overfill.

 Note: Excessive oil consumption is indicative of developing trouble.
 - 0.2 Record running hours.
 - 0.3 Check proper function of pneumatic reducing valves by observing a whisper of air discharge from the pilot air dome control. Observe normal air output pressure.
 - 0.4 Check belt drives for tension, where applicable.
 - 0.5 Function test compressor automatic control circuit. Discharge system to permit both compressors to cut in. Record running time of each compressor.
 - Observe proper function of automatic unloaders, the closing operation during start up and air discharge on stopping.
 - 0.7 Clean unloaders.
 - 0.8 Note any abnormal noises or vibrations.
 - 0.9 Check and record motor amps during operation.
 - 0.5 Clean up oil and dirt spills.
 - 0.6 Check condition of intake /outlet filters.
- 2 Dryer- Bowser (ONLY)
 - 0.1 Check gauges for indication of air leaks between the towers.
 - 0.2 Check blower motor, belt, change over limit switches and tower heater function.
 - 0.3 Lubricate four way valve.
 - 0.4 Check oil level in Norgren regulator, replenish if required.
 - 0.5 Function test for proper dryer operation cycle.

COMPRESSOR /DRYER /AIR SYSTEM MAINTENANCE PROCEDURES

Page 2 of 3

0.6 Record running amperage for blower motor and heater.

3 DRYER- OTHER MANUFACTURES

- 0.1 Check purge pressure and line pressure.
- O.2 Check pressure drop across the pre-filter. Should not be more than 5 psig. (35 kpa).
- 0.3 Function test dryer operation cycle.
- 0.4 Complete system dew point Test. Should be -45 C
- 0.5 Complete Bi Monthly Inspection Form.

ANNUAL INSPECTION

- 1. Complete inspection and checks listed on the Annual Compressor/Dryer/air system Inspection (form).
- 2. Replace all filters on the compressors and dryer system.
- 3. Drain and replace compressor oil.
- 4. Function test pressure switches.
- 5. Inspect all motor contractors and wiring.
- 6. Complete a condition running test on each compressor.

Method: With only one compressor on line, and in lead position, drain air from air receiver until automatic cut-in occurs. Record the time it takes to bring the system up to normal pressure /shutdown. Repeat the identical test with the second compressor. Record results.

- 7. Check motor bearings for over heating and roughness when running. Lubricate when required.
- 8 Complete Annual Compressor/Dryer Form.
- 9. Breakers with Compressors Complete [Breakers C/W Compressor Form]

COMPRESSOR /DRYER /AIR SYSTEM MAINTENANCE PROCEDURES

Page 3 of 3

10. Clean Condensate Drain Valve on Air Dryer

COMPRESSOR OVERHAULS

The frequency and extent of compressor overhauls will be determined from experience with each compressor system.

Factors that may indicate that an overhaul is required are:

- 1. Excessive oil consumption.
- 2. Change in inter-stage pressure/back pressure.
- 3. Excessive time to bring system up to pressure.
- 4. Oil leaks.
- 5. Broken valve spring/overheating.
- 6. Excessive noise, vibration, etc.

Page 5 of 9, Isl Int Sys Power Outages Bi-Monthly - COMPRESSOR/DRYER/AIR SYSTEM INSPECTION

	Station:	Ten I	Date:		Readings E	Ву:	
ution: Be	fore inspection and mainte	_			lation and Permit.	1175	
DEW	POINT TEMPERATU					JRE:	KPA
DEW	POINT TEMPERATU	JRE:	0C	@	OPERATING F	RESSURE:	KPA
							olerate E
	× × × =		Comp. No.	1/A	Comp. No.2/B		
	Base (Dil Level					
	0	il Added		1000			
	Oil Changed (If Re	equired)					
	Un-loader Cleaned &	& Tested					
	Moisture Di	scharger					
	Operating Position (Lea	ad / Lag)					
	Cut	t In KPA					
	Cut (Out KPA				7	
	Moto	or (amps)					
	Running Tir						
	(Cut in to Compressor Rur						
FUNCT	ION TEST SYSTEM:						
	er Heater (amps):	A		3	C	Till till till till till till till till	
						ter:	
_	h Side: High Pressure A					re Alarm:	
Low	Side: High Pressure A					re Alarm:	
Syst	Differential Pre em Pressure: High Sid			low S	ide:	sure Drop:	
	g						
	COMPLETED: Check guards/couplers Check flex connections Check limit and flow swit	ches oner	ation	Cl	neck oil relief valves neck for oil & air lea neck dryer heater & :	ks in the system	d press. gaug
	Check thermostats & all e	_			neck condition of int		

REVISED NOV. 29, 2013

PUB-NLH-082, Attachment 1

Page 6 of 9, Isl Int Sys Power Outages Bi-Monthly - COMPRESSOR/DRYER/AIR SYSTEM INSPECTION

Station:	Date:	Readings By:	
Check Blower oil, fan, & belt	STATE OF THE	Report any Oil Leaks as per EERP (Environmental Emergency Response Plan)	(
Check Water/Oil SeparatorHeat Tracing Working (Where ap	oplicable)	Check Belt Drives for tension and wear	
Note Any Concerns Below:			
			_
		Tura Arri	

ANNUAL BREAKERS WITH COMPRESSOR/DRYER/AIR SYSTEM INSPECTION

Equipment ID: Manufacturer:	Station: Date:		JDE W/O # : Readings By:	
I	DEW POINT	TE	PERATURE	
	(Breakers w			
DEW POINT TEMPERATUR	E:ºC	@	TEST PRESSURE:	KPA
DEW POINT TEMPERATUR	E:ºc	@	OPERATING PRESSURE:_	KPA
	COMPRES	SOI	R/DRYER	
COMPRESSOR HOU	RS:			HOURS
CUT IN:				KPA
CUT OUT:				KPA
(RUN TIME) CUT IN / C	CUT OUT:			MINUTES
LOW PRESSURE AL	ARM:			KPA
MOTOR AMPS	,			AMPS
CONTROL CABINET H	EATERS:			AMPS
COMPRESSOR CABINET HE	ATER(If Applicable)		30.12.0	AMPS
Marketing				
CHANGE BASE O	IL:			
REPLACE DESSICANT				
CHECKS COMPI	ETED		CHECKED OK	
LOW POINT DRAIN	NED:			
AIR FILTERS: (CLEAN/REPLACE	CE IF REQUIRED)	0		
CHECK V BELT: (REPLACE				
CHECK BKEAKI	ER			
.INTERCONNECTING	HOSES:			
	IRING:			

Page 8 of 9, Isl Int Sys Power Outages ANNUAL - COMPRESSOR/DRYER/AIR SYSTEM

Equipment ID:St	ation:		JDE W/O#		
Manufacturer:	Date:		Readings By		
NOTE: All TESTS MUST BE CO	MPLETED	OR MARK	ED N/A (Unless	Otherwise Instruct	ed).
DEV	W POIN	T TEPE	RATURE		1715
DEW POINT TEMPERATURE:		°C @ T	EST PRESSUR	E:	KPA
DEW POINT TEMPERATURE:	The state of the s	°C @ O	PERATING PR	ESSURE:	KPA
NOTE: 1 BDETS. Do not have Comp	ressors or	a Dryar in tl	a TS Air System	Q. J. I. Tum 1	
NOTE: 2 CATTS. Do not have a Dry		•	•		
CAUTION: Before inspection and maintena	noo provido	the proper Ic	solotion and Down	in a lateral belongs to	
CAUTION. Before hispection and maintena	lice provide	the proper is	solation and Fern	III.	
and the Meneral of	C	OMP. #1	COMP. #2	DRYER	
Hour Met					
Replaced Pre-Filt					
Replaced After-Filt	er				
Clean Condensate Dra	in		7,50		11 (1 - 27)
Change Desicca	nt	1			
Change Base C					
Condensate Drain Working	ng		*		
Oil Level Alar	m				
Start Failu	re				
FUNCTION TEST SYSTEM:					
Compressor #1 (amps): A		В	C		
Compressor #2 (amps): A		В	C		
Dryer Heater (amps): A		B	C		
Lead Comp. #1: Cut In	kpa	Cut Out	kpa	Running Time _	min
Lead Comp. #2: Cut In	kpa			Running Time	
Lag Comp.: Cut In			kpa	Running Time	
	_		-		
High Side: High Pressure Alarm	ո։	kna	Low Pressu	re Alarm:	kna
20		r-			

REV DEC 03 2013

PUB-NLH-082, Attachment 1 Page 9 of 9, Isl Int Sys Power Outages ANNUAL - COMPRESSOR/DRYER/AIR SYSTEM

Page 2 of 2

	ment ID:	Station: Date:	JDE W/O #: Readings By:	
	Side: High Pressurerential Pressure:	e Alarm:kpa kpa	Low Pressure Ala 15 min Pressure I	
CHECKS	COMPLETED:			
Check/ Check Check Check Check Check	clean outlet and purge clean inlet & purge exhaoil relief valves, check whold down bolts for oil & air leaks in the guards/couplers flex connections condensate drain valve o	ust switching valves alves, and pressure gauges system	Check/clean the re-pres Check limit switches, a Check belt drives for te Check all motor contac Check dryer failure alar Check thermostats & al Heat Tracing Working	surization valve nd flow switches operation nsion and wear tors, wiring, and bearings rm l electrical controls
COMMEN	ITS:			
				0

REV DEC 03 2013

Battery Banks

GENERAL INSPECTION (4 MONTH)

- Observe D.C. voltage by means of station voltmeter or the meter on the charger. The correct range of readings should be marked on the meter so that any variation from normal is visible. A reading outside normal range should be investigated and reported.
- Observe charger ammeter reading. The normal current drain on the battery should be marked on the meter. If the reading is below the mark, the cause should be investigated and reported.
- 3 Check that the charger ammeter reading indicated that the battery current drain is normal.
- 4 Record the D.C. system voltage.
- 5 (VRLA) Measure voltage of pilot cell. Record on appropriate form.
- 6 (Flooded Cell) Measure specific gravity & voltage of pilot cell. Record on appropriate form.
- 7 (Flooded Cells) Check the electrolyte levels during a walk around inspection of the battery. Note that water must be added if lower limit is reached and at that time all cells should be filled to upper limit and given an equalize charge.
- Function test 125V D.C. emergency lighting. Where applicable function test 6 and 12 volt emergency lighting and check battery condition.

ANNUAL INSPECTION

- 9 Check that the D.C. voltage is within the normal range marked on the voltmeter.
- 10 Check that the charger ammeter reading indicated that the battery current drain is normal.
- 11 For Cordex Rectifiers: Remove rectifier and clean internally
- Record the D.C. system voltage.
- 13 Check and record with the use of the Midtronics Battery testing Equipment. The voltage, Conductance) MHOS and Temperature of each Cell.
- 14 Check and record the conductance MOHS of the Inter- Cell Connecting Straps.

Batteries Flooded Cells Annual Inspection Form

- 15 Measure and record the voltage and specific gravity of the pilot cell.
- Add water as required to bring levels in all cells to upper limits.
- 17 Determine the Pilot Cell by lowest specific gravity.
- 18 REQUIRED IF WATER IS ADDED:
 - (a) Apply an equalize charge for 24 hours at 2.33 volts per cell or at a lower voltage for locations having electronic or other voltage sensitive load that must not be subjected to the full equalize charge.
 - (b) To determine if the equalize charge has been maintained for a long enough period, a reading of specific gravity of all cells should be taken some time after gassing has stopped. (ie. Not less than one hour after an equalize charge is terminated or it can be delayed until next visit.) These readings should be taken under stable conditions so they are comparable. Use appropriate form to record specific gravities.
 - (c) If the equalize charge does not return the specific gravity of the pilot cell to "normal", continue the equalize charge for another 24 hour period.
- 19 Check each Cell for Cracks, Corrosion on Terminals and Leaks (Report any Leaks as per EERP Environmental Emergency Response Plan). Inspect the plates for deterioration, buckling, etc.
- Wipe down cells if required.
- 21 Complete appropriate Inspection Forms.

Batteries VRLA Annual Inspection Form

- Check each Cell for Cracks, Corrosion on Terminals and Leaks (Report any Leaks as per EERP Environmental Emergency Response Plan). Inspect the plates for deterioration, buckling, etc.
- 23 Measure and record the voltage of the pilot cell.
- 24 Complete Equalize Charge only if Required (Check Manufacture Battery Guide Lines).
- 25 Determine the Pilot Cell by lowest voltage.
- 26 Complete appropriate Inspection Forms.

PUB-NLH-082, Attachment 2 Page 4 of 11, Isl Int System Power Outages

120 DAY - FLOODED (VENTED) BATTERY AND CHARGER INSPECTION

	on:				•		cture Charger: _		
	· · · · · · · · · · · · · · · · · · ·	BAT	ΓERY	CHARGER	.#1	or # 2			
DC Voltage	Output:	Found				I	Left		
DC Amperag		Found]	Left		
Position Fou		Float]	Equalize		
Position Left		Float]	Equalize		
127									以为以来代。2013年
		FLC	ODEL	(VENTE	D) BATTE				
Room or Cal	oinet Temp	erature °C	300 00000000		Cabinet H	eater (If App	olicable) On	_ Off _	
Battery Bank	Voltage (Disconnected)		DC					
Pilot Cell:	#	Voltage	DC	Specific (N-0-0-0-0-0	Temperati		X (
Water Added		No					s No		
		Note: Specific G	ravity	Should be	maintained	d between	1200 & 1220.		
Battery Bank	c Electrolyt	e Level: (Found)		Normal	Low _		Very Low		_
	Voltag	Why given: ge:	Amp		NG CHARG	E Duration	1:	hrs	
Notes: -Equalize ch	arge is requ	aired after any dis	tilled v	vater is add	ed				
CHECKS C	Check t Check t (Enviro Inspect Check (ED: he Accuracy of the Accuracy of the Accuracy of the Each Cell for Crack the Battery Rack Cells for Deposits the Operation of Version of Vers	ks, Concey Results for Sign on the	rrosion on Toponse Plantons of Corroll Bottom	Terminals, L) osion & Batt	eaks (Repo	ort any Leaks as	s per EE	.RP).
Note Any C	oncerns Be	low:							
				N. N. W.					
_		W-1							

Page 1 of 1

PUB-NLH-082, Attachment 2 Page 5 of 11, Isl Int System Power Outages

120 DAY - VRLA BATTERY AND CHARGER INSPECTION

Station: Date:				Manufacture Charger:
			BATTERY CHARGER	
	oltage Output:	Found		Left
DC Ar	nperage Output:	Found		Left
	The state of the s		VRLA BATT	ERY CELLS
Room	or Cabinet Temp	erature °C	11121121111	Cabinet Heater (If Applicable) On Off
	y Bank Voltage ()DC	
Pilot C		Voltage	DC Temperatu	re °C
Note A	Check e (Enviror Inspect Check the	ach Cell for one one of the Battery Researcher of the Equalize Central for the Equation for the	Cracks, Corrosion on Tergency Response Plan) ack for Signs of Corros of Ventilation Fans and	

ANNUAL - Battery Cell Temperature Inspection

Station:	JDE W/O # :		
Manufacturer:	Date:	Readings By:	

Cell No.	Temp (°C)	Cell No.	Temp (⁰ C)	Cell No.	Temp (°C)
1		21		41	
2		22		42	
3		23		43	
4		24		44	
5		25		45	
6		26		46	
7		27		47	
8		28		48	
9		29		49	
10		30		50	
11		31		51	
12		32		52	
13		33		53	
14		34		54	
15	to a second	35		55	
16		36		56	
17		37		57	
18		38		58	
19		39		59	
20		40		60	

Table 1: Take temperature readings at the negative terminal of cells.

PUB-NLH-082, Attachment 2 Page 7 of 11, Isl Int System Power Outages

ANNUAL - Flooded Battery Cell Inspection

Station:	JDE W/O # :	
Manufacturer:	Date:	Readings By:

		Temp	Specific	Electrolyte 1	Level			Temp	Specific	Electrolyte Le	vel
	Volt	(°C)	Specific Gravity	(low/normal/ high)	Refilled		Volt.	t. Temp	Gravity	(low / normal / high)	Refilled
1						31					
2						32					
3					l .	33				1	
4						34					
5						35					
6						36					
7						37					
8						38					
9						39					
10						40					
11						41			3		
12			1 200000 1 20000			42					
13						43					
0						44					
15						45					
16						46					
17						47					
18						48					
19						49					
20						50				k)	
21						51					
22						52					
23						53				İ	
24						54					
25						55					
26						56					
27						57					
28						58					
29						59					
30			1		1	60					

^{**} Take temperature readings at the negative terminal of cells.

Take specific gravity readings before adding water to cells.

Add water to cells with low levels of electrolyte.

PUB-NLH-082, Attachment 2 Page 8 of 11, Isl Int System Power Outages

ANNUAL - FLOODED (VENTED) BATTERY AND CHARGER INSPECTION

	JDE W/O #	t: ::		dings By:	
Roon Average Battery	n Temperature: / Temperature:	$-^{\circ}_{\circ}^{C}$			
Pilo	ery Bank with Charger C t Cell Voltage: Pilot Cell No.:	V	V		
	rs – Clean internally , Rectifier #2	, Rectifie	r #3		
Voltage Output of C DC Current Output of AC Current Output of	of Charger (A):	(3)	Left Left	(CHAR Found Found	Left
Terminal DC Voltage	to Ground (V):	Positive		Negative	
Check eac Inspect the Clean and Record spectors the Evaluate a (Tests to lead	accuracy of the charger of the cell for cracks, corrosice battery rack for signs of lubricate all battery and ecific gravity, electrolyte operation of ventilation and attach MIDTRONICS be completed on all Batter equalizing charge to batter	on on terminal corrosion & cell connection level & temp fans and therm B Battery Diagonies and Cell	ls, leaks. battery leakage. ins as needed. erature of cells. nostat. gnosis Test repo	rt.	
**Notes: -Equalize charge i -Do not allow exce	s required after any distil	led water is a	dded		
COMMENTS:	ossive gassing				
		61)			
	1935-184 - 1840-185-186 - 1860-186		56-1-1774 3747 BW		7 2 272-
	- 5		14 (14 (14 (14 (14 (14 (14 (14 (14 (14 (
- 1					
	1 Made 2004 1 1 1			70.00	HAMP OF THE PERSON OF THE PERS

REV DEC 2, 2013

PUB-NLH-082, Attachment 2 Page 9 of 11, Isl Int System Power Outages

ANNUAL - VRLA Battery Cell Inspection

_	Station:	JDE W/O #:	
	Manufacturer:	Date:	Readings By:

Cell No.	Impedance	Conductance	Resistance	Cell No.	Impedance	Conductance	Resistance
1				31			3 Million 1 - 1 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -
2				32			
3				33			***
4				34			
5	**			35			
6				36			
7				37			
8				38			
9				39			
10				40			
11				41			
12				42			
13				43			
14				44			
15				45			
16				46			
17			-	47			
18				48			
19				49			
20			0 0000000000000000000000000000000000000	50			
21				51			
22				52			
23				53			
24				54			
25				55			
26				56			
27				57			
28				58			
29				59			
30				60			

NOV 20, 2013

PUB-NLH-082, Attachment 2 Page 10 of 11, Isl Int System Power Outages

ANNUAL - VRLA BATTERY CELL AND CHARGER INSPECTION

Station: Manufactu	Date:				
Room Temperature: Average Battery Temperature:	°C °C				
Voltage of Battery Bank with Charger Pilot Cell Voltage: Pilot Cell No.:	V	V			
Cordex Rectifiers – Clean internally Rectifier #1, Rectifier #2	, Rectifier #	3			
Voltage Output of Charger (V): DC Current Output of Charger (A): AC Current Input of Charger (A): Terminal DC Voltage to Ground (V):	Found Found Found	Left	Found		
CHECKS COMPLETED: Check the accuracy of the charger voltage meter against another meter. Check each cell for cracks, corrosion on terminals, leaks, swelling. Inspect the battery rack for signs of corrosion & battery leakage. Clean, lubricate cell connections if required. Conduct individual cell temperature Check the operation of ventilation fans and thermostat. Evaluate and attach MIDTRONICS Battery Diagnosis Test report. (Tests to be completed on all Batteries and Cell Interconnections (Straps).					
COMMENTS:					
1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -					
P 1	×-	**			
		50. S			
				159445	
			STATE STATE SECTION		
3-10-10-10-10-10-10-10-10-10-10-10-10-10-				9 - 30-30	

REV DEC 2, 2013

ANNUAL - BATTERY CONNECTIONS RESISTANCE INSPECTION

Station:	JDE W/O #:	
Manufacturer:	Date:	Readings By:

Clean & re-torque any connections with high resistance readings

Meter Probes	As-Found	As-Left	Meter Probes	As-Found	As-Left
Between Cell Posts	(Micro-Ohms)	(Micro-ohms)	Between Cell Posts	(Micro-Ohms)	(Micro-Ohms)
Lug & No. 1			30 – 31		
1 – 2			31 – 32		
2 – 3			32 – 33		
3 – 4			33 – 34		
4 – 5		3 5 7 6 1 7	34 – 35		
5 – 6			35 – 36		
6 – 7			36 – 37		
7 – 8			37 – 38		
8 – 9			38 – 39		
9 – 10			39 – 40		
10 – 11			40 – 41		
11 – 12			41 – 42	- M	
12 - 13			42 – 43	_ = =	
13 – 14			43 – 44		
14 – 15			44 – 45		
15 – 16			45 – 46		
16 – 17			46 – 47		
17 – 18			47 – 48		
18 – 19			48 – 49		
19 – 20			49 – 50		
20 – 21			50 – 51		
21 - 22			51 – 52		
22 - 23			52 – 53		
23 – 24			53 – 54		
24 – 25			54 – 55		
25 – 26			55 – 56	70% SCI	
26 – 27			56 – 57		
27 – 28			57 – 58		
28 – 29			58 – 59		1
29 – 30			59 - 60		
			No. 60 & lug		

REV NOV 20, 2013 Page 1 of 1

Terminal Station Building and Grounds

Page 1 of 6

Building Fire Extinguishers

GENERAL INSPECTION (One Month for occupied Terminal Stations HWDTS & SVLTS and 4 months for all others).

- Inspection date and inspectors initials should be recorded on the tag attached to the extinguisher.
- 2 Check the accessibility of the extinguisher.
- 3 Check that it is the proper extinguisher for that location.
- 4 Check that the lock pin is in place, the seal intact, and the hanger secure.
- If equipped with a pressure gauge, check to be sure the indicator is in the operating range. Tap the gauge lightly with your finger to be sure the needle is not stuck.
- 6 Check the general condition of the hose, nozzle, and shell.
- 7 Check that the extinguisher is clean and the instructions are readable.
- If there is any indication the extinguisher has been used or tampered with, it should be completely checked and/or recharged.
- 9 Complete Building & Grounds Inspection Form noting condition of hoses, charged or discharged, number of extinguishers inspected, initial tag and date all extinguishers. Note if a hydrostatic test is required.

ANNUAL INSPECTION: C02 TYPE ONLY

- Weigh extinguisher with the approved extinguisher weighting scald and recharge if weight is 10% below fully charge weight indicated on the nameplate or as specified by the manufacturer.
- 11 Check condition of shell, nozzle, hose, and mechanism of the extinguisher.
- Have shell tested hydrostatically if evidence or corrosion or damage is found.
- Record weight, date of inspection, and initials of inspector on the tag attached to the extinguisher.
- 14 Complete (Fire Extinguishers Inspection Form)

Page 2 of 6

ANNUAL INSPECTION: STORED PRESSURE & CARTRIDGE OPERATED DRY CHEMICAL TYPES:

- 15 Check condition of extinguisher shell. If there is any indication of damage or corrosion, test hydrostatically.
- Remove hose and check for plugging and deterioration.
- For the stored pressure type, weigh complete extinguisher with the approved extinguisher weighing scale. If the weight is 10% less than the weight indicated on extinguisher recharging is necessary.
- For the stored pressure type, invert the extinguisher to determine the condition of the powder. If it appears to be caked, the extinguisher should be emptied and recharged.
- 19 For the cartridge operated type, remove the gas cartridge and weigh with the approved extinguisher cartridge scale. If the weight is ½ oz. or less than weight stamped on cartridge or as per instruction plate of extinguisher, it must be replaced.
- For the cartridge operated type, open the extinguisher and check the powder. If it is low or caked, the powder should be replaced.
- 21 Extinguishers located near electrical equipment should be checked for corona damage to the hose.
- 22 Inspection date and inspectors initials should be marked on the tag each inspection.
- 23 Complete Annual Fire Extinguishers Inspection.

 Note: Hydrostatic Tests are to be performed as the extinguisher comes due.
- 24 Inventory First Aid Kits/Stationery/Cleaning Supplies
 - 0.1 Check the contents of the first aid kit and refill according to the list of contents posted:

#2 First Aid Kit Checklists:

- 1 Emergency First Aid Safety Oriented Manual
- 1 First Aid Record Book
- 12 Safety Pins
- 1 Splinter Tweezers- Blunt Nose
- 1 Pair Scissors 10 cm

		Page 3 of 0
Dressings:	Flygna, Traverra	4
Sterile Bandage Compressed - 10 cm x 10 cm	2	
Sterile Pads - 7.5 cm x 7.5 cm	16	
Sterile Adhesive Dressings - 2.5 cm x 7.5 cm	ner of a 3 of pulls in a	
Triangular Bandages - 95 cm x 95 cm	6	

Adhesive Tape:

1 Roll - 2.5 cm x 5 m

Check the stationery supplies on hand and replenish according to the checklist posted.

 PC10A Red Tags Caution Operation Restriction Tags Hold - off Tags Tag Holder Ties Periodic Maintenance Record Tags 	X
3. Caution Operation Restriction Tags 10 4. Hold - off Tags 10 5. Tag Holder Ties 15 6. Periodic Maintenance Record Tags 10 7. Periodic Maintenance Record Tags 5 8. Work Permit or Condition Guarantee Book PC2 1 9. Test Operate Under a Work Permit Book PC14 1	5
 4. Hold - off Tags 5. Tag Holder Ties 6. Periodic Maintenance Record Tags 7. Periodic Maintenance Record Tags 8. Work Permit or Condition Guarantee Book PC2 9. Test Operate Under a Work Permit Book PC14 	20
5. Tag Holder Ties 15 6. Periodic Maintenance Record Tags 10 7. Periodic Maintenance Record Tags 5 8. Work Permit or Condition Guarantee Book PC2 1 9. Test Operate Under a Work Permit Book PC14 1	5
 6. Periodic Maintenance Record Tags 7. Periodic Maintenance Record Tags 8. Work Permit or Condition Guarantee Book PC2 9. Test Operate Under a Work Permit Book PC14 	5
 Periodic Maintenance Record Tags Work Permit or Condition Guarantee Book PC2 Test Operate Under a Work Permit Book PC14 	0
 Work Permit or Condition Guarantee Book PC2 Test Operate Under a Work Permit Book PC14 1 	.5
9. Test Operate Under a Work Permit Book PC14 1	.0
	1
10. Order to Operate Trades Use Book PC17A 1	1
	1
11. Order to Operate Trades Use Book Pc17B	1
12. Writing Pads 1	2
13. Clip Board 1	1
14. Thumb Tack Box	1
15. 1835 Bulbs (Boxes) 1	2
16. 24X Bulbs (Boxes)	2
17. NE44 Bulbs (Boxes)	2
18. AC Exit Bulbs 2	6
19. DC Exit Bulbs 2	6

0.2 Check the cleaning supplies on hand and replenish according to the checklist posted.

Cleaning Sup	pplies Checklist M	<u>IN</u> M	AX
1. Garba	ge Bags	5	20
2. Mop		1	1
3. Bucke	times governospolita las Suasiones Chining	1	1
4. Broom	1	1	1
5. Dust P	Pan	1	1
6. Floor	Soap Container	1	1
7. Toilet	Tissue	2	10

				Page 4 of 6
8.	Hand Towels	2	6	
9.	Hand Soap	2	4	
10.	Plunger	1	1	
11.	Sani Flush Bowl Cleaner	1 -	2	

Emergency Oil Spill Kits (Annual Inspection):

- 0.1 Check and restock Spill Kit (If Required).
- 0.2 Install seal after inspection is completed.
- 0.3 Refer to SOP-20 procedure & complete appropriate form.

Eye Wash Stations Inspection:

- 0.1 Check the water supply to ensure it is clean, the flow and pressure adequate.
- 0.2 Ensure the nozzles are unobstructed and the valve operates freely.
- 0.3 Ensure the nozzle caps are in place.
- 0.4 For self contained units, replace the water and anti fungus solution every four months.

27 Security Building/Yard:

- 0.1 Check to ensure the fencing is intact and the barbed wire is in good condition.
- 0.2 Check that crushed stone is up to the bottom of the fence and no access can be provided under the fence.
- 0.3 Ensure all locks are in place and in good working order.
- 0.4 If an intruder alarm is present, ensure it is working properly and has not been tampered with.

28 System Grounding:

- 0.1 Ensure that fence grounding is intact, all clamps are tight and flexible braids are on the gates.
- 0.2 Ensure that all equipment grounding is in place and straps and connections secure.

Page 5 of 6

29 General Conditions:

- 0.1 Check conditions of the yard surface stone, note any washouts or erosion of ditches.
- 0.2 Check the condition of building inside and out, note if any repairs are required.

30 Warning Signs:

- 0.1 Check that High voltage warning signs are around perimeter fence.
- 0.2 Check for the presence of hard hat, noise level, and any other warning sign that may be required.

31 Station Service:

- 0.1 Check and function test yard lighting.
- 0.2 Check and function test emergency lighting.
- 0.3 Check all building and entrance lights.
- 0.4 Check and clean bug light if one is provided.
- 0.5 Check station service condition.

32 Telephone:

0.1 Ensure the remote bell is working properly.

33 Access Road:

- 0.1 Check if road surface is in good condition.
- 0.2 Check to ensure all drainage ditches and culverts are free.
- 0.3 Check for good visibility along roadway.

34 Vegetation:

- 0.1 Check for excess weeds, grass, etc.
- 0.2 Check for alders, shrubs, etc., and remove.

Page 6 of 6

0.3 Ensure there is an adequate fire break around outside of fence

35 Rodent Guards:

0.1 Check rodent guards for correct operation if applicable. Check by listening close to the unit to detect changing tones emitting from the unit.

INSPECTION (Annually)

Normally completed from ground level during a period of heavy system load.

- 1 A visual inspection of external high-voltage electrical connections performed using an infrared thermography camera.
- 2 Check all high-voltage electrical connections between equipment and conductor/bus and between one section of conductor/bus and another section of conductor/bus.
- 3 For each set of connections (i.e. all three phases at one location), view one phase at a time on the infrared camera.
- 4 For each phase, identify the maximum temperature of the connection shown on the infrared camera. Compare the maximum temperatures of all three phases. A connection whose temperature is higher than another phase is a hot spot.
- If a hot spot is present, capture a photo of it on the infrared camera and record the following information about that hot spot on the completed work order: equipment name, connection location, phase, and temperature difference between that phase and the phase with the lowest temperature.
- 6 Continue until all external connections in the terminal station have been viewed.
- 7 Submit a work request for each identified hot spot.

The following provides guidance as to priority and time to respond to different severities of hot spots:

Priority	Temp. Difference	Respond Within
	(ΔT Phase to Phase)	
1 (Emergency)	Visually Hot	24 hours
2	Above 50°C	1 week
3	20°C to 50°C	1 month
4	Below 20°C	1 year

Page 9 of 11, Isl Int Sys Power Outages 120/180 DAY INSPECTION – TERMINAL STATION, BUILDING & GROUNDS INSPECTION

Station:	Date:	Readings By:		
Building Fire E	xtinguishers			
Danieling I ii v	A. Check condition of hoses	¬okay		
	B. Check if charged/discharged	¬ charged ¬ discharged		
	C. Number inspected			
	D. Initial tag & date	***, * * .		
Inventory (Refe	er to posted List)			
, (-	A. First Aid Contents	□ okay		
	B. Stationary/Cleaning Supplies	□ okay		
Eye Wash Station		- Caraj		
	A. Water supply/pressure	□ okay		
	B. Caps on spray nozzles	□ okay		
	C. Initial tag & date	□ okay		
Security Buildin		Li Ollay		
Double Daniel	A. Locks in Place	□ okay		
	B. Barbed wire	□ okay		
	C. No open access, Intruder alarm	□ okay		
System Ground		_ 0.141		
Dystem Ground	A. Fence /Equipment grounding	□ okay		
General Condit		- Okuy		
Outeran Condit	A. Crushed stone/holes etc.	□ okay		
	B. Building condition outside/inside	□ okay		
	C. Check & report any environmental	o onay		
	Substandard Conditions as per EERP	□ okay		
	D. Box Structure Concrete Base	□ okay		
	E. Post Insulator Concrete Base	□ okay		
Warning Signs	27 T OUT THOUSAND CONTINUE DATE			
7,	A. High voltage	□ okay		
	B. Hard hat	□ okay		
	C. Noise levels	□ okay		
Station Service				
	A. Yard Lighting (Check and Function Test)	□ okay		
	B. Emergency Lighting (Check and Function			
	Test)			
	C. Building & Entrance	□ okay		
	D. Bug light (Empty if required)	□ okay		
	E. Station Service Condition (Panel, Conduit,			
	Wiring)	2 only		
Telephone				
	A. Remote bell (Check if Applicable)	¬okay		
	B. Verify Emergency Telephone numbers are	¬okay		
	posted near telephone	,		
Access Road				
The state of the s	A. Surface	□ okay ¬rough ¬icy ¬narrow		
	B. Visibility (Vegetation, Access etc;)	□ okay		
Vegetation	,,			
	A. Weeds	□ okay		
	B. Alders	□ okay		
	C. Fire break around yard	□ okay		
Rodent Guards		_ 0.00		
- Louville Oddids	A. Check Power on	□ okay		
	11. CHECK I OWEL OIL	- onaj		

PUB-NLH-082, Attachment 3

Page 10 of 11, Isl Int Sys Power Outages 120 DAY INSPECTION TERMINAL STATION SUPPLIES

Station: Date:	Checked By:			
INSPECT: LOCKOUT CENTER:		T T		
Stationary Supplies:	MIN.	MAX.	#On hand	
PC3 Tags Series,,	10	15		
PC 10A Tags	15	20		
Caution Operation Restricted Tags	10	15		
Hold Off Tags	10	15		
Tag Holder Ties	15	30		
Tag Protectors	10	15		
Period Maintenance Record Tags	5	10		
Work Protection or Condition Guarantee Book PC2	1	1		
Test Operate Under a Work Permit Book PC14	1	1		
Order to Operate Trades Use Book PC 17A	1	1		
Order to Operate Trades Use Book PC 17B	1	1		
Writing Pads	2	1		
Clip Board	1	1		
Thumb Tack Box	1	1		
1835 Bulbs (Boxes)	1	2		
24X Bulbs (Boxes)	1	2		
NE44 Bulbs (Boxes)	1	2		
AC Exit Bulbs	2	6		
DC Exit Bulbs	2	6		
te: All of the above Items apply to Stations with Control rooms.	Items 1 to 5 inclusive apply	to all Term	inal Stations	
Cleaning Supplies:	MIN.	MAX.	#On hand	
Garbage Bags	5	10		
Mop	1	1		
Bucket	1	1	7	
Broom	1	1		
Dust Pan	1	1		
Floor Soap Container	1.	1		
Toilet Paper	4	10		
Hand Towels	2	4		
Hand Soap	1	2		
Plunger	1 .	1		
Toilet Bowl Cleaner	1	2		
REMARKS:				
			W	

REV NOV 28, 2013

PUB-NLH-082, Attachment 3 Page 11 of 11, Isl Int Sys Power Outages ANNUAL - FIRE EXTINGUISHERS INSPECTION

.on:	Date:		Completed By:		
AREA LOCATION:	TYPE:	CLASS		SIZE:	
MFG:	SERIAL #		: HYDROSTATIC TI		
MFG:	SERIAL #		HIDROSTATIC	EST DATE: MONTH	_YEAR
GAUGE:	HOSE:	CHECKS	SEAL:		
CYLINDER: CONDITION:	HOSE.	ACCESSIBILIT			
CARTRIDGE WEIGHT:			IDER WEIGHT:		_
TAG INITIALED:		CILII	IDEK WEIGHT.		
NOTES: If Hydrostatic test is req Replace Cartridge if requ REMARKS:		inder Instructions			
				-	
AREA LOCATION:	TYPE:	CLASS	7.	SIZE:	
MFG:	SERIAL#	CLAS		SIZE: EST DATE: MONTH	VEAD
MFG.	SERIAL #	CHECKS	HIDROSIATIC II	EST DATE, MONTH_	_ YEAR
GAUGE:	HOSE:	CHECKS	SEAL:	10.00	
INDER: CONDITION:	HOSE.	ACCESSIBILIT		* 300	
CARTRIDGE WEIGHT: TAG INITIALED:			NDER WEIGHT:		
NOTES: If Hydrostatic test is rec Replace Cartridge if requ REMARKS:		linder Instructions	S.		
AREA LOCATION:	TYPE:	CLAS		SIZE:	
MFG:	SERIAL#		HYDROSTATIC T	EST DATE: MONTH_	YEAR
	T ====	CHECKS			
GAUGE:	HOSE:		SEAL:		,
CYLINDER: CONDITION:		ACCESSIBILIT			
CARTRIDGE WEIGHT:		CYLIN	NDER WEIGHT:		
TAG INITIALED: NOTES: If Hydrostatic test is rec Replace Cartridge if requ REMARKS:	_	linder Instructions	S.		
			and the same of th		

REV DEC 6, 2013

Capacitor Banks

120 DAY PM VISUAL INSPECTION (No Outage or Work Protection Required)

- 1 Check primary connections Visually inspect connections for looseness or damage.
- 2 Check grounding connections- Visually inspect connections for looseness or damage.
- 3 Bushing Condition Visually inspect bushings for burns, cracks and general condition.
- 4 Capacitor Tanks (Oil Leaks/Rust) Visually inspect all cans for signs of leaks, excessive rust, or tank bulging.
- 5 Fuses Blown Identify and report any blown fuses
- 6 Arrestor (If Applicable) Visually inspect for burns, cracks and general condition.
- 7 Support Insulators Visually inspect for burns, cracks and general condition.
- 8 Record load current on each phase and the neutral. (Only required if the bank is on-line)
- 9 Record any abnormality or discrepancy in the remarks section on the form.

6 YEAR PM INSPECTION

- When de-energizing the bank wait 10 minutes prior to applying grounds.
- 11 Check primary connections. (Inspect each connection up close and move with hand to check for looseness or damage. Re-torque any loose connections and repair any damaged conductor.)
- 12 Check grounding connections (Inspect each connection up close and move with hand to check for looseness or damage. Re-torque any loose connections and repair any damaged conductor.)
- 13 Clean Bushings and Support Insulators (Clean with Methyl Hydrate, as required)
- 14 Check all fuses. Ensure none are loose and spring tension is adequate. Note all fuses blown in each phase and document number of fuses replaced.
- Record nameplate capacitance per phase. It will be required to calculate the phase capacitance based upon the individual nameplate value.
- Measure capacitance for each phase. Compare to nameplate values and investigate if there are any discrepancies greater than 2 %.

CAPACITOR BANK MAINTENANCE PROCEDURE

Page 2 of 2

- 17 Perform 5 kV Megger test phase to ground and record results.
- 18 Check for leaks. (Report any Leaks as per the EERP Environmental Emergency Response Program.)
- After capacitor bank is energized, check and record load current on each phase and the neutral. (Bank must be placed on-line.)
- 20 Record any abnormality or discrepancy in the remarks section on the form.

120 DAY VISUAL INSPECTION – CAPACITOR BANK

Inspected B	y:	Station:	W/O	No	Date:					
MFG:				Capacitor Ba	ank II) No:				
Status:	Status: Energized De-Energized 7									
		Phase A		Phase B		Phase C				
Cans per Pha	se In Service									
Primary Con	nections			· · · · · · · · · · · · · · · · · · ·						
Grounding	-		100000							
Bushings (Co	ondition)									
Capacitor Ta Condition (C Leaks/Rust)										
No. of Fuses	Blown									
No. of Fuses	Replaced									
Arrestors (if	applicable)									
port Insu	lators									
Bank Currents	Neutral									
Bank Voltages	Neutral									
Che Che Che Che	eck Bushings eck & Repor vironmental leck Paint/Ru eck Concrete	t any Oil Leaks as Emergency Respo st Condition		and Burn M	Iarks	lain Insulators for uits & Cabinets ading	Flashover, (Cracks		
Remarks:										
	70					W- 1 03 - PF	.00	7107		
·	CAPARO 1935 II- 90		1.6							
								. —		

REV Nov 26, 2013

6 YEAR INSPECTION - CAPACITOR BANK

Inspected	l By:	Station:	JDE W/O #	Date:
NOTE:	All TESTS	MUST BE COM	PLETED OR MARKED N/A (ur	nless otherwise instructed).
	MFG:		Capacitor Bank ID No:	
		OUT OF SER	VICE (DE-ENERGIZED) CH	ECKS
		PHAS	SE A PHASE B	PHASE C
	Cans Per Pha	ase ·		
	Check Primar Connections	у		
	Check Groun Connections	ding		
	Clean Bushin	gs		
	Clean Suppor	t		
	No. Of Fuses	Blown		
	No. Fuses Re			
0	Capacitance (UF)	Nameplate		
	Capacitance (UF)	Measured		
	Megger Test (Mohms			
		INSERV	TICE (ENERGIZED) CHECK	S
	Bank Amps	NEUTRAL		
	Capacitor Voltage*	NEUTRAL		
	*NOTE: I or	ok at capacitance of ind	ividual cans or phases	
GENER —	AL CHEC Check Bus Check & R Environme Check Pair Check Con	KS TO INCLUDE: hings & Tanks eport any Oil Leak ental Emergency Reat/Rust Condition acrete Base nary Connections	Check Pos s as per EERP and Burn N sponse Plan	nduits & Cabinets

PUB-NLH-082, Attachment 4 Page 6 of 6, Isl Int Sys Power Outages

6 YEAR INSPECTION - CAPACITOR BANK

Inspected By:	Station:	JDE W/O #	Date:	
REMARKS:				
		11 - 15 LT 145 AT (B) 1 A	THE STEET OF THE PERSON	
V				
			34.0	

Circuit Breakers

120 DAY GENERAL INSPECTION

- 1 Visual inspection of the porcelain insulators.
- 2 A general visual inspection of the mechanism box including the mechanism space heater.
- 3 Check the air pressure.
- 4 Check for air leaks, (Listen, Ultrasonic Leak Detector.)
- 5 Inspect all grounding connections.
- 6 Check general paint coating condition.
- 7 Complete Inspection Form 120 Day-Air Blast Breaker Inspection.

6 YEAR PM INSPECTION

- 8 Outage required.
- 9 Check the counter operations and record reading before and after work is performed.
- 10 Complete pressure drop check. Close main air supply valve and record pressure. Record again after 20 minutes. Pressure drop should not be more than 5 psig (35.5 kpa). Type DCF and DCVF breakers must be in the open position for test.
- 11 Check and clean auxiliary contacts in each control block and main control cabinet. Check each contact assembly for physical damage or deterioration. Clean all contacts and function test via breaker operation.
- 12 Complete sequence timing. (Note: Test to be completed only on breakers that have single phase operating circuits unless otherwise instructed).
- 13 Complete contact resistance (ductor) test.
- 14 Complete interrupter insulation (megger) test.
- 15 Complete continuity (resistance) test on all control coil circuits.
- Monitor pressure switches (with air pressure dropping).
- 17 Complete a general inspection of control cabinet and mechanism boxes including heaters, auxiliary switches, contactors and control wire terminations.

AIR BLAST CIRCUIT BREAKER MAINTENANCE PROCEDURE

Page 2 of 2

- Lightly lubricate the tripping system in the control blocks. (Type DCF and DCVF breakers).
- 19 Check all primary connections.
- 20 Repair all air leaks.
- 21 Recharge with air and check pressure to be within normal range.
- 22 Complete Appropriate Form.

AS INSTRUCTED OR AS CONDITIONS INDICATE

- 23 Clean air intake filters.
- 24 Clean pressure reducing valve.
- 25 Lubricate all arcing chambers.
- Time individual interrupter heads.
- 27 Doble test. (Normally only during commissioning).

120 DAY GENERAL INSPECTION - SF6 CIRCUIT BREAKER

- 1 Check all primary connections.
- 2 Visual inspection of all porcelain.
- 3 Check condition of air receiver if applicable.
- 4 Check all grounding.
- 5 Check for air or hydraulic leaks if applicable.
- 6 Perform a general visual inspection of the control cables, door hinges, and paint condition.
- 7 Check operation of and record current for cabinet and control box heaters.
- 8 Record reclose counters and operation counters.
- 9 Drain sufficient air to check operation of pressure switches. Record cut in and cut out of compressor if applicable.
- 10 Record compressor hours and dryer counter if applicable.
- 11 Check and record interrupter SF6 gas pressures.
- 12 Complete Form 120-Day SF6 Breaker Inspection.

INSPECTION: ELF TYPE BREAKERS C/W COMPRESSOR & DRYER

- 1 Complete the appropriate from for records.
- 2 Complete Dew Point Test, as per form.
- 3 Complete compressor/dryer checks as per form.
- 4 Change compressor base oil (note condition).
- 5 Replace desiccant (note condition).
- 6 Drain low point of any water.
- 7 Clean or replace air filters, as required.

SF6 CIRCUIT BREAKER MAINTENANCE PROCEDURE

Page 2 of 2

- 8 Check V belt. Replace if required.
- 9 Check all breaker interconnecting hoses.
- 10 Check control wiring.

6 YEAR PM INSPECTION:

- 1 Outage required.
- 2 Complete the appropriate form for records.
- Record operating pressure and counter reading before operating breaker.
- 4 Complete resistance (Ductor) test and record.
- 5 Complete timing test and record. (Note: Test to be completed only on breakers that have single phase operating circuits unless otherwise instructed.)
- 6 General visual check of air system or hydraulic system, if applicable.
- 7 Complete 20 minute pressure drop test, if applicable.
- 8 Check pressure switches and record.
- 9 Perform dew point test/moisture PPM on SF6 gas and record.
- 10 Check operation of all heaters.
- 11 Lubricate all moving parts, as required.
- Replace dessicant in operating air system, if applicable.
- Drain condensate from dryer, if applicable.
- 14 Perform doble test during commissioning only.
- 15 Complete internal inspection, if instructed.
- 18 Check SF6 pressure gauges for accuracy, using test gauge.

120 DAY GENERAL INSPECTION - OIL CIRCUIT BREAKERS

- 1 Check oil levels in tanks and bushings.
- 2 Check operation of and record current for cabinet and tank heaters.
- Perform a general visual inspection in mechanism cabinet and around breaker including paint condition.
- 4 Record operating and reclose counters.
- 5 Record compressor running time, if applicable.
- Drain sufficient air to check operation of pressure switches. Record cut in and cut out of compressor, if applicable. *Note:* Record if there is any moisture being drained off.
- 7 Listen for air leaks or abnormal noises from compressor and note belt condition if applicable.
- 8 Complete appropriate form.

6 YEAR PM INSPECTION:

- 1 Record operating pressure and counter reading before operating breaker.
- 2 General visual check of the air system including belt condition and adjustment if applicable.
- 3 Change oil in compressor.
- 4 Check external dash pot oil level (breaker in open position.)
- 5 Drain air system noting operation of pressure switches and record, if applicable.
- 6 Inspect latches, clean and lubricate, as required.
- 7 Inspect contactors and auxiliary switches.
- 8 Lubricate operating mechanism as required.
- 9 Measure and record run time of compressor from cut-in to cut-out, if applicable. (10% increase in run time requires compressor overhaul.)

OIL CIRCUIT BREAKER MAINTENANCE PROCEDURE

Page 2 of 2

- Measure interrupter resistors bushing to bushing (138 KV kSO only), with breaker contacts open but mechanism jacked in sufficiently for resistor contacts to make.
- 11 Visual check bushings and wipe down, if required.
- 12 Complete a dielectric test ASTM 877 of the oil.
- Perform insulation test (megger) of each phase to ground with breaker in closed position and record results.
- 14 Perform resistance (Ductor) tests and record results.
- 15 Record final operating pressure and counter reading.
- 16 Doble test as required.

PERFORM THE FOLLOWING ONLY IF INSTRUCTED

- 17 Complete internal inspection.
- 18 Perform complete motion analyzer test and record results.

120 DAY GENERAL INSPECTION-MINIMUM OIL CIRCUIT BREAKERS

- 1 Check interrupter nitrogen pressure (normal working pressure is 0.3 0.7 MPA and can be read on the manometers). Note: Breakers at the Town Switching SS and Quartzite SS Labrador West are not nitrogen pressurized.
- 2 Check operation of and record current for cabinet heaters.
- 3 Perform a general visual inspection in mechanism cabinet and around breaker including paint /rust condition.
- 4 Check interrupter insulators and CTs for cracks and flashover.
- 5 Complete appropriate form.

6 YEAR PM INSPECTION:

- 6 Record operating pressure and counter reading before operating breaker.
- 7 Check control coils 3-PH Trip and 3-PH close resistance.
- 8 Complete Megger test on the interrupters (5KV test).
- 9 Complete resistance (Ductor) test on the interrupters. Acceptable readings $< 80 \mu$ ohm.
- Record nitrogen pressure, if applicable. Top up, if required, and check for the source of the leak (repair/ report findings).
- 11 Pneumatic regulated units: operate breaker and record pressure.
- 12 Spring charged units: Check motor amps.
- 13 Lubricate Operating mechanism.
- 14 Record cabinet heater amps.
- 15 Record final operation counter.
- 16 Perform visual check of bushings and wipe down, if required.
- 17 Doble test.

MINIMUM OIL CIRCUIT BREAKER MAINTENANCE PROCEDURE

Page 2 of 2

CHECKS TO BE COMPLETED IF INSTRUCTED

- 18 Internal inspection.
- 19 Oil lab analysis.

MONTHLY - COMPRESSOR/DRYER/AIR SYSTEM INSPECTION Page 10 of 31, Isl Int Sys Power Outages Nonthly - Compression of the Compre

	Station:I	Date:		Readings By:	oren outild
ltion: Bet	fore inspection and maintenance pro			lation and Permit. PERATURE	-11 45.2.1
DEW	POINT TEMPERATURE:			TEST PRESSURE:	KPA
DEW	POINT TEMPERATURE:	⁰ C	@	OPERATING PRESSUR	E: KPA
		Comp. No. 1	1/A	Comp. No.2/B	A-1/
	Base Oil Level	Comp. No.	./A	Comp. 140.27B	
	Oil Added				
	Oil Changed (If Required)				
	Un-loader Cleaned & Tested				
	Moisture Discharger				
	Operating Position (Lead / Lag)				
	Cut In KPA				
	Cut Out KPA				
	Motor (amps)				
	Running Time (min) (Cut in to Cut out)				
	Compressor Running hrs.				
	ION TEST SYSTEM:	_		_	
Drye	er Heater (amps): A	F	3	C	
High	n Side: High Pressure Alarm:			Dryer Counter: Low Pressure Alarm: _	
_	Side: High Pressure Alarm:			Low Pressure Alarm:	
20	Differential Pressure:			15 min Pressure Drop:	
Syst	em Pressure: High Side:		.ow S	ide:	
	COMPLETED: Check guards/couplers Check flex connections Check limit and flow switches operated the connections Check thermo stats & all electrical connections	-	Cl	neck oil relief valves, check valveck for oil & air leaks in the syneck dryer heater & failure alarmeck condition of intake/outlet f	estem m

DEC 2: 2013

PUB-NLH-082, Attachment 5

Page 11 of 31, Isl Int Sys Power Outages MONTHLY - COMPRESSOR/DRYER/AIR SYSTEM INSPECTION

Station:Da	ate: Readings By:
Check blower oil, fan, & belt	Report any oil leaks as per EERP (Environmental Emergency Response Plan)
Check water/oil separator	Check belt drives for tension and wear
Check heat tracing working (where ap	
Note Any Concerns Below:	
	1-1-1-X-11-1
	1 (0) (1) (1) (1)

120 DAY - AIR BLAST CIRCUIT BREAKER INSPECTION Page 12 of 31, Isl Int Sys Power Outages

Station:	Date:		Readings By:		
WEATHER CONDITION	ONS:dry	rain	humidity _	temperature	
Breaker No.					
Air Pressure (kPA)					
Operations Counter					
Recloser Counter					
Heater (amps)					
Heater (on / off)					
Heat Trace Cable (amps)		6.			
Breaker No.					
Air Pressure (kPA)					
Operations Counter					
Recloser Counter					
Heater (amps)					
Heater (on / off)					
Heat Trace Cable (amps)					
KS COMPLETED: Check primary conditions Check porcelain for Check grounding Check control cable Check concrete bases.	cracks or chips	Chec Chec	k for air leaks k tank and paint cond k pipes and fittings k tank and cabinet hea k heat trace cable (if ap	aters	
					

DEC 10, 2013

120 DAY - OIL CIRCUIT BREAKER INSPECTION

Station:			_ Date	e:		Read	ings By:	temperature				
WEATHER CON	NDITION	IS:	_ dry	_ rain	h	umidity		temperature				
	Bre	aker No.										
	Volt	age (kV)					24 2 2					
O ₁	perations	Counter										
	Reclose	Counter						3				
Air Pressure		Cut In										
(kPA)		Cut Out		1.								
Comp. Run	ning Tim	e (mins)										
Base Oil (No	r. / Low	/ Added)										
	Moto	r (amps)								-		
M	oisture D	ischarge										
Heaters		Cabinet						-				
(amps)		Tank										
inimum Oil Bro-ui pment ID#	eaker:	A PH PR	ESSURE	_KPA		ESSURE	KPA	C PH PRES		_KPA		
CHECKS COMPLETED: Check Air Vent Check Porcelain for Cracks or Chips Check Primary Connections Check Grounding Check Oil level of Tank and Bushings Check Compressor Operation					Chec	ck Tank and ck Concrete	aint/Rust ges & Lu Cabinet : Base	bricate as req Heaters				
Chec	k Compr	essor Ope	ration		Check & Report any Oil Leaks as per EERP (Environmental Emergency Response Plan)							

REV DEC 10, 2013

120 DAY - SF₆ CIRCUIT BREAKER INSPECTION

Station: Date: Readings By:					
. EATHER CO	NDITIONS:	dry rain	humidity	temperature	
	Breaker No.			MI AND DESCRIPTION	
	Voltage (kV)				
	A				
Operation	s B				
Counte					
	3 PH				
	A				
Reclose Counte	В				
Reciose Counte	C				
	3 PH				
Pressur	e Cut In				
(kPA	Cut Out				
Cor	mp. Running Time				
	o. Oil (Nor. / Low)				
Oil Added (Yes /No)					
Motor (amps)					
	Moisture Dis.				
	Dryer Counter				
Re	commended - Kpa	+			
	A ph - Kpa				
Pressure	B ph - Kpa				
	C ph - Kpa	+.			
Hyd	raulic Oil Pressure				
	Cabinet				
TT	Drive Gaskets	4			
Heater (amps	Tical Trace				
	Dryer Drain				
CHECKS COM SF6 GAS:		Dew	Point:	Operating Temp:	_
Che Che	ck for Air Leaks ck Porcelain Insula ck Grounding ck Cabinet heaters	ators for Cracks or Chip	Check Contro	y Connections and bushings I Cables Hinges & Lubricate, as requi	

120 DAY - SF₆ CIRCUIT BREAKER INSPECTION

Station:	L EXHILL	Date:	Readin	ngs By:	
	F6 Losses as per	or Pressure Switches _ EERP during Top Up	Air System (O	perate Low Point	Drain) if applicable
					(
					\

6-YEAR 69 KV - SF₆ CIRCUIT BREAKER INSPECTION Page 16 of 31, Isl Int Sys Power Outages

Manufacture	D;	<u>. </u>	ion:ype:	Nom	inal Vol	erial No.:	110	12	
Test Date:	lest	Completed By	:		J.	D.E. W/O #:			
WEATHER CONDI	TIONS:	dry	rain	hum	idity	tempe	rature	Smith Hide of Y	
NOTE: All TESTS	MUST BE (COMPLETED	OR MARK	ED N/A (unless o	therwise Instru	cted).		
BEFORE OPERATI									
SF6 Pressure:	$\frac{3 \text{ ph}}{2 \text{ ph}}$		A ph	Kpa	B ph	Kpa	C ph	Kpa	
Operation Counter:	3 ph		A ph		B ph		C ph	Na1.	
ACCEPT	TABLE DUC	TOR READIN	IG						
$69 \text{ KV} < 100 \mu\text{Ohm}$ DENSITY MONITOR TEST (kPa):									
	RRENT	MICE	20Ω	Low: _		Lockout	<u> </u>	<u> </u>	
A ph									
B ph									
C ph									
CONTROL COILS:	3-I	PH TRIP #1	Ω :	3- Ph TRIP	#2	Ω 3-PH	CLOSE:	Ω	
			PERATING	MECHAN	IISM	7			
PNEUMATIC REG	ULATED (A					TION) (If Applica	ble)		
CUT IN		KPA CUT O				L.PRESSURE		KPA	
NTIME	MIN.					#J000019			
MOTOR AMPERA	GE								
				MERCHAN					
SPRING CHARGEI) OPERATOR	: (If Applicable)						
MOTOR AMPERA	GE					1000000			
CADDIET HEATER	AMPEDAC	NE.							
CABINET HEATER	CAMPERAC	JE:							
SF6 Gas: Dew Point	:		Operatin	g Temp:_					
CHECKS COMPLE	TED.			ONI	VIEIN	ISTRUCTED:			
Check Prima		ons		ONI		ing Test			
Check for of				-		Analysis Sample	e		
Check Pullre							-0		
Check Dash									
Lubricate M									
Change Brea	aker Compre	ssor Oil							
		er EERP during	Top Up.						
Doble Test Performe	ed: Yes	_ No							
AFTER OPERATIN	IG: (If Applica	able)							
SF6 Pressure:		-	4 1			TZ	T a 1		
S. o Tiossaio.	3 ph	kpa	A ph	Kpa	B ph	Kpa	C ph	Kpa	

REV DEC 13, 2013

PUB-NLH-082, Attachment 5

Page 17 of 31, Isl Int Sys Power Outages 6-YEAR 69 KV - SF6 CIRCUIT BREAKER INSPECTION

System ID: Manufacturer: Test Date:			ad W	Station: Type: d By:		Serial No.:Nominal Voltage Class: J.D.E.W/O #:				<u> </u>		
COMMENTS:		- 1			1)							7
	e mar	-Christia	gler ex	nutti i fi	ALPERT OF	r quit	Maura	2.10	- h73	rk.rk.l		
							1,001		12			
			- N							11	1.167 L	- 44
Account of the second						74.18	The Grand	23.70		A 1		
			11111			+ 25				_		
		- 170		111 %					55,00			

6- YEAR 69/230 KV - MINIMUM OIL CIRCUIT BREAKER INSPECTION

System ID: Station: Type: Test Date: Test Completed By:		Nominal Voltage Class:	No may be 114		
NOTE:	IER CONDITION All TESTS MUS E OPERATING:	T BE COMPLI	ETED OR MARK	humidity te ED N/A (unless otherwise In	emperature structed).
	OL COIL RESIST		PH TRIP:	3- PH CLO	SE:
A PH B PH C PH	dro has only one 230 1 LEFT 1 LEFT 1 LEFT oreakers have 2 Interpretable	Mega Mega Mega Mega Mega Mega Mega Mega	 Ω 2 RIGHT Ω 2 RIGHT Breakers have 1 In ADING 	no longer in service Mega Ω	
INTERE A ph	RUPTER NITROC /	GEN PRESSUR Kpa B	ph /	Kpa C ph	/ Kpa
SPRING	HOTELER			MECHANISM Ole) OPERATING PRESSI	
AFTER CHECK	OPERATING: C S COMPLETED: Check Prin Check Con Lubricate Doble Test Perfori	mary Connectior ntrol Wiring Hinges	as and Bushings	ONLY IF INSTR Internal i Oil Anal	Inspection

Rev Dec 13, 2013

6- YEAR 69/230 KV - MINIMUM OIL CIRCUIT BREAKER INSPECTION										
Manufacturer:	Type:	Serial No.:Nominal Voltage Class: J.D.E.W/O #:								
COMMENTS:			SO KILOVALU TITO STREET							
			L p. 9.90994							
		STREET STATE OF A STREET								
		nofacility of the state of the	. O lossettis							
	CTR*T on the Transial Left		,							
	faces 3	And the second of the second o	1990 1981 N							
	ale come to l									
		militaria de la completa del completa del completa de la completa del completa del la complet								
			C							

Page 1 of 2

6 Year PM – 138/69 KV OIL CIRCUIT BREAKER INSPECTION Page 20 of 31, Isl Int Sys Power Outages

M Test I	System ID: Manufacturer: Date:	and Length	Type:		Nominal V	oltage Class:	# 11 *** ** ** ** ** ** ** ** ** ** ** **	
WEATHI	ER CONDITIONS	: d	ry rain		humidity	1	emperature	J. D. K. M.,
BEFORE	OPERATING:	OPERATI	ON COUNTER		PRESSU	JRE	KPA (138 K	V KSO ONLY)
CONTRO	OL COIL RESISTA	ANCE	3-PH TRIP:	25,84	ter in Sir Jake	3- PH CLO	DSE:	
INTERR	UPTING RESIST	ORS (138 KV	KSO ONLY)		out of	Part of the	And I have	
A-PH	- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ω	В-РН	1 - 0	Ω	C-PH	M ALEM THE	Ω
INTERRI A ph	UPTOR MEGGER	R TEST 5 k	V (Phase to Ground B ph	nd / Bre	aker in Close	position): C ph	7	2 493
	ACCEPTABLE 138 KV- K 69 KV- KSO	so < 900 į	ıOhm	e, ng				
A ph B ph h	% CURREN	Γ	ΜΙCRΟ Ω					
							discide	2011/04/1
LINE:	G OIL LEVEL (I	A	/IAL/HIGH)	В		T LETTINGTON	C	
LOAD:		A		В			C	
					ECHANISM			K BMINO
	ATIC REGULATI			OMPRE				KDA
CUT IN RECHAI	RGE TIME	KPA MIN.	CUT OUT		KPA	L.PRESSU	IRE ALARM	KPA
MOTOR	AMPERAGE							
	CHARGING (M AMPERAGE	OTOR) OP	ERATOR: (FKP Ty	pe Only)				
SOLENC	DID TYPE OPERA	TOR: (69 K	V KSO Only)			S9234		
	OD RESISTANCI		Ω					
HEATER	R AMPERAGE:		CONTROL CAI	BINET	A	TANK		A
TER (OPERATING:	OPERAT	ION COUNTER		PRESSI	URE	KPA (138 K	/ KSO ONL)

REVDEC 13, 2013

6 Year PM - 138/69 KV OIL CIRCUIT BREAKER INSPECTION

System ID: _	Station:	Serial No.:	J. 117248 58
Manufacturer: _	Type:	Nominal Voltage Class:	o cibrimatica
Test Date:	Test Completed By:	J.D.E.W/O #:	
rikkiri	Marian III	THORS are contra	TOTAL OF HEIR ARTS
OIL INSULATION TES	ST: ASTM D877 (field) – Dielectr	ic (kV): (Min. 22 KV)	
CHECKS COMPLETEI	D: 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	and openional free	
	rimary Connections and Bushings		
Lubricate Lubricate Check C	e Control Cabinet Door Hinges ontrol Wiring		
Check T	ank Paint/Rust Condition		
Lubricate	e Mechanism		
Check O	CB Oil Level		
138 KV KSO Only			
Check for	or Air Leaks		
Drain Ai	r Receiver		
Check E	xternal Closing Dashpot Oil Level (l	Breaker Open)	
ONLY IF INSTRUCTE	D		
Internal	Inspection		
Timing/	Motion Analyzer Test		
CHECKS COMPLETED	D:		
	est Performed:YesNo		
COMMENTS:			
	TASK N. I PROGRAM	Maria Cara Artico	
	CALL ENGINEER WAS TO		
			The state of the second
			SECTION OF PARTY
	and the second section of the second		
AND DESCRIPTION OF STREET	2 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	A MARKET REPORT OF THE PROPERTY OF THE PROPERT	
	Property America (1974)	100 11 24 27 1 1 1 1 1 1 1 1 1 1	
		17 MA	Larbicon To
		# 1900 and 1000	
A	and the same	LA STATISTICAL DE	A PRODUCT TO

REV DEC 13, 2013

Page 22 of 31, Isl Int Sys Power Outages 6 Year – 230 KV DLF AIR BLAST CIRCUIT BREAKER INSPECTION

	System ID: Manufacturer: Date:	— 'n l. 1 e'fngn	Typ	e:	Nomina	al Vo	oltage Clas		I Washing
WEATH	ER CONDITION	S:	dry	rain	humid	ity	F. 1 . 1 . 1 . 2	temperature	
	All TESTS MUST						otherwise	nyll is a	
ACCI	EPTABLE DUCT		NGS < 120) μOhm					
	% CURREN	T	μOh	m					
A ph		2 24 4 2 -1							
B ph									
C ph			- 1						
125.00		THE Z							
MEGGE	R TEST 5 KV (PHASE TO	GROUND)					
A PH		Mega Ω	B PH		Mega	Ω	C PH		Mega Ω
	TIMINO	TEST (mi	lliseconds)						
		A	В		С				
\bigcirc	3-PH Close								
m :	3-PH Trip								
·	p Free (dwell)								
	ement On Trip		+						
	d Current Close	a	amns	Trip	amps				
NOTE: T	THE BREAKER (D BE ATTACHEI	TIMING TO THE	EST) PERI	FORMAI ED INSP	NCE REPORT I	M.			ONTACTS
	OL CIRCUIT RES		(Ohms): (te	00000		Cabine	- Company		
Trip Coil		A ph		Ω	B ph		Ω	C ph	Ω
Trip Coil Close:	I # Z.	A ph		$\frac{\Omega}{\Omega}$	B ph		Ω	C ph	Ω
Close.		A ph		22	B ph		22	C ph	52
		HF	ATER AM	PERAGE	3				
CABINE	ET HEATER:		ATTEME THAT	LEIGIGE					
	OL BLOCKS:	A:		B:		C:			

REV NOV 28, 2013

6 Year -230 KV DLF AIR BLAST CIRCUIT BREAKER INSPECTION

System ID: _	a la de la companya d	Station:	Serial N	No.:		
Manufacturer:	about Lenguith's Off	Type:	Nominal Voltage C	lass:	_	
Test Date:	Test Completed	By:	J.D.E.W	′/O #:		
PRESSI	URE SETTINGS (kl	Pa)	ons.	121 128 13	177	
	Found	Left	CHECKS COMPI	LETED:		
Block Reclose		is a declarate spirit	A STATE OF THE STATE OF THE STATE OF	eck for Air Leaks		
Block Trip			Lu	bricate Control Block	cs	
Aux Block Trip		72 12	Ch	eck Primary Connect	ion's and	
Block Close			Bu	shings		
Low Pressure Alarm			20	Minute Pressure Dro	p	
			CleA	an Air Intake Filters an Main Filters ph Control Block Aux ph Control Block Aux ph Control Block Aux ontrol Cabinet Aux Co sually In Spect Performed: Yes	x Contacts x Contacts ontacts	
COMMENTS:						
*						
			3.7		100	
- 1 1 1 1 1 1 1 1 1 h	THE STATE OF	The state of the state of				
		ULTI TITLI	PARTIES A PARTIE AND A			
3						
*****				Jan Tari	Total (Maria	
		511-81				
					4 hadani	
		V 19 10 10 10 10 10 10 10 10 10 10 10 10 10				
		(A)				
					7 ()	

REV NOV 28, 2013

6 YEAR - AIR BLAST CIRCUIT BREAKER 230/138 KV DCF/DCVF INSPECTION

	System ID:	11	Station:		Serial No.:	Hain	
N	Manufacturer:		Type:	Nomina	l Voltage Class	72.50 (1/4)	
Test l	Date:	_ Test Comp	leted By:	- 1	_ J.D.E.W/O #	# :	
WEATH	ER CONDITION	[S: dı	y rain	humidi	ty	temperature	
	E OPERATING:		kpa:			_	
NOTE:	All TESTS MUS	T BE COMP	PLETED OR MAI	RKED N/A (unl	ess otherwise I	nstructed).	
D	UCTOR (RESIS		I .				
		LE READIN	G				
	•	HM 230 KV					
		IM 138 KV	N. CECTO O				
	% CURREN	NI	MICRO Ω				
A ph		College College					
B ph		20121					
C ph							
	TIMINO	G TEST (mill					
		Α	В	С			
	3-PH Close						
	3-PH Trip						
	p Free (dwell)						
	ement On Trip						
_	sistor Contacts						
mman	d Current Clos	se a	mps Trip_	amps			
		, mn, m, ro, mr	om: PERFORM	VOE DEDODE			TOTOTOD
			ST) PERFORMA				
CONTA	C18 SHOULD B	E ATTACHE	ED TO THE COME	LETED INSPE	CHON FORM.	(If Applicable	e)
CONTR	OL CIDCUIT DE	CICTANCE (Ohms): (Tests to be Co	1.15 0.10	11 - M - 1 - 1 N - 1 \		
and the same of th				-		1	. 0
Trip Coil		A ph		B ph	Ω	C ph	Ω
Trip Coil	1 # 2:		Ω				
Close:		A ph	Ω	B ph	Ω	C ph	Ω
TIE A TEX	O . AMDC			CADIMETER	EATED:	8	
	R: AMPS	ΙΔ.		CABINET H	EAIEK:	C	
CONTR	OL BLOCKS:	A:		B:	<u> </u>	C:	

REV NOV 28, 2013

Sheet 1 of 2

PUB-NLH-082, Attachment 5 Page 25 of 31, Isl Int Sys Power Outages 6 YEAR - AIR BLAST CIRCUIT BREAKER 230/138 KV DCF/DCVF INSPECTION

System ID:	nie "i	Station:	Serial No.:		
Manufacturer:		Type:	Nominal Voltage Class:	<u>Sa</u> ithaile	
Test Date:	Test Comple	ted By:	J.D.E.W/O #:		
PRES	SURE SETTINGS	(kPa)	SKULLE	TOTALITY	
	Found	Left	Heading All 12 portion		
Block Reclose	-				
Block Trip			THE STREET WE NOT A		
Aux Block Trip	***		1		
Block Close	V		the second of the first		
Low Pressure Alarm			DESKIDE OF PRINCIPAL OF		
AFTER OPERATING:	Dros	ouro IrDo			
AFTER OFERATING.	FIES	surekPa	Counter:		
CHECKS COMPLETE	ED:				
Air Lea			A mb Control Disch Aver	744-	
	te Control Blocks		A ph Control Block Aux (
	Primary Connection	ns and Duchings	B ph Control Block Aux		
	ite Pressure Drop	iis and Dusnings	C ph Control Block Aux Control Cabinet Aux Con		
	ir Intake Filters		Clean Main Filters		
Clean A	iii iiitake i iiteis		Clean Main Fillers		
ONLY IF INST	RUCTED				
	Arcing Chamber			Maria de la la companya de companya del companya de la companya d	
, , , , , , , , , , , , , , , , , , ,	_	Required Yes	No	TOTAL SHIPLE (
Char	noor Eudification i	ccquired res	140		
CHECKS COM	PI ETED:				
	ormed:Yes l	No			
COLO CENTRO					
COMMENTS:					
-			27		
I.	7				
	2117	119		- Sand	
2					
			*		
·			700		
			70		
			_1		
				-	

6 YEAR - SF 6 230 KV CAT ARM BREAKER INSPECTION Page 26 of 31, Isl Int Sys Power Outages

	System ID:		Serial No.:	- Net			
	Ianufacturer:		Type:	9 (1			
Test I	Date:	_ Test Compl	eted By:	981	_ J.D.E.W/O	#	21 1
NOTE: A	All TESTS MUS	T BE COMPI	LETED OR MAR	RKED N/A (Unlo	ess Otherwise	Instructed).	dial diameter
BEFORE	OPERATING:						
SF ₆ Pre	ssure	kP	a Air. Pı	ressure	1.7	kPa	
Phase C	Counters: A _	Manda	a Air. Pr	_ C	<u> </u>	the first state of	
NOTE, I	47T1 CI II	DENT DOIN	TC(b =)	DOTENTIAL D	ODITE (a d	Red m.V. n	
		RRENT POIN	TS (b-g) TS (b-g)	POTENTIAL P	POINTS (e - f)	
	ACCEPTABLE	E DUCTOR R	EADINGS				
	230 KV	$V < 100 \mu Ob$	ım				
		E DUCTOR					
	% CURREN	NT T	MICRO Ω				
A ph							
B ph		The state of the s					
C ph							
	TID AINIA	C TECT (:11:					
	TIMIN	G TEST (milli		C			
-	3-PH Close	A	В				
	3-PH Close						
Tri	PFree (dwell)						
	ement On Trip						
		se an	nps Trip_	amns			
Commun	a carront cro	un	1119 _	amps			
NOTE: T	HE BREAKER (TIMING TES	ST) PERFORMA	NCE REPORT I	NCLUDING A	ALL MAIN CO	NTACTS
			OMPLETED INSP				
			S): (test to be completed				
Trip Coil		A ph	Ω	B ph	Ω	C ph	Ω
Trip Coil	# 2:	A ph	Ω	B ph	Ω	C ph	Ω
Close:		A ph	Ω	B ph	Ω	C ph	Ω
DENSIT	Y MONITOR TE	EST (KPA)	SF6 LOW:		LOCKO	UT:	
			·	2 2.87 87.60			97.

REV NOV 25, 2013

PUB-NLH-082, Attachment 5

6 YEAR - SF₆ 230 KV CAT ARM BREAKER INSPECTION

System ID: Manufacturer:	Ту	Vo.: rpe:	.941	Total Coloures		
Test Date: Te	st Completed By:			J.D.E.W/O	#:	SHEAT IN
GAS PRESSURE SWITCH	READINGS (kP	a) (operate / r	eset)	500	C SYSTEM IN	
	Found	Let	ft		afety Relief Va	
L.P. SF6 Alarm (63GA)					ondensate-Drye	er
L.P.SF6 Block (63GL)		1.711	U.Z	20 min.		
L.P.SF6 Alarm Bus (63GI)	N 1980			Lubricat		
L.P. Air Alarm(63AL)					any SF6 losses	to EERP
L.P Air Block(63AR)	1 72 2 15 11 179 1451	1 - 1 - 1 - 1 - 1	11.14	during T	op Up.	
SF ₆ GAS: Dew Point: AFTER OPERATING: SF ₆ Pressure		rating Temp:		Check Pri Bushings		ono unu
Phase Counters: A		В		C		
				Section 19 Section	10.775,00	
COMMENTS:			2	- F **	ALM TAN	
	1					7
					1,112 min	F 1 3 124 II
	10		W.L.	×11111	<u> </u>	
	That I	FELL Code	fa fili i	not payout		Totalic.
	1186	LACTO III			ALTATIA.	
		vo a Dil Lene in				
10.2	1	lo T C				

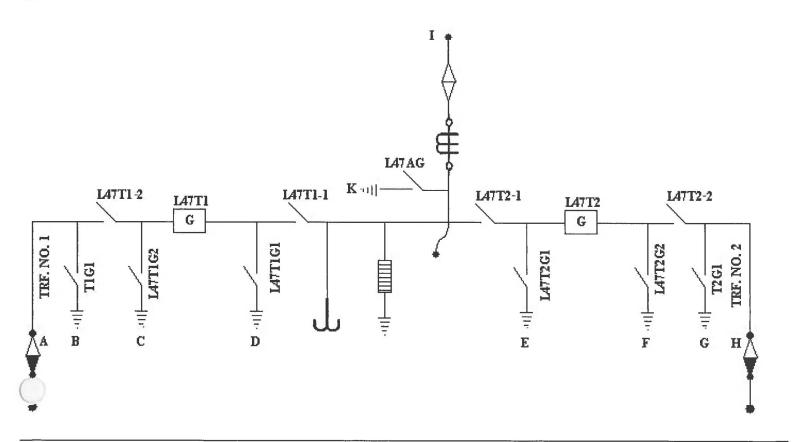
6 YEAR —CAT ARM CIRCUIT BREAKER & DISCONNECT INSPECTION DUCTOR FORM

Date:	Readings By:

	Pha	ise A	Ph	ase B	Ph	Phase C		
Section	Resistance ($\mu\Omega$) Tolerance at 20^{0} C		Resistance (μΩ)	Tolerance at 20°C	Resistance (μΩ)	Tolerance at 20 ⁰ C		
B – C								
C – D								
D - E								
D – K								
K – E								
$\mathbf{E} - \mathbf{F}$								
F - G								

- ** Current connection points are B & G
- ** Record on resistance for L47T1-2 will include T1G1 (B-C)
- ** Record on resistance for L47T2-2 will include T2G1 (F-G)

Ground connections to ground switches will be disconnected for test



6-YEAR - SF₆ CIRCUIT BREAKER INSPECTION

Test Date:	turer:	Test Comple		- 18. (18.)	N	erial No.: Nominal Voltage Class: D.E.W/O #:	
WEATHER CON	DITIONS:	dry	rain	hui	midity	temperature	
NOTE: All TES	TS MUST I	BE COMPL	ETED OR MA	RKED N/A	unless o	therwise Instructed).	
BEFORE OPERA	ATING: (If						
SF6 Pressure:		Kpa. A	ir Pressure:			Hydraulic Pressure:	Kpa.
Operation Counters:	3 ph		A ph	11 (- 70)	B ph	C ph	
DENSITY MON			SF ₆ Low:		Lock	out:	
230 K	V SIEMEN: LF & SPRE	OUCTOR RE S-3AQ1-< 5 CH SCHU. < : 100 μ Ohi	0 μOhm < 150 μOhm				
0/0	CURRENT		MICRO Ω				
A ph	CORREIVI		WHCKO 32	we me the course			
B ph							
Cph							
Сри							
	TIMING 7	ΓEST (millise	econds)	nie' m	4		
		A	В	С			
3-PH	Close						
3-PI	H Trip						
Trip Free (dwell)						
Disagreement O	n Trip		KI III				
Command Curre	nt Close	am _]	ps Trip	am	nps		
F10001	gjirtii.		3AQ1 ACCEP	TABLE TIM	IING	The stand	
TEST	100000000000000000000000000000000000000	N	NORMAL		1	WITH RC ELEMENTS	
CLOSE	1 2113	r è sauco 1	00 +/- 5MS			100 +/- 5MS	
TRIP	mm Y T	3	6 +/- 3MS			23 +/-3MS	
TRIP FREE		6	5 +/- 10MS			65 +/-10MS	

NOTE: THE BREAKER (TIMING TEST) PERFORMANCE REPORT INCLUDING ALL MAIN CONTACTS SHOULD BE ATTACHED TO THE COMPLETED INSPECTION FORM.

SISTANCE (Ohms): (1	est to be completed from the	e Control Cabinet	Terminal Board)		
A ph	ΩΒμ	h	Ω	C ph	Ω
A ph	ΩΒμ	h	Ω	C ph	Ω
A ph	ΩΒμ	oh	Ω	C ph	Ω
	A ph A ph	$egin{array}{cccc} A \ ph & \Omega & B \ p \ A \ ph & \Omega & B \ p \ \end{array}$	$ \begin{array}{c cccc} A \ ph & & \Omega & B \ ph \\ A \ ph & & \Omega & B \ ph \\ \end{array} $	A ph Ω B ph Ω	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

REV DEC 13, 2013

Sheet 2 of 3

6-YEAR - SF₆ CIRCUIT BREAKER INSPECTION

System ID: Manufacturer: Test Date: T				Nominal Voltage Class:		
	HEA	TER AMI	PERAGE:			
CABINET HEATER:						
CONTROL BLOCKS:	A:	n apply	B:	C:		
		OP	PERATING MEG	CHANISM		Mar 2016 Mar June 17 June 17
PNEUMATIC REGULATED	(AIR)C	PERATO	R: (If Applicable)	OPERATE	SAFETY RELIEF VAL	LVE
HYDRAULIC OPERATOR: (CUT IN:	If Applicable		PUMP AMPS.	KPA	HYD PUMP HOURS	
PNEUMATIC REGULATED	(AIR)C	PERATO	R: (COMPRES	SOR INSPEC	TION) (If Applicable)	A31 () ()
CUT IN		CUT OU			RUN TIME	MINUTES
COMPRESSOR HOURS		DRYER (COUNTER	MOTOR	R AMPERAGE	
SPRING CHARGED (MOTO MOTOR AMPERAGE SF ₆ GAS: Dew Point: CHECKS COMPLETED: PRESSURE Block R	SETTING	Oper	rating Temp:	— Check I — Check I — Lubrica	Pullrod Connections Primary Connections and te Mechanism Breaker Compressor O	reference to the d
	Close	5.4111	. Funda 1657 7	_	Control Wiring	
Low Air Pressure N ₂ General Loss (Hyd. E	Alarm			(Including	All Heaters any Operating Rod's Heaters) erated Breakers Condensate Dryer, 20 Minute Pres	ssure drop Test)
AFTER OPERATING: (If A	pplicable)	ifo is a southful	ic 2 par Est	This is the first of the same	Alakar India
SF6 Pressure:	Kpa.	Air Pressur	e: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Кра.	Hydraulic Pressure:	Kpa.
Operation Counters: 3 ph		A	ph	B ph	C ph	
CHECK COMPLETED: Doble Test Performed:YoReport any SF6 losses per ONLY IF INSTRUCTED:			Up.			

REV DEC 13, 2013

6-YEAR - $SF_{\rm 6}$ CIRCUIT BREAKER INSPECTION

System ID: Manufacturer: Test Date:	Type:	Serial No.: Nominal Voltage Class: J.D.E.W/O #:
Check Pull Rod Cons Gas Analysis	nections	
COMMENTS:		

Circuit Switchers

120 DAY GENERAL INSPECTION

- Check Gas Pressure Indicators on Interrupters.
 Clear Normal
 Red Loss of Gas
- 2 Check blades are properly closed and alignment.
- 3 Check insulators for chips, tracking and oil leaks (if applicable).
- 4 Check arcing horns and blades for signs of burning.
- 5 Check motor mechanism for voltage supply, parts clean and dry, lubrication as required.
- 6 Check heater.
- 7 Complete 120 Day-Circuit Switcher Inspection Form.

6 YEAR PM INSPECTION

- 8 Outage required.
- 9 Check all items on the 120 Day-Circuit Switcher Inspection Form.
- 10 Check and record motor amperage
- 11 Complete interrupter resistance (Ductor) test.
- 12 Check rubber spider of motor coupling for wear and cracks.
- Operate shunt trip, if applicable, blades will open after shunt trip is initiated.
- 14 Complete interrupter resistor check, if applicable. (Four Meg Ohms). Open switch manually and stop after audible trip of interrupters.
- 15 Complete 6 Year -230/138 kV Circuit Switcher Inspection Form.

PUB-NLH-082, Attachment 6 120 DAY - CIRCUIT SWITCHER INSPECTION Page 3 of 4, Isl Int Sys Power Outages

Station: Date: Readings By:							
WEATHER CONI	DITIONS:	_ dry	rain h	umidity	temperature		
Circu	it Switcher No.						
Gas Pressure Indication	A B						
(Clear/Red)	C						
Gas Pressure Indic		Equipped)	<u>l</u>	KF	PA		
	Source Voltage						
	Heater (amps)						
Н	leater (On / Off)						
Motor Contr	rol (Man / Auto)						
	Counter						
Check Check Check Check Check Check Check Check Check	ETED: disconnect blades insulators for sign structure condition grounding motor operator he control power sup arcing horns Concrete Base any SF6 losses (ns of burns, flash on eater pply		(oil leaks if app	olicable)		

REV DEC 10, 2013

Page 1 of 1

6 YEAR - 230/138 KV CIRCUIT SWITCHER INSPECTATION of 4, Isl Int Sys Power Outages

	System ID: _			
	Manufacturer: _		Type:	Voltage:
Tes	st Date:	Test Co	ompleted By:	J.D.E.W/O #:
NOTE	: All TESTS MU	ST BE CO	MPLETED OR MARKED N	humidity temperature N/A (unless otherwise Instructed).
BEFO	RE OPERATING:	Counter _		
NTER	RUPTORS SF6 I	PRESSURE	INDICATORS	
A ph	Clear	Red		
B ph	Clear	Red		
Cph	Clear re Indicator (If Equi	Red	VD A	
1essu	re marcator (ir equi	pped)	NFA	
10 EXE.	***		•	
	DUCTOR (R	ESISTANO	CE) READING	
	% CURRI	ENT	MICRO Ω	
A ph				
B ph				
ph				
			OPERATING MEG	CHANISM
RIN	G CHARGING/ ((MOTOR)		
	Amperage			et Heater
AFTE	R OPERATING:	Counter		
	KS COMPLETEI	. .		
CHEC			Manual & Electrical Trip	Check Break Condition
			ections in Transition Box	Check & Lubricate as Required
			or Damage, Wear, & Corro sion	_
	Check Po	ower train i	of Damage, Wear, or Como 40.	Check Motor Coupling
	Check Po			Check Wotor Coupling
	Check Li	imit Switcherimary Coni	es nection s	
	Check Li Check Pr Check D	imit Switcherimary Coni isconnect S	es nections witch Alignment (If Applicabl	
	Check Li	imit Switcherimary Coni isconnect S	es nections witch Alignment (If Applicabl	
ONII V	Check Li Check Pi Check D Doble Test Perfo	imit Switcherimary Coni isconnect S rmed:	es nections witch Alignment (If Applicabl	
ONLY	Check Li Check Pi Check D Check D Doble Test Perfo	imit Switcherimary Conrisconnect Surmed:	es nections witch Alignment (If Applicabl	
	Check Li Check Pi Check D Check D Doble Test Perfo IF INSTRUCTE Dismant	imit Switcherimary Conrisconnect Surmed:	es nections witch Alignment (If Applicabl YesNo	
	Check Li Check Pi Check Pi Check D Doble Test Perfo IF INSTRUCTE Dismant	imit Switcherimary Conrisconnect Surmed: D le and check	es nections witch Alignment (If Applicabl YesNo	le)
	Check Li Check Pi Check Pi Check D Doble Test Perfo IF INSTRUCTE Dismant	imit Switcherimary Conrisconnect Surmed:	es nections witch Alignment (If Applicable Yes No	
	Check Li Check Pi Check Pi Check D Doble Test Perfo IF INSTRUCTE Dismant	imit Switcherimary Conrisconnect Surmed:	es nections witch Alignment (If Applicable YesNo	le)

REV NOV 22, 2013

Disconnect Switches

DISCONNECT SWITCH MAINTENANCE PROCEDURE

Page 1 of 3

DISCONNECT SWITCHES - AIR BREAK/SF6-15KV TO 230 KV

120 DAY GENERAL INSPECTION:

- Perform a visual check of blade positions for alignment and signs of over heating.
- 2 Check insulator stack conditions.
- 3 Check operating of motor mechanism heater.
- 4 Check control voltage and fuses.
- 5 Complete appropriate inspection 120/180 Day-Disconnect Switch Inspection Form to record:
 - a) Switch no.
 - b) Switch-Alignment: Check if okay if adjustment is required, provide details in remarks.
 - c) Insulators: Check condition (cracks, broken skirts etc.)
 - d) Heater amps (record if applicable).
 - e) Operating motor voltage source (record if applicable).

6 YEAR PM INSPECTION: (Air Break Switches)

- 6 Outage required.
- Manually operate the switch and check contact alignment, toggles, stops, linkage and ease of operation.
- 8 Check contact pressure observe jaw spread as blade rotates in jaw.
- 9 On Kearney switches check that the blade is positioned opposite the pressure springs in the jaws.
- 10 Check contacts for burns or wear.
- 11 Check the silver plating for peeling or deterioration.
- 12 Check hinge end shunts or wiping contact.

- 13 Clean contacts and lubricate by applying grease and then removing so there is only a light film left. If too much grease is applied, it will harden. Lubricate linkage pivot points.
- 14 Check cap screws, bolts, lock nuts, pins, etc. for tightness. On double horizontal break switches, remove cover from centre stacks and check gear bolts and pivot.
- 15 If the switch is equipped with arcing horns, see that beads of material caused by burning are removed.
- 16 Check shunts for tightness, fraying or deterioration.
- 17 Check line connections to the switch.
- 18 Check that there is a minimum of stress on the insulator stack from the line connections.
- Gear box covers should be removed, if readily accessible, for inspection and lubrication of gears.
- 20 Check that switch grounding is tight and undamaged.
- 21 Ground mats, if supplied, should be checked for continuity with the station grounding system.
- 22 Lubricate, where necessary.
- 23 Test operate manually and electrically.
- 24 Check grounding device on drive mechanism.

MOTOR MECHANISM

- 25 Check the operation of the mechanism space heater.
- 26 Contacts on auxiliary switches and motor circuits should be cleaned.
- 27 Auxiliary contacts should be checked for compression and alignment.
- 28 Check wiring connections for tightness.
- 29 Apply a light film of multi-purpose grease to the gear train.
- 30 Apply a few drops of light oil to the main bearings.

DISCONNECT SWITCH MAINTENANCE PROCEDURE

Page 3 of 3

- 31 Check interlock switches and locking devices for proper operation.
- 32 Observe the mechanism during switch operations.
- Operate in motor both local and remote.

 Note: Check that indicating lights on panels work, and that in motor mode, the switch does not bring up hard against stops.
- 34 Complete appropriate inspection form.

GROUND SWITCHES-HIGH SPEED SOLENOID OPERATED/MANUAL RESET

- 35 Check and record solenoid resistance.
- 36 Check auxiliary contacts and switches.
- 37 Check electrical operation.
- 38 Check cable terminations.
- 39 Check junction boxes for moisture.
- 40 Complete appropriate inspection form.

DISCONNECT SWITCHES WITH (LOAD BREAK) VACUUM MODULES

- 1 Complete lubrication.
- Complete resistance (Ductor) test on each vacuum module (Max 1500 Micro Ω each Module)
- 3 Complete AC High Potential test, if instructed.
- 4 Paint interrupter housing, if required. (Use manufactures recommended paint.)
- 5 Complete appropriate inspection form.

Switch No. Alignment (Condition) Motor (Operator) Heater (Amp	Station:		Date:	Readings	Ву:
insulators					
Therefore / A control			Inculators	Motor (O	perator)
	Switch No.	Alignment		Control Voltage	Heater (Amps
		8			
					1
				7.66	
					7 100 100 1000
	L				
	Check discor	nnect blades for al	ignment		
Check disconnect blades for alignment					
Check interlocks operating			urn s, flashover, & o	cracks	
Check interlocks operatingCheck insulators for signs of burn s, flashover, & cracks	Check struct	ture condition			
Check interlocks operating	Check groun	nding			
Check interlocks operatingCheck insulators for signs of burn s, flashover, & cracks	Check concr	rete base			
 Check interlocks operating Check insulators for signs of burn s, flashover, & cracks Check structure condition 					
 Check interlocks operating Check insulators for signs of burns, flashover, & cracks Check structure condition Check grounding 	A C				
 Check interlocks operating Check insulators for signs of burns, flashover, & cracks Check structure condition Check grounding Check concrete base 	any Concerns Bel	ow:			
 Check interlocks operating Check insulators for signs of burns, flashover, & cracks Check structure condition Check grounding 					

REV DEC 4, 2013

6 YEAR PM - DISCONNECT SWITCH (Manual)

	Equipment ID: Manufacturer:		
CHE	CKS COMPLETED:		
	GENERAL		
	Check disconnect bla	des for alignment.	
	Check insulators for s	signs of burns, flashover, & cra-	cks.
	Clean insulators as ne	ecessary.	
	Check structure cond	ition, grounding, and concrete l	base.
	Check & lubricate as	required: main contacts, inter l	inkages, & ground-slide contacts.
	MAIN CONTACTS, INT	ER LINKAGE, & GROUND S	SLIDE CONTACTS
	Check mechanical sto	ops and conductor terminations	
	Check all connection	s & tighten as necessary.	
	Examine contacts for	burns and corrosion.	
	Check condition of sl	nunt brades.	
	Operate manually and	d observe for ease of operation.	
	Check gear boxes for	moisture.	
Note	Any Concerns Below:		
		<u> </u>	
-	7	A00.2000 - 100.0	

REV NOV 28, 2013

6 YEAR PM - DISCONNECT SWITCH (Motorized)

	Equipment ID:		tion:		JDE W/O #: _				
	Manufacturer:	_ 1	Date:		Readings By: _				
СНЕ	ECKS COMPLETED:								
	GENERAL								
	Check disconnect blades	for alignme	ent.						
	Check insulators for sign	ns of burns,	flashover, cracks	s & clean	insulators as nece	essary.			
	Check structure condition	n, groundin	g, and concrete b	oase.					
	Check & lubricate as rec	quired: main	contacts, inter l	inkages, &	ground-slide co	ntacts.			
	MAIN CONTACTS, INTER	LINKAGE	E, & GROUND S	SLIDE CO	<u>NTACTS</u>				
	Check mechanical stops	, conductor	terminations. Ch	eck all co	nnections & tight	en as necessary.			
	Examine contacts for bu	rns and corn	osion.						
	Check condition of shur	it brads.							
	Operate manually and o	bserve for e	ase of operation.						
	Check gear boxes for m	oisture.							
	VACUUM MODULES (LO	AD BREAK	() DISCONNEC	TS					
	Check & lubricate as required								
	Check & paint interrupt								
	Complete continuity res		2						
	A ph/_ B ph/								
	C ph/					MicroΩ			
	-								
	MOTOR								
	Check cable termination					connect operation.			
	Check auxiliary contact			Check	motor and brake	e condition.			
	Check operating limits	and indicatin	ng lights.						
	Motor Open: amps	ī	Motor Close:		_ amp s				
	Motor Voltage:	_ volts	Heater:	amps	-				
Note	e Any Concerns Below:								
1400									

REV NOV 28, 2013

6 YEAR PM - GROUND SWITCH

	Equipment ID:	Station: Date:	JDE W/O #: Readings By:	
		MANUAL OPERATED GR	OUND SWITCH	
HE	CKS COMPLETED:			
	GENERAL			
		gns of burns, flashover, & crac		
		plades for alignment and any pi	tting or burning.	
	Clean in Sulator s a s nec	•		
		ion, grounding, and concrete b		
	Check & lubricate as r	equired: main contacts, inter li	nkages, & ground-slide contacts.	
	Н	IGH SPEED SOLENOID OPE	RATED/MANUAL RESET	
		(ALL CHECKS A	BOVE PLUS)	
	OPERATING MECHANI	SM		
	Solenoid Resistance (Ω)		
1	Check auxiliary contact	ets and switches.		
	Check electrical opera	tion.		
	Check cable termination	ons.		
	Check junction boxes	for moisture.		
	Operate electrically &	manually and observe for ease	of operation.	
Jote	Any Concerns Below:			
1010	This concerns below.			
		400		
-				

REV NOV 28, 2013

PUB-NLH-082, Attachment 7 e 9 of 11, Isl Int Sys Power Outages

$\begin{array}{c} \textbf{Page 9 of 11, Isl Int Sys Power Outages} \\ 6 \ YEAR \ PM-GROUND \ SWITCH \ (CAT \ ARM) \ (SF_6) \end{array}$

0	Equipment ID: Manufacturer:		JDE W/O #: _ Date: _		Readings By:	
REC	ORD MECHANICA		,			
	Close: A	В	C	Open: A	В	C
REC	ORD INTERLOCK (Close:					
CHE	CKS COMPLETED	:				
	Check & lubri Check mechar Examine conta Operate manua Check for sim	lts, nuts, groucate as required indicator acts for burns ally and obserultaneous ope	nd terminal cored: (inter linkages. and corrosion to the for ease of corrosion of all thronges.	nnections, etc. are tigges). hrough view port. operation. ee poles and adjust		
	ELECTRIC OPER			Applicable)		
	Check manual					
	Check auxilian	•				
	Check local/re					
	Check cable to	-	/II .			
Note	Any Concerns Below	v:				
-		-				
					, , , , , , , , , , , , , , , , , , ,	
					(40)	

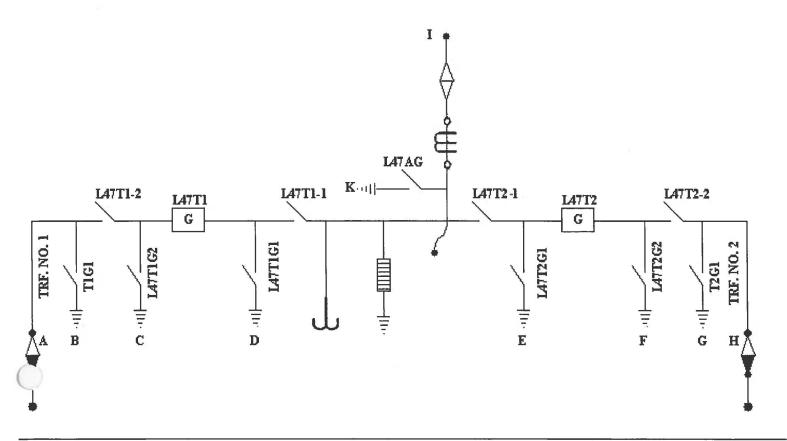
6 YEAR -CAT ARM CIRCUIT BREAKER & DISCONNECT INSPECTION DUCTOR FORM

Date:	Readings By:

	Pha	ise A	Ph	ase B	Phase C		
Section	Resistance (μΩ)	Tolerance at 20 ⁰ C	Resistance (μΩ)	Tolerance at 20°C	Resistance (μΩ)	Tolerance at 20°C	
B – C							
C – D							
D - E							
D – K							
K – E							
E – F							
F - G							

^{**} Current connection points are B & G

Ground connections to ground switches will be disconnected for test



^{**} Record on resistance for L47T1-2 will include T1G1 (B-C)

Record on resistance for L47T2-2 will include T2G1 (F-G)

6 YEAR - DISCONNECT SWITCH PNEUMATIC (CAT ARM) (SF₆)

0	Equipment ID: Manufacturer:	JDE W/O #: Date:		
RECO	ORD MECHANICAL STO		pen: A B C	
RECO	ORD CONTROL COIL RE	ESISTENCE (ohms): pen Interlock		
RECO	ORD DUCTOR READING Tester Connections: Cu Readings: A	G (micro ohms): arrent Points (b-g) Potential P B	oints () C	
CHE	CKS COMPLETED:			
	Clean insulators as r Check structure cond Check & lubricate as OPERATING MECHAN Check mechanical st Operate manually ar Check manual/remo Check auxiliary con Check operating lim	dition, grounding, and concress required: main contacts, into NISM tops and conductor termination dobserve for ease of operation te DC interlock. tacts and switches. its and indicating lights. and pneumatic operation.	te base. er linkages, & ground-slide contacts. ons.	
Note	Any Concerns Below:			

REV DEC 3, 2013

Power Transformers and Shunt Reactors

POWER TRANSFORMER MAINTENANCE PROCEDURE:

120 DAY GENERAL INSPECTION

Normally completed from ground level. Visual inspection.

- 1 Check oil levels in main tank, conservator tank, tap changer compartment and bushings. Check for oil leaks. Record findings.
- 2 Observe all HV connections for signs of overheating or broken terminations.
- 3 Inspect all oil and winding temperature devices and record findings.
- 4 Check explosion vent diaphragm for signs of damage or deterioration.
- 5 Observe for signs of oil leaks. Clean up any stains or spills.
- 6 Check condition of silica gel. Change if 50 % or more contaminated.
- 7 Check that all equipment grounds are in place and all connections are sound.
- 8 Check condition of concrete foundations for cracks and/or heaving.
- 9 Check main tank, radiators and other metal parts for signs of rust penetration.
- 10 Control Cabinets and devices:
 - 10.1 Check cabinet heaters, function test and record amperage. Observe for signs of overheating such as burn marks on adjacent wires and/or cabinet paint coating.
 - 10.2 Inspect control wiring and terminations for breaks, corrosion, overheating or damage.
 - 10.3 Manually operate each cooling fan stage and record amperage.
 - 10.4 Observe all cooling fans while running for abnormal noise, vibrations or bearing overheating.
 - 10.5 Check all cabinet doors for ease of operation. Lubricate as required.
- 11 Complete 120 Day Inspection Power Transformer Inspection Form.

6 Year (PM) Preventive Maintenance

- Perform on site dielectric oil test for all applicable compartments, conservator, tap change compartment and diverter switches.
- 2 Check conservative tank drain for presence of water. If water is present, drain and record.
- Function test & complete 500 Volt megger test on protection devices:
 - 3.1 Winding temperature relay.
 - 3.2 Liquid temperature relay.
 - 3.3 Fault pressure gas relays & pressure relief devices.
 - 3.4 Low oil level gauge.
- 4 Tap Changer (On-Load TYPE)
 - 4.1 Record operations count before and after test.
 - 4.2 Visual inspect mechanical and tap position indicating devices and gear drives. Lubricate when necessary. Observe for mechanical parts that may be worn or loose. Confirm operation.
 - 4.3 Check wiring and contactor controls.
 - 4.3 Operate the tap-changer through the full range of taps raise and lower. Observe Operation of the tap indicating devices. Confirm electrical and mechanically limits in both raise and lower positions.
 - 4.4 Complete winding resistance test on Tap position **Found**.
 - 4.6 Complete winding resistance test on Maximum Tap position Raise.
 - 4.7 Complete winding resistance test on Maximum Tap position **Lower**.
 - 4.8 Complete winding resistance test on Tap position **Left**.
- 5 Check cabinet heaters (Record Amperage).

- Replace oil in diverter or tap changer compartment, if instructed or if condition of oil indicates a requirement.
- 7 Check function and accuracy of Tap Changer indication Local/Remote (control building & ECC.
- 8 Tap Changer (Off Load TYPE):
 - 8.1 Complete winding resistance test on Tap position **Found**.
 - 8.2 Operate the tap changer through all of the tap positions to wipe contacts clean.
 - 8.3 Complete winding resistance test on Maximum Tap position **Raise**.
 - 8.4 Complete winding resistance test on Maximum Tap position Lower.
 - 8.5 Select final tap position and complete a mechanical centre and continuity check.
 - 8.6 Complete winding resistance test on Tap position Left.
- Inspect all HV/LV connections, look for signs of overheating. Apply Anti-Oxid Compound (Pentrox) to all connections that were opened and are to be remade.
- 10 Complete dielectric absorption test. Record Polarization Index (10 Minute Divided by 1 Minute reading = Polarization Index)
- Inspect all ground connections to arrestors. Complete low resistance (Ductor) test from each Arrestor Base to the closest point to the Ground Grid.
- 12 Complete a close up inspection of all porcelain for cracks and wipe down, if required.
- 13 Repair identified oil leaks.
- 14 Clean and paint rust areas found on the top of transformer tank.
- 15 Complete applicable 6 Year PM Transformer c/w Conservator Tank Form.
- 16 Complete Doble Test, if scheduled.

SHUNT REACTORS MAINTENANCE PROCEDURE:

120 DAY GENERAL INSPECTION FORM

Normally completed from ground level. Visual Inspection.

- 1 Observe primary connections.
- 2 Check bushing conditions.
- 3 Check bushing oil levels.
- 4 Check tank and fittings for rust, paint condition.
- 5 Check if ladder guards are in place.
- 6 Check condition of silica gel. Change if 50 % or more contaminated.
- 7 Check breather "oil lock" for moisture contents and correct oil level.
- 8 Check all oil levels (normal, high, low).
- 9 Check explosion vent and fault pressure relief.
- 10 Check winding and oil temperatures for current and peak.
- 11 Check gas relay for accumulation.
- 12 Check all equipment grounding.
- 13 Check cabinet heaters.
- 14 Complete 120 Day-Power Transformer Inspection.

6 Year (PM) Preventive Maintenance

An outage will be required.

- 15 Complete items identified in the general inspection checklist.
- 16 Complete dielectric oil test on conservator tanks.
- 17 Check conservator tank drain for water.

SHUNT REACTORS

Page 2 of 2

- 18 Function test protective devices:
 - 18.1 Oil temperature relay.
 - 18.2 Gas detector relay.
 - 18.3 Winding temperature relay.
 - 18.4 Fault pressure relay.
 - 18.5 Protective relay RS1000.
- 19 Complete circuit resistance check:
 (Including Wiring to Terminal Boards 500 Volt Megger test)
 - 19.1 Oil temperature relay alarm/trip.
 - 19.2 Gas detector relay alarm/trip.
 - 19.3 Fault pressure relay trip.
 - 19.4 Protection relay RS1000 trip.
 - 19.5 Conservator oil level gauge alarm.
- 20 Check conservator oil level.
- 21 Check bushing oil levels.
- 22 Check conservator low oil alarm.
- 23 Inspect all bushing connections.
- 24 Perform dielectric absorption at 5 kV (record).
- 25 Perform ground continuity (micro-ohms) on H.V. arrestors.
- 26 Complete sampling for analysis, as required.
- 27 Complete 6 Year PM Form-138kV Shunt Transformer Inspection.
- 28 Completed Doble Test, if scheduled.

TRANSFORMER WINDING RESISTANCE TEST FORMPUB-NLH-082, Attachment 8

					of 26, Isl Int Sys P	
System ID:						
Type: OLTC T						
Test Dat	e:	Test Complet	ted By:	J.D.E. W/	J #:	TOTAL PORT AND
		7.0				
					1100 000	
VECTORS	HV:		LV:	TEI	RT:	
		* *	* * *		* * *	
 Complete Wind Confirm Mecha 	ing Resistance Test on ing Resistance Test on nical Center (Off Load ing Resistance Test on	Maximum Tap Positio Maximum Tap Positio I Tap Changers). Tap Position Left.	n Lower.			
TAP POSITION	WINDING	CURRENT	RESISTANCE	% CURRENT	RESISTANCE	RESISTANCE
ACTION OF ACT OF SIGNATURE PROPERTIES OF S	TESTED	RANGE	RANGE			DELTA x 1.5
Found						
Found						
Found						
Max. Raise						
Max. Raise						
Max. Raise						
Max. Lower						
Max. Lower						
c. Lower						
Left						r.
Left						
Left						
Non Tap Winding						
Non Tap Winding					r.	
Non Tap Winding						
Tertiary Winding						
Tertiary Winding						
Tertiary Winding						
Note: Observe Indicate REMARKS:	or Light & Recor	d OHMS or MIL	LI-OHMS			
				102	12-7	
y -1	7		***			
P			W-4400-0-40			
			34000			

Page 1 of 1

REV NOV 26, 2013

TRANSFORMER RATIO TEST FORM Page 8 of 26, Isl Int Svs Power Outages

System ID:								Page 8 of 2	26, ISI INI	Sys Power Outag	ges
Test Date:	System	ID:	Stat	ion:	Serial N	ō:		Manufacturer:			
VECTORS: HV: LV: TERT: H.V. High Pos. L.V. Low Voltage Calculated Ratio Jumper X Phase angle Alger Y Phase angle Alger Jumper Alger Phase angle Alger Y Phase Alger Y Phase Alger Y Phase Alger Y Phase Alger Y	Type: (DLTC	TC	_ High V	oltage	Low Voltag	e	Tester S	erial No):	
VECTORS: HV: LV: TERT: H.V. High Voltage L.V. Low Voltage Calculated Ratio Jumper X Phase angle Algebrase Y Phase angle Algebrase Jumper X Phase Algebrase Jumper X Phase Algebrase Jumper X Phase Algebrase Phase Algebrase Jumper X Phase Algebrase Jumper X Phase Algebrase Jumper X Phase Algebrase Phase Algebrase Jumper X Phase Algebrase Phase Algebrase Jumper X Phase Algebrase Jumper X Phas		Test D	ate:		Test Comple	ted By:		J.D.E. W/O #:			
VECTORS: HV: LV: TERT: H.V. High Voltage L.V. Low Voltage Calculated Ratio Jumper X X Phase angle Angle Angle Y X Phase angle Angle Angle Angle Y X Phase angle An	-						,			***************************************	
H.V. High Voltage Pos. Voltage Calculated Ratio Tumper X_ Phase angle X_ Phase angle X_ Imper X_ Phase angle X X_ Phase angle Phase angle X X_ Phase angle X X_ Phase angle X X_ Phase angle Phase angle X X_ Phase angle X X_ Phase angle Phase angle X X_ Phase angle Phase								TED T		• •	
H.V. High Voltage Pos. Voltage Calculated Ratio Tumper X Phase angle X Phase angle X Phase angle X X		VECTORS	i: I								
H.V. High Voltage Pos. Voltage Calculated Ratio Jumper X_ Phase angle H				3.00	• •	* *	•		() .		
H.V. High Voltage Pos. Voltage Calculated Ratio Jumper X Y Phase angle H Phase angle X X Phase angle X X Phase angle X X Y Phase angle X Y Y Phase angle Y Y Y Y Phase angle Y Y Y Phase angle Y Y Y Phase angle Y Y Y Y Y Y Y Phase angle Y Y Y Y Y Y Y Y Y Y											
H.V. High Voltage Pos. Voltage Calculated Ratio Jumper X Y Phase angle H Phase angle X X Phase angle X X Phase angle X X Y Phase angle X Y Y Phase angle Y Y Y Y Phase angle Y Y Y Phase angle Y Y Y Phase angle Y Y Y Y Y Y Y Phase angle Y Y Y Y Y Y Y Y Y Y								Iumper			
H.V. High L.V. Low Calculated Jumper Phase angle H Phase Jumper Phase Angle H Phase Angle Phase Angle Phase Angle Phase Phase Angle Phase Phas									,		
Pos. Voltage Pos. Voltage Ratio X angle X angle X angle X angle X angle X x								X	,		
Pos. Voltage Pos. Voltage Ratio XX H XX					the state of the s	Jumper		X		Jumper	
	Pos.	Voltage	Pos.	Voltage	Ratio	_	angle	i	angle		angle
						H H		H		H H	
										*	
	2-3										
										-	
			-								
		b									
							<u> </u>				
				1			ŀ				
								-			
			į.								
					1						
							i				

Station:	Date: Readings By:
vv EATHER CONDITIONS: dry:	rain: humidity: ambient temperature: 0°C
NOTE: All ITEMS MUST BE CO	OMPLETED OR MARKED N/A (unless otherwise Instructed)
Visual Inspection:	
> Primary terminations	TO C NI
> Tank & fittings	Trf. No Tap Pos
> Explosion vent	Load: M.W (or) Amps Temp: Winding <u>/Peak</u> Oil: <u>/Peak</u>
•	Temp: Winding /Peak Oil: /Peak
> Check for gas accumulation	Reset Drag Hands Once Completed: _ Oil Levels: Tank Tap Chr Bush
> Paint conditions	Vacuum Pressure Gauge (Sealed Unit, if equipped) KPA:
> Temperatures (Current & Peak)	SF ₆ Bushing Diff. (kPa): H1 H2 H3
> Check bushings and lightening arrestors	Fan Load Current (amps): Stage I Stage II Stage II
> eneck businings and rightening arrestors	Cabinet Heaters: On Off Amps
> Access ladder/guard	Tap Chr: Counter Rust Condition: Tank Cont.Cabinet Rads
> Foundation	Silica Gel: OKReplace if 50% or Greater Contamination:
	Explosion Vent Diaphragm
> Silica Gel Breather checked	Remarks:
> Oil Levels (Normal, High, Low)	
> Check vacuum pressure gauge (Seale	ed Trf. NoTap Pos
Units if equipped)	Load: M.W. (or) Amps Temp: Winding /Peak Oil: /Peak
> Rust Condition	Temp: Winding /Peak Oil: /Peak
A - Minor	Reset Drag Hands Once Completed: _ Oil Levels: Tank Tap Chr Bush
B - Moderate	Vacuum Pressure Gauge (Sealed Unit, if equipped) KPA:
	SF ₆ Bushing Diff. (kPa): H1 H2 H3
C – Severe	Fan Load Current (amps): Stage I Stage II Stage II
Check Concrete Base	Cabinet Heaters: On Off Amps
> Check &Report all Oil leaks	Tap Chr: Counter
As per EERP	Rust Condition: Tank Cont.Cabinet Rads Silica Gel: OK Replace if 50% or Greater Contamination:
(Environmental Emergency Response Plan)	Explosion Vent Diaphragm
Operate Manually:	Remarks:
Operate Manually.	
> Cabinet heater thermostat	Trf. No Tap Pos
> Fan controls	Trf. No.
	Reset Drag Hands Once Completed:
> Circulating Pumps Controls	Oil Levels: Tank Tap Chr Bush
(T1, T2, T3-HRDTS)	Vacuum Pressure Gauge (Sealed Unit, if equipped) KPA: SF ₆ Bushing Diff. (kPa): H1 H2 H3
	Fan Load Current (amps): Stage I Stage II
	Fan Control Return to Auto/Remote _
	Cabinet Heaters: On Off Amps
	Tap Chr: Counter Rust Condition: Tank Cont.Cabinet Rads
	Kust Condition: Tank Cont.Cabinet Rads
	Silica Gel: OKReplace if 50% or Greater Contamination: Explosion Vent Diaphragm
	Remarks:

REV DEC 10, 2013

System ID: Manufacturer: Test Date:	T	ion: ype: leted By:	V(f)	M.V.A: _	The Control of the Co		
NOTE: All TESTS MUST B	E COMPLETED	OR MARK	ED N/A (unless o	therwise In	structed).		
WEATHER CONDITIONS: DIELECTRIC OIL TEST AST			umidity:	ambient	temperature:C		
LIQUID TEMP RELAY: (Check	k if Applicable)			3.22	the control of 2484		
Alarm: Setting: °C	Found		°C	Left	°C		
Trip:Setting:°C YesN/A	Found		°C	Left	°C.		
FAULT PRESSURE RELAY:	: (GAS DETECTO	OR)					
Alarm:	Found		(cc)	Left	(cc)		
Trip:	Found		(kpa)	Left	(kpa)		
		39.00					
FAULT PRESSURE RELEAS		ck if Applicable)		N 5004 BD. 4900			
Function Test Control Circuit:			Tested Ok				
Function Test Control Circuit:	(Relay RS1000)		Tested Ok				
Liquid Temp Relay: Alar Trip Fault Pressure Relay: Alar Trip Conservator O/L Gauge: Alar	CHECKS: (including n Mega Ohms or N/A (according to 1-1) m	g Wiring to Termina ceptable readings > ine 2	Line 1/2 -	needs on the form			
** Caution: Confirm all Prima		cuits are open	before Closing Li		ty TopySo.		
CHECK OIL LEVEL: (High, N			110	Conservat			
HV BUSHINGS: LV BUSHINGS:	H1 HO1		H2		H3		
LV BUSHINGS:	HOI		HO2		НО3		
CABINET HEATER AMPERAGE:							
GROUND CONTINUITY: (Micro-Ohms)	****					
HV. ARRESTORS:	H1		H2		H3		
LV BUSHINGS/GROUND:	HO1		HO2		HO3		
0							
CORE GROUND: (500 Volt	test)		Externally Connec	cted yes	No		

REV NOV 27, 2013

PUB-NLH-082, Attachment 8 Page 11 of 26, Isl Int Sys Power Outages

6 YEAR PM - 138 KV SHUNT TRANSFORMER INSPECTION

System ID: Manufacturer:				: <u>In ma</u>	
Test Date:	Test (Type: Completed By: _	J.D.E. W/O #		leat
RESISTOR: (Ohms)	Ser alles		CORE GROUND: (Mega C	Ohms)	
DIEL	ECTRIC AF	SORBTION (5	KV): 10 MIN. ÷ 1 MIN. = IN	IDEX	r mar i du l
H1/H0 - H2/H0/H3H0/GND	1 Min.	Mega Ω	10 Min. Mega Ω		%
H2/H0 - H1/H0/H3H0/GND	1 Min.	Mega Ω			%
H3/H0 - H1/H0/H2H0/GND	1 Min.	Mega Ω	10 Min. Mega Ω	1	%
H1/H0/H2/H0/H3H0 - GND	1 Min.	Mega Ω	10 Min. Mega C		%
	The last			17 11 11	
RUS	ST/PAINT C	CONDITION (A	- Minor , B – Moderate , C –	Severe)	
MAIN TANK:	23.61		RADIATORS:		
CONTROL CABINET:	THE PART OF THE PA		OTHER:		
Check porcelain insula	-	The factor of the second	Visual Check for Dirty In: Check Conservator For Woble Test Performed: Yes	ater & Drain if	
CHECKS COMPLETED ONI Obtain Gas An Capacitive Brid	alysis Samp				
COMMENTS:					
and the second				11 11 11 11 11	
		VI			
				so le re mar	<u>natta las</u>
		110 2378174			Travita triga
	-34-5 11-30-	14			ude figne. Di

REV NOV 27, 2013

PUB-NLH-082, Attachment 8

$\textbf{Page 12 of 26, Isl Int Sys Power Outages} \\ 6~YEAR~PM-230~KV~TRANSFORMER~INSPECTION~(CAT~ARM)$

System ID: Manufacturer: Test Date:		100	Serial No.: M.V.A: E. W/O #:	mar and the
NOTE: All TESTS MUST BE CO	OMPLETED OR MARI	KED N/A (Unless C	Otherwise Instructed)).
WEATHER CONDITIONS: d		humidity:	ambient temperature:	°C
WINDING TEMP RELAY: (Check	if Applicable)	ا دلات الواد	3.000	
First Stage Fans: Settings	°C Found	°C	Left	~C
Alarm: Settings °C	Found	°C	Left	°C
Trip: Settings °C	Found	°C	Left	°C
LIQUID TEMP RELAY: (Check if A	onlicable)		and the pro-	To the state of th
Alarm: Settings: °C	Found	°C	Left	°C
Trip: Settings °C	Found	°C	Left	°C
FAULT PRESSURE RELAY: (IN			uit: Alarm Trip _	
LOW PRESSURE ALARM (63G)			1-	
Found: Operate:/ Reset:		Left: Operate:	/Reset:	
BUSHING/TRANSFORMER INT	FREACE MONITOR (K	PA) / Normal KPA is 0 \		10 1 - 1 2 - 1
HV Bushin ₂ s; A p		B ph	C ph	
1 2 120 10	1 pc Pt. 197	The total day of	1711112	
CONSERVATOR TANK: (Function	Test Low level Alarm) OK			
T.	RESISTANCE CHECKS			
	ing to Terminal Boards)	500 Volt Test		
Test & record in Mega (Ohm)	
	Line 1-line 2	Line 1/2 -		
Winding Temp Relay: Alarm				
Trip			e e e	
Liquid Temp Relay: Alarm			- III IS	
Trip				
Fault Pressure Relay: Alarm				
Trip Conservator O/L Gauge: Alarm		N, N		
		100		
** Caution: Confirm all Primary I	Protection Circuits are ope	en before Closing Li	inks.	1
OUND CONTINUITY: (Micro C	Ohm)	NEUTRAL BUSH	HING:	
LIGHTNING ARRESTOR COUL	NTER: A ph	B ph C	C ph	
REV NOV 27, 2013	1 10000 1 10 10 10 10 10			Page 1 of 3

PUB-NLH-082, Attachment 8

Page 13 of 26, Isl Int Sys Power Outages 6 YEAR PM – 230 KV TRANSFORMER INSPECTION (CAT ARM)

System ID:	Station:_		Serial N	o.:		
Manufacturer:		M.V.A:				
Test Date:	J.D.E. W/C	#:				
		1.11				
CHECK OIL LEVEL: (Hig	h, Normal, Low) Conserva	tor Ta	nk:			
	OPERA	TING	AMPERAGE:			
1 st Stage Fans:			Cabinet Heater:			ryche w_ l
	OFF LO	AD TA	AP CHANGER:			
Tap Position: (Located on the HV		112	Left			
Off load Tap Changer (Con					ya a a gilik a a di	
Transformer Winding Resi			No			of Pality
			Hann, J			mit pusil
	LECTRIC ABSORBTION	(5 KV		1in		
H-LG		Mega Ω	10 Min. Meg	аΩ	Index.	%
L-HG		Mega Ω	10 Min. Meg	α Ω	Index.	%
HL-G	1 Min.	Mega Ω	10 Min. Meg	α Ω	Index.	%
CORE GROUND: (500 V	olt test)					
RESISTOR: (Ohms)			CORE GROUND: (Mega Ohms)			
						L max III
	RUST/PAINT CONDITIO	N(A	- Minor , B – Moderate , C	- S	Severe)	
MAIN TANK:			RADIATORS:			
CONTROL CABINET:		*	OTHER:			
CHECKS COMPLETED						
CHECKS COMPLETED:	T					
Check Explosion V			Silian Cal Chapland would		: £ 500/	
Check HV & LV (Ladder Guards	Connections	_	Silica Gel Checked replacements Contaminated	ace	11 50% or more	
		P	latara & Class :CNI			
Manually Operate	_ Visual Check for Dirty					
Doble Test Performed:		_ Check Conservator For	wa	ter & Drain it Neces	ssary	
Doble Test I chormed.	105100					
CHECKS COMPLETED	ONLY IF INSTRUCTED:					
	Analysis Sample					
100 00 00 00 00 00 00 00 00 00 00 00 00	er Ratio Readings					
	Bridge Testing					
	0					

REV NOV 27, 2013

PUB-NLH-082, Attachment 8 Page 14 of 26, Isl Int Sys Power Outages 6 YEAR PM -230 KV TRANSFORMER INSPECTION (CAT ARM)

\bigcirc	System ID: Manufacturer:	Station: Type:	Serial No.: M.V.A:	
	Test Date:			
COM	MENTS:			
		- 2- 2- 2- 2- 2- 2- 2- 2- 2- 2- 2- 2- 2-		

Page 15 of 26, Isl Int Sys Power Outages 6 YEAR PM – OLTC TRANSFORMER C/W DIVERTER SWITCHES

	Station:							
Manufacturer:			ed By: J.D.E. W/O #:			the state of the s		
Test Date: Test Completed By: J.D.E. W/O #:						the Character		
NOTE: All TESTS MUST	Г ВЕ СОМЕ	PLETED OR I	MARKED N/	A (Unless	Otherwise Instr	ucted).		
WEATHER CONDITIONS: dry: rain: humidity ambient temperature:0C								
DIELECTRIC OIL TEST	ASTM D-18	16 (kV): Cons	servator Main	Tank:	Conservator Di	verter Switches:		
Diverter Switch # 1								
WINDING TEMP RELAY	7 · (O)1 · (C A1)	11->		10.7	Im Division			
First Stage Fans: Setting:		Found		°C	Left	°C		
		Found		°C	Left	°C		
Second Stage Fans: Setting Alarm: Setting:°	<u>g. </u>	Found		°C		°C		
Trip: Setting: °C	<u>C</u>	Found	6 VII.111	°C	Left	°C		
Trip. Setting C		Toulid	****		Lett			
LIQUID TEMP RELAY:	Check if Applicable	e)	12.0					
	С	Found		°C	Left	°C		
	С	Found		°C	Left	°C		
EAULT PRESSURE REL	AY: (GAS D	ETECTOR) M	Iain Tank					
(_rm:		Found	Ta Bussell (17 17 17 17	(cc)	Left	(cc)		
Trip;		Found		(kp)	Left	(kpa)		
EALL TO DO EQUIDE DEL	437 (YAT T YA	E CAC DETE	CEOD II	0 1 1				
FAULT PRESSURE REL			CIOR) divert	er Switches	S (Check if Applicable)			
(Function test Control Circuits) Test	ed OK N	/A						
FAULT PRESSURE REL	EASE RELA	YS: (Function test	Control Circuit if Ar	nlicable)				
Main Tank: Tested Ok	Audi Walistin au	T. G. deliction test	condition chear in 115	pricable)		100 111 012 01		
Diverter Sw: A ph:Tested OK		Diverter Sw: B	ph:Tested OK	N/A	Diverter Sw: C	ph:Tested OKN/A		
- Anti-			SWEETS WEETS	set Second				
CONSERVATOR MAIN	TANK: (Functi	ion Test Low level Ala	arm) OK					
CONSERVATOR DIVER	TER SWITC	CHES: (Function 7	Test Low level Alarm) OK	William Special Control			
3.8		NCE CHECKS				D'I I		
-37	Line 1 – Line	cord in Mega Ohms of 2 Line	1/2-GND	readings > 500	Line 1 – Line 2	Line 1 / 2 GND		
Winding Temp Relay: Alarm	I have to	-540	FOT COSMIT	Trip	12 1 1	18.34		
Liquid Temp Relay: Alarm				Trip				
Fault Pressure Relay: Alarm (Main Tank)		100000000000000000000000000000000000000	147728	Trip				
Fault Pressure Relay: Alarm (In Line Diverter Switches)	edilai	ark (Ty fill)		Trip		MENTAL STATE		

REV NOV 26, 2013 Page 1 of3

6 YEAR PM – OLTC TRANSFORMER C/W DIVERTER SWITCHES

System ID:	Serial No.:					
Manufacturer:		Type:		M.V.A:	HILL COLOR	
Test Date:	Test	Completed By	/: fm	J.D.E. W/O #:	TO ALL	
beg magler	RESISTANC	E CHECKS: (including Wiring to Term	ninal Boards) 500 Volt Te	st	
			rd in Mega Ohms or N/	A (Acceptable readings >	500 Mega Ohms)	
	Asammide dinst	en l'espide	Line 1 – Line	2	Line 1 / 2 - GN	<u>D</u>
Conservator (Main tank) Oil level		Alarm				
Conservator (Diverter Sw's) Oil le		Alarm		V 1 3 1755	는 우리 만나다	a. Elli
Fault Pressure Release Relay (Div		-	ar grading.	EN 22		
Fault Pressure Release Relay (Div						
Fault Pressure Release Relay (Div	erter Sw C ph):	Trip		i en in		akari in
** Caution: Confirm all Prin	nary Protection	on Circuits are	open before Clos	sing Links.		
	(CHECK OIL L	EVELS (High, Norm	nal low)		
CONSERVATOR (MAIN T		1		R (DIVERTER S	WITCHES)	
HV BUSHINGS:	H1		12	H3	WITCHES)	
LV BUSHINGS:	X1		ζ2	X3		
				1.30		
	C	PERATING A	MPERAGE: (If A	opplicable)		
1 st STAGE FANS		nd STAGE F		AIN TANK CAB	INET HEATER	
	GROUN	D CONTINUIT	TY (RESISTANO	CE): (Micro-Ohms)		
NEUTRAL BUSHING:				()		
HV. ARRESTORS:	H1		H2		H3	
LV. ARRESTORS:	X1		X2		7 X3	
	1111				113	
		ON LOAD	TAP CHANGE	R		
TAP CHANGER COUNTE	R: 1	FOUND		LEFT		
CHECK LIMITS:		RAISE		LOWER		
AMPERAGE:		MOTOR		DE TON-10 18 V4 77 N 400 POST	ABINET HEATER	1. 0100
CHECK GEARS, CHAINS		Checked	OK:	- COMMINGE C	TIDITE TIDITE TO	
TRANFORMER WINDING		700 00 100-00 10				
						-
DII	ELECTRIC A	ABSORBTION	(5 KV): 10 MIN	I. ÷ 1 MIN. = IN	DEX	
H-LG	1 Min.	Meg	a Ω 10 Min.	Mega Ω	Index.	%
L-HG	1 Min.	Meg	a Ω 10 Min.	Mega Ω	Index.	%
HL-G	1 Min.	Meg	a Ω 10 Min.	Mega Ω	Index.	%
	al victori	4/4	· · · · · · · · · · · · · · · · · · ·		ing it spit it go	
		CORE GRO	UND: (500 Volt	test)		- Invited
Externally Connected Yes	No					4
RESISTOR: (Ohms)			CORE GRO	OUND: (Mega Ol	nms)	

REV NOV 26, 2013

PUB-NLH-082, Attachment 8 Page 17 of 26, Isl Int Sys Power Outages 6 YEAR PM – OLTC TRANSFORMER C/W DIVERTER SWITCHES

	System ID:	Station:	Serial No.:						
	Manufacturer:	Type:	M.V.A:						
	Test Date:	Test Completed By: _	J.D.E. W/O #:						
	RU	ST/PAINT CONDITION (A	- Minor, B – Moderate, C – Severe)						
	MAIN TANK: RADIATORS:								
CON	TROL CABINET:		OTHER:						
Do	Manually Operate FarCheck Oil Filtering U	ators for chips or cracks ators for chips or cracks ns Jnit (type 51) {check Oil Pres BBKTS T3, HRDTS T8 & WYes No LY IF INSTRUCTED: nalysis Sample Ratio Readings	Silica Gel Checked replace if 50% or more Contaminated Visual Check for Dirty Insulators & Clean if required Check Conservator Tanks for water, drain if necessary sure gauge} Replace Filter if Required AVTS T5 ONLY)						
8 - S	****								
	CONTRACTOR								
	<u> </u>								
		3. 12							

REV NOV 26, 2013

PUB-NLH-082, Attachment 8 Page 18 of 26, Isl Int Sys Power Outages

6 YEAR PM - OLTC TRANSFORMER C/W TAP CHANGER COMPARTMENT

System ID: Manufacturer: Test Date: T	Type:	1 1	erial No.: M.V.A:	
NOTE: All TESTS MUST BE COM				
WEATHER CONDITIONS: dry:	rain:	numidity ambi	ent temperature:°C	
DIELECTRIC OIL TEST ASTM D-18	316 (kV): Conservato	or Tank:Tap	Changer Compartment:	21 2000
	WINDING TEMP RE	LAY: (Check if Applicabl	e)	of month
First Stage Fans: Setting: °C	Found	°C	Left	°C
Second Stage Fans: Setting: °C	Found	°C	Left	°C
Alarm: Setting: °C	Found	°C	Left	°C
Trip: Setting: °C	Found	°C	Left described a level of the	°C
		1 40 5		
	LIQUID TEMP REI		5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	production of
Alarm: Setting: °C	Found	°C	Left	°C
Trip: Setting: °C	Found	°C	Left	°C
FAIIITP	RESSURE RELAY: (GAS DETECTOR)	Main Tank	J. F. W. G. T.
Alarm:	Found	(cc)	Left	(cc)
	Found	(kpa)	Left	(kpa)
FAULT PRESSU	RE RELAY: (GAS DI	ETECTOR) Tap Ch	anger Compartment	
Trip:	Found	(kpa)	Left	(kpa)
77.4.7.7				
······································	PRESSURE RELEA			27/4
Function Test Control Circuit: Main	Tank: Tested Ok l	N/A Tap Chan	nger Compartment Tested ok _	_ N/A
	CONSERVA	TOR TANK:		
Function Test Low Level Alarm: OK	COLODICITA			

REV NOV 26, 2013 Sheet 1 of 3

6 YEAR PM - OLTC TRANSFORMER C/W TAP CHANGER COMPARTMENT

System ID:	e Cilpitals	Station:_			Serial No.:				
Manufacturer:	r: Tyj e: Test Comple		ype: M.V.A:		M.V.A:				
Test Date	1est	Completed	Бу:		J.D.E. W/O #:	11 (25)			
Mana	RESISTANCE CHECKS								
	g Wiring to To					7			
Test & record in	Mega Ohm					sample and a			
			ne 1-lin	e 2 Line	1/2-GND	15			
Winding Temp Relay:		arm		hina a a d	X 11 E 11 1 A 11 2 1				
		Trip							
Liquid Temp Relay:		arm		Name of the					
		Trip				a figure (40) out to			
Fault Pressure Relay (Main						15 64 pm			
		Trip			-10, 11 1				
Fault Pressure Relay (T/Cha					41 200	N			
	THE RESERVE OF THE PARTY OF THE	Trip							
Conservator O/L Gauge:		arm		ESPEC OF	74 J				
** Caution: Confirm all Prir	nary Protection	on Circuits	are ope	n before Closi	ng Links.				
		OIL LE	VELS;	(High, Normal, Lov	v)				
CONSERVATOR TANK:	Aller Compact				COMPARTMEN	VT:			
HV BUSHINGS:	H1		H2		H3		r endula		
LV BUSHINGS:	X1		X2		X3				

1.17	0	PERATING	G AMP	ERAGE: (If Ap	plicable)				
1 st STAGE FANS	2	2 nd STAGE	E FANS	MA	IN TANK CAB	INET HEATER			
	GROUND	CONTINU	JITY (RESISTANCI	E): (Micro-Ohms)				
NEUTRAL BUSHING:					2 / (timete cinns)	Tree of the control of	7		
HV. ARRESTORS:	H1	And a series		H2	1 31	Н3			
LV. ARRESTORS:	X1	y IVI	f Bull	X2		X3			
						dance Lucia	Y III WALL		
	District Co.	ON LO	AD TA	P CHANGER	2				
TAP CHANGER COUNTE	R: I	FOUND			LEFT				
CHECK LIMITS:]	HIGH			LOW				
AMPERAGE:]	MOTOR			CONTROL C	ABINET HEATER	₹		
CHECK GEARS, CHAINS	or BELTS:	Chec	ked Ok	C :					
TRANFORMER WINDING	RESISTAN	CE: Com	pleted '	Yes: No:					
				- · · · · · · · · · · · · · · · · · · ·					
					$\div 1 \text{ MIN.} = \text{INI}$				
H-LG	1 Min.		Mega Ω	10 Min.	Mega Ω	Index.	%		
L-HG	1 Min.	-	Mega Ω	10 Min.	Mega Ω	Index.	%		
HL-G	1 Min.		Mega Ω	10 Min.	Mega Ω	Index.	%		

REV NOV 26, 2013

PUB-NLH-082, Attachment 8

Page 20 of 26, Isl Int Sys Power Outages 6 YEAR PM – OLTC TRANSFORMER C/W TAP CHANGER COMPARTMENT

	stem ID:							
	facturer:est Date:	Type: Test Completed By: _						
Management	And the second s	CORE GROUN	D: (500 Volt test)					
Externally Co.	nnected YesNo _		D. (500 Voic test)					
RESISTOR: (CORE GROUND: (Mega Ohms)					
	RUSTA	PAINT CONDITION (A	- Minor, B – Moderate, C – Severe)					
MAIN TANK			RADIATORS:					
CONTROL C	ABINET:		OTHER:					
Check Ladde Check Manu	k Explosion Vent k HV & LV Connec er Guards	rs for chips or cracks	Silica Gel Checked replace if 50% or more Contaminated Visual Check For Dirty Insulators & Clean if required Check Conservator For Water & Drain if Necessary					
	CHECKS COMPLETED ONLY IF INSTRUCTED: Obtain Gas Analysis Sample Transformer Ratio Readings Capacitive Bridge Testing							
COMMENTS	2.	34.3 43.44 2 5 3.3						
			200 100					
100								
}								
		i i						
		300						

REV NOV 26, 2013

PUB-NLH-082, Attachment 8

Page 21 of 26, Isl Int Sys Power Outages 6 YEAR PM – TRANSFORMER C/W CONSERVATOR TANK

System ID:	Alta Aleie	Station:	S	erial No.:	
Manufacturer:		Type:		M.V.A:	
Test Date:	T	est Completed By:	J.D.I	E. W/O #:	
NOTE: All TESTS MUST BE	COM	PLETED OR MARK	KED N/A (Unless C	Otherwise Ins	tructed).
WEATHER CONDITIONS: DIELECTRIC OIL TEST ASTI			numidity:	ambient te	mperature:0C
QUITE A WEST TOO	V	VINDING TEMP REI	LAY: (Check if Applicab	le)	315 42 3 13 43 1
First Stage Fans: Setting:	°C	Found	°C	Left	°C
Second Stage Fans: Setting:	°C	Found	°C	Left	°C
Alarm: Setting: °C		Found	°C	Left	°C
Trip: Setting: °C	111	Found	°C	Left	°C
(4.2		LIQUID TEMP REL	AY: (Check if Applicable	,	540 97 31 341
Alarm: Setting: °C		Found	°С	Left	°C
Trip: Setting:°C		Found	°C	Left	°C
	ERELA	Y: (GAS DETECTO	OR) (In Line or Top		Check if Applicable)
Alarm: Setting: (cc)		Found	(cc)	Left	(cc)
Trip; Setting: (kpa)		Found	(kpa)	Left	(kpa)
F	AULT	PRESSURE RELEAS	SE DEVICE: (Check	if Applicable)	
Function Test Control Circuit:		ted Ok N/A		и присава у	
Function Test Low level Alarr	n: OK	CONSERVA	TOR TANK		
Tunction Test Low level Alari	ii. OK_				
	RES	STANCE CHECKS	181 1 27-1		
		to Terminal Boards) 500			and a continue of the continue
1 est & record in Mega	Dr N/A (Acceptable Read Line 1-line 2	Line 1/2 - (The Astronomy Street	
Winding Temp Relay: Alarm	n	Eme 1-me 2	Line 1/2 - (JIND	
Trip					
Liquid Temp Relay: Alarn	1				
Trip		11 11/7 1 1 4			
Fault Pressure Relay: Alarm	1				
Trip					
Conservator O/L Gauge: Alarn	n				
** Caution: Confirm all Primar	y Prote	ction Circuits are ope	n before Closing Lin	nks.	
0		OIL LEVELS;	(High Normal I)		
Conservator Tank :		OIL LEVELS, ((might, Normal, Low)		S-140 100 100 100 100 100 100 100 100 100
Consolvator rank.					

REV NOV 27, 2013

PUB-NLH-082, Attachment 8 Page 22 of 26, Isl Int Sys Power Outages

6 YEAR PM - TRANSFORMER C/W CONSERVATOR TANK

Manufacturer:	Station: Type: Test Completed By:		M.V.A:			
HV BUSHINGS:	H1 X1	President Auf 1731	H2		H3	
LV BUSHINGS:	XI	NOTHER F	X2		X3	LES-IL-FREIWE
	OD.	ERATING AMPER	ACE: AND IS	1 11 11 11 11 11 11 11 11		
1 at STACE HANG.	OF				THE ATTENT	
1 st STAGE FANS;	TO (ONII M)	2 nd STAGE FANS)		T HEATER	
PUMPS: HRDTS T1,T2,	13 (ONLY)	1 st STAGE:		2 nd STA	AGE:	1 1 1 1 1 1 1 1 1
	Mal		<u>l</u>	p.0		mark to junish.
	GROUN	ID CONTINUITY (RESISTANCE): (Micro-Ohms)		Simuster (g. 11
NEUTRAL BUSHING:	3000					II.
HV. ARRESTORS:	H1	THE RESERVE OF STREET	H2		H3	
LV.ARRESTORS:	X1		X2		X3	
(If Applicable)						
	OFF LOAD	TAP CHANGER LO	OCATION: (Lo	cated on the HV Windi	ng)	
Tap Position:		Found	,	Left		
Off load Tap Changer (C	Confirm Mecha	anical Center):				
Transformer Winding Re	sistance: Form	Completed Yes	No	* * * * * * * * * * * * * * * * * * * *		
		in a second				
DIELE	CTRIC ABSO	ORBTION (5 KV):	10 MIN. DIVI	DED BY 1 MIN	I. = INDEX	
H-LG	1 Min.	Mega Ω	10 Min.	Mega Ω	Index.	%
L-HG	1 Min.	Mega Ω	10 Min.	Mega Ω	Index.	%
HL-G	1 Min.		10 Min.		Index.	%
		CORE GROUND) (500 Volt te	et)		
Externally Connected Yes	No	CORE GROOME	. (500 1011 10	3t <i>)</i>	3. 3. 333	
RESISTOR: (Ohms)	No		CORE GROI	JND: (Mega O	hme)	
RESISTOR. (OIIIIs)	Tire.		COKE ONOC	ordo. (Iviega O	111113)	
	RUST/PAIN	T CONDITION (A	- Minor , B - N	Moderate, C – S	Severe)	ACTOR OF STREET
MAIN TANK:			RADIATORS	S:	-17	

CHECKS COMPLETED:

PUB-NLH-082, Attachment 8 Page 23 of 26, Isl Int Sys Power Outages 6 YEAR PM – TRANSFORMER C/W CONSERVATOR TANK

	System ID: Manufacturer: Test Date:		M.V.A:
	Check Explosion Vent Check HV & LV Cont Ladder Guards Check Porcelain Insula Manually Operate Fan Pumps HRDTS, T1,T Doble Test Performed	ators for chips or cracks s - 2,T3	Silica Gel Checked replace if 50% or more ContaminatedVisual Check For Dirty Insulators & Clean if NecessaryCheck Conservator For Water & Drain if Necessary
CHEC	CKS COMPLETED ONI Obtain Gas An Transformer R Capacitive Brid	alysis Sample atio Readings	
COMI	MENTS:		
0-	****		
	3000 1000		
	-		

REV NOV 27, 2013

Page 24 of 26, Isl Int Sys Power Outages 6 YEAR PM – TRANSFORMER (SEALED TANK TYPE) INSPECTION

System ID:					A. mariez
Manufacturer:		Туре:		M.V.A: _	
Test Date:	Te	est Completed By:	J.D.1	E. W/O #: _	0.011 1-12
NOTE: All TESTS MUST: Sheet 1 of 2 WEATHER CONDITIONS: DIELECTRIC OIL TEST AS	dry:	rain:	humidity:	ambient t	emperature: ⁰ C
			RELAY: (Check if Applicab		1-12-15/10/10/10/10/10/10/10/10/10/10/10/10/10/
First Stage Fans: Setting:	°C	Found	°C	Left	°C
Second Stage Fans Setting:_	°C	Found	°C	Left	°C
Alarm: Setting: °C		Found	°C	Left	°C
Trip: Setting: °C	1981	Found	°C	Left	°C
		I IOI IID TEMB DI	ELAY: (Check if Applicable	<u> </u>	26 12 27
Alarm: Setting: °C		Found	°C	Left	°C
			°C		°C
Trip: Setting: °C		Found	17 77 1 21 11 17	Left	
	FAUI	T PRESSURE RE	ELAY: (GAS DETEC	TOR)	
Function Test control Circuit			of things		I I I
27 341		39.75.1	T to gapli		
	. I	FAULT PRESSUR	E RELEASE DEVIC	E:	
Function Test Control Circuit	t: Test	ed Ok N/A	2-484 - 2 - 4843/2 ·		
VACUUM/PRESSURE GA	IICE: (VDA	Pressure	Zero	Vacu	111m
VACOUMIT RESSURE OA	UGE. (KPA) Flessure	Zelo	v act	iuiii
	RESI	STANCE CHECK	S		
	including Wiri	ng to Terminal Boards) 500	Volt Test		
Test & record	in Mega Ohms	or N/A (Acceptable readi	lings > 500 Mega Ohms) Line 1/2 - 0	CNID	- SERVICE STREET
Winding Temp Relay: Al	arm	Line 1-inie 2	Lille 1/2 - V	עאט	
Tr				99000	_
	arm			*	with the second of the second
Tr		winds			
	arm	12.1		V 10 11 5% 15	1 V 1 v 2 1 v 2 v 2
llη Tr		Z			
	arm			card griek	g of all one of the same
** Caution: Confirm all Prin	nary Protec	ction Circuits are o	pen before Closing Li	nks.	defeat un e
		OIL LEVEL	S(High , Normal , Low)	*****	
Main Tank:			eutral Bushing:	b. 10166660	
HV BUSHINGS:	H 1		H2		H3
BUSHINGS:	X1		X2		X3

PUB-NLH-082, Attachment 8 Page 25 of 26, Isl Int Sys Power Outages

6 YEAR PM - TRANSFORMER (SEALED TANK TYPE) INSPECTION

System ID: Manufacturer: Test Date:	Station: Type: Test Completed By:			M.V.A:	10 A		
Tost Duto.			-	J.D.E. 1170 II.			
Markey	unt a territorial cosc	do University		like galsketa			
1		RATING AMP					
1 st STAGE FANS;	2 nc	I STAGE FANS	<u>S:</u>	CABINE	ET HEATER		
	GROUND CO	ONTINITITY (RESISTANO	CE): (Micro-Ohms)			
NEUTRAL BUSHING:	GROOND C	SIVIII (REDID IT II I). (Wileto-Ollins)			
HV. ARRESTORS:	H1		H2	ilgan diga e	Н3	المراوات الما	
LV. ARRESTORS:	X1		X2		X3	y Latinese	
	and a			Tarring			
		D TAP CHANG	GER: (Located o	1			
Tap Position:	Fou			Left:			
Off load Tap Changer (Co							
Transformer Winding Res	istance: Complete	d Yes	No				
DIEI E	TTDIC ADCODDT	TON (5 VV).	10 MIN DIX	JIDED DV 1 MIN	I - INDEV	17.27	
H-LG	CTRIC ABSORBT 1 Min.		10 Min. DIV	Mega Ω	Index.	%	
L-HG	1 Min.	Mega Ω	10 Min.	Mega Ω	Index.	70	
HL-G	1 Min.	Mega Ω	10 Min.	Mega Ω	Index.	%	
112 0	1 1141111	mega sa		Iviega sa	maon.		
	C	ORE GROUND	D: (500 Volt	test)			
Externally Connected Yes_	No						
RESISTOR: (Ohms)			CORE GR	OUND: (Mega O	hms)	THE PARTY	
	RUST/PAINT CO	ONDITION (A	- Minor , B -	- Moderate, C – S	Severe)		
MAIN TANK:			RADIATO	RS:			
CONTROL CABINET:			OTHER:		11 12 21 12 12 12 12 12 12 12 12 12 12 1		
				E			
CHECKS COMPLETED:			CHE	CKS COMPLETE		ISTRUCTED:	
Manually Operate				Obtain Gas Ar			
Check HV & LV Ladder Guards	Connections			Transformer I Capacitive Bri	Ratio Readings		
Check porcelain is	neulators for chins	or cracks		Capacitive Bit	age resting		
	Dirty Insulators &		ssarv				
v isaar cheek i or	Dirty insurators a	Cicum ii ricco	our y				
COMMENTS:							
	-	- Alexander - Company		James and Control			
	30000			V 187 11	-18 W. 61	-	

REV NOV 26, 2013

PUB-NLH-082, Attachment 8

Page 26 of 26, Isl Int Sys Power Outages 6 YEAR PM -TRANSFORMER (SEALED TANK TYPE) INSPECTION

0	System ID: Manufacturer: Test Date:	Station: Type: Test Completed By:	Serial No.: M.V.A: J.D.E. W/O #:	

Current Transformers and Potential Transformers

CURRENT TRANSFORMER MAINTENANCE PROCEDURE

Page 1 of 1

CURRENT TRANSFORMERS - 12.5 KV AND UP

120 DAY GENERAL INSPECTION

- 1 Perform a general visual check of bushings, tanks and oil levels, if gauged.
- 2 Complete 120 Day-Current Transformer Inspection Form.

6 YEAR PM INSPECTION

- 3 Outage required.
- 4 Check conduit, fittings, and wiring connections.
- 5 Check porcelains for chips, cracks, cementing, and fastenings. Wipe down, if required.
- 6 Check for signs of overheating or flashovers.
- 7 Check oil levels, if gauged.
- 8 Do touch-up painting, if required.
- 9 Complete CT & PT 6 Year Current Transformer Inspection Form.
- 10 Perform Doble Test, if required.

POTENTIAL TRANSFORMER MAINTENANCE PROCEDURE

Page 1 of 2

POTENTIAL TRANSFORMERS

120 DAY GENERAL INSPECTION

- 1 Complete visual check of connections.
- 2 Completed visual check for leaking fluid.
- 3 Completed visual check for dirty insulators and external flashovers.
- 4 Check secondary voltages and record.
- 5 Complete 120 Day-Potential Transformer Inspection Form.

6 YEAR PM INSPECTION

- 6 Requires outage.
- 7 Check connections for position and tightness.
- 8 Check insulators and wipe down, if required.
- 9 Check for weeping or leaking units.
- 10 Check the grounding device.
- Open the door of the coupler box and inspect to confirm if conditions inside are normal.
- 12 Check gaskets and gap clearances.
- 13 Check heater operation, if so fitted.
- 14 Report excessive rusting.
- 15 Check conduit, fittings, and wiring connections.
- 16 Check porcelains for chips, cracks, cementing, fastenings; wipe down.
- 17 Check for signs of overheating and flashovers.
- 18 Check oil levels.
- 19 Complete touch-up painting, if required.

POTENTIAL TRANSFORMER MAINTENANCE PROCEDURE

Page 2 of 2

- 20 Complete 6 Year-Potential Transformer Inspection form.
- 21 Perform Doble test, if scheduled.

PUB-NLH-082, Attachment 9 120 DAY - CURRENT TRANSFORMER INSPECTION 8, Isl Int Sys Power Outages

Station:	Readings By:		Date:	
		RUST/PAIN	rel (Normal / High NT CONDITION (Moderate, C – Sev	A - Minor,
Tr.	Location	Phase A	Phase B	Phase C
-	,			
	- 175 · · · · · · · · · · · · · · · · · · ·	_		

		-		
	11.7.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.		,	
			3	
	_10			
	- 22			
		-		

1	715	TI	ΔΤ	INI	SDE	CT	ION:
- 3	LO	\mathbf{v}		TIAN) L L	\sim 1	LOIA.

Check Paint/Rust Condi	tion	Iank
------------------------	------	------

- ___ Check & report any Oil Leaks as per EERP
- (Environmental Emergency Response Plan)
- ___ Check Groundings & Terminations
- ___ Check Conduits & Cabinets
- ___Check Porcelain Insulators for Tracking or Cracks
- ___ Check Concrete Base

			Station:		I	Date:	
			Secondary Vo	ltage & Oil	Level (Normal	/ High / Lo	w)
		RUST/	PAINT COND	_		_	•
1			ase A		ase B		ase C
	Location	Oil Level	Sec. Voltage	Oil Level	Sec. Voltage	Oil Level	Sec. Voltage
	9						
	7.0 NO 700270						
		9					
	****	1					
_							
-							
_	-						

Station:	Read	ings By:		Date:				
	Class	Oil Level (Normal / High / Low) Rust Condition * Note: Class A-Small amount of Rust. (Clean with brush and touched up with paint, if possible). Class B-Remove unit from service within 12–24 months and refurbish Class C- Remove unit from service. ASAP (within same maintenance year) and replace unit						
	Pha	se A	Pha	se B	Pha	se C		
Location	Oil Level	Condition Rust Etc;	Oil Level	Condition Rust Etc;	Oil Level	Condition Rust Etc;		
Check for oil leak Check paint condi Check conduits & Check porcelain in	s tions cabinets nsulators for trad	_	Check pr	imary connecti	ons			
Check primary & Clean porcelain ir Test and read hear	secondary conr sulators if dirty ter amps (Recor Amp	d Heater						
	Location Location Location Location Check bushings & Check for oil leak Check paint condi Check porcelain in Check groundings Check groundings Check primary & Clean porcelain in Test and read hear	* Note: Class Class Class Pha Location Oil Level UAL INSPECTION: Check bushings & tanks Check for oil leaks Check paint conditions Check conduits & cabinets Check procelain insulators for trace Check groundings & terminations ECKS COMPLETED: Check primary & secondary connucted procelain insulators if dirty Test and read heater amps (Recons	* Note: Class A-Small amount Class B-Remove unit for Class C-Remove unit for Phase A Oil Level Condition Rust Etc; JAL INSPECTION: Check bushings & tanks Check for oil leaks Check onduits & cabinets Check paint conditions Check conduits & cabinets Check groundings & terminations Check groundings & terminations CKS COMPLETED: Check primary & secondary connections Clean porcelain insulators if dirty Test and read heater amps (Record Heater Amperage)	Value of the conditions and the conditions of the condition of the conditions of the	Oil Level (Normal / High / Low Rust Condition * Note: Class A-Small amount of Rust. (Clean with brush and tour Class B-Remove unit from service within 12-24 months a Class C-Remove unit from service, ASAP (within same n Phase A Phase B Oil Level Condition Rust Etc; Oil Level Condition Rust Etc; Oil Level Condition Rust Etc; Check bushings & tanks Check for oil leaks Check porcelain insulators for tracking Check groundings & terminations CKS COMPLETED: Check primary & secondary connections Clean porcelain insulators if dirty Test and read heater amps (Record Heater Amperage)	Oil Level (Normal / High / Low) Rust Condition * Note: Class A-Small amount of Rust. (Clean with bush and touched up with pain Class B-Remove unit from service, within 12-24 months and refurbish Class C-Remove unit from service, ASAP (within same maintenance year) Phase A Phase B Pha Condition Rust Etc; Oil Level Condition Rust Etc; Oil Level Condition Rust Etc; Check bushings & tanks Check for oil leaks Check primary connections Check conduits & cabinets Check procelain insulators for tracking Check groundings & terminations CKS COMPLETED: Check primary & secondary connections Clean porcelain insulators if dirty Test and read heater amps (Record Heater Amperage)		

PUB-NLH-082, Attachment 9 6 YEAR - POTENTIAL TRANSFORMER INSPECTION 8, Isl Int Sys Power Outages

Readings By:		Station:		D	ate:		
		0	(17)	nal / High / Lov ondition	v)		
	Class	B-Remove unit f	at of Rust. (Clean with brush and touched up with paint, if possible) from service within 12–24 months and refurbish from service, ASAP (within same maintenance year) and replace				
	Pha	se A	Phase B		Pha	se C	
Location	Oil Level	Condition Rust Etc;	Oil Level	Condition Rust Etc;	Oil Level	Condition Rust Etc:	
UAL INSPECTION: Check bushings & Check for oil leak Check paint cond Check concrete b Check primary co	cs lition ase		Check co	orcelain insulated or cabir or	et	g	
ECKS COMPLETED Check secondary Clean & lubricate Test and read hea	connections e ground switche ater amps (Recor	d Heater		arge gap rimary and seco orcelain insulate		ions	
ble Test Preformed:		perage)					

REV NOV 26, 2013

Protection and Control

6 YEAR PM INSPECTION

1 Equipment outage required.

PROTECTIVE RELAY FUNCTION TESTING

- 2 Function test each protective relay one at a time.
- 3 For each relay:
 - a. Using appropriate drawings, identify the locations where the protection circuit will be blocked
 - b. Block the protection circuit.
 - c. If required, remove the relay from the panel.
 - d. Connect the relay test equipment to the relay.
 - e. Configure the relay test equipment settings to those required for the relay.
 - f. Function test each in-service function of the relay using the relay test equipment.
 - g. Troubleshoot the relay if it fails any function tests.
 - h. Record and save the results in the relay testing software.
 - i. Un-block the protection circuit.

PROTECTION CIRCUIT FUNCTION TESTING

- 4 Function test each protection circuit one at a time.
- 5 For each protection circuit:
 - a. Using appropriate drawings, identify the locations where the protection circuit will be blocked
 - b. Block the protection circuit.
 - c. Operate the relay (or jumper out the relay contacts if the relay has already been function tested)
 - d. Verify the function of the circuit.
 - e. Troubleshoot the protection circuit if it fails any function tests.
 - f. Un-block the protection circuit.