

SCHNEIDER AUTOMATIC CIRCUIT RECLOSER JOB SAFETY ANALYSIS



Title: Schneider Automatic Circuit Recloser Job Safety Analysis

Purpose and Scope: This document describes the tests to be carried out before accepting a new or repaired N and W series Schneider Automatic Circuit Recloser.

Staffing Resources: Staff will have the minimum requirement of an Electrical Fitter / Mechanic Licence and be trained in the safe use of the required test equipment.

Documentation/References:

[CS000501F115](#). Daily / Task Risk Management Plan (Form)

[ES000901R102](#). Health and Safety Risk Control Guide (Reference)

[MN000301R102](#). On Load and Directional Verification Test (Reference)

[MN000301R165](#). 8 Level Field Test Competency (Reference)

[MN000301W107](#). Commission New and Augmented High Voltage Plant (Work Instruction)

[P53](#). Operate the Network (Enterprise Process)

[SWMS007](#). Live Work - Low Voltage SWMS (Safe Work Method Statement)

[SP0233R01](#). Schneider Automatic Circuit Recloser Job Safety Analysis (Reference)

[SP0233R02](#). Workshop Assembly, Testing, Field Installation and Commissioning of Schneider Automatic Circuit Reclosers (Reference)

[SP0506](#). Substation Primary Plant and Secondary Systems Field Testing SWP (Standard Work Practice)

AEMO – Power System Security Guidelines SO_OP3715

[AM-P-STD-002A Auto-Reclose Standards](#)

AS 1931.1-1996 High Voltage Test Techniques

AS 2067-2008 Substations and High Voltage Installations Exceeding 1 kV AC

AS 2650-2005 Common Specifications for High Voltage Switchgear and Control Gear Standards

AS 62271.100-2008 High Voltage Switchgear and Control Gear

Customer Test Procedures – N Series CaPM4

National Electricity Rules

National Electricity Network Safety Code

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Key Tools and Equipment:

- Test and Training Set (TTS)
- Secondary Voltage Injection Interface Set (SVIIS)
- Gas Fill Adaptor
- HV test equipment
- High Voltage Insulation Test Set-5/10KV insulation tester
- Micrometer.
- High current injection equipment
- Variable AC or DC voltage supply as required
- Calibrated clamp meter
- Automated secondary injection test set and test software i.e. Omicron CMC, Doble F6 series or equivalent
- Hot Tong and link stick
- Insulated test leads and test blocks
- Manufacturers software to communicate with and configure CaPM under test
- Switchboard Rescue kit
- LV mats, covers, barriers as required
- Class 00 Low voltage gloves
- Dry chemical fire extinguisher

Development Team: Paul Blyth, Tony Lenz, Dean Maltby, Robert Bates and Helena Tholsgard	Date Completed: 15 March 2012
Reviewed By: Nathan Seshachalam and Rob Bayliss	Date Completed: 5 April 2012
Related SWP/SWMS Nos: SP0233, SWMS001 and SWMS006	SWP/SWMS Owner Approval: Brian Bowthorpe, Group Manager Energy Network Services

Key Stakeholders:

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Task No.	Task Step	Hazard	Associated Risk	Consequence	Likelihood	Inherent Risk Score (Without control measures)
1	Carry out an on site risk assessment - Completing the DTRMP.	Incomplete or incorrect assessment of work activity and hazards.	a. Harm to personnel, plant and equipment and environment occurring through inadequate implementation of control measures.	Major	Likely	High
2	Preliminary Checks - Uncrating the Schneider ACR.	Inadvertent contact with crating material.	a. Harm to personnel through contact with crating material causing cuts and lacerations.	Moderate	Likely	High
	Preliminary Checks - Moving the Schneider ACR for testing.	Inadvertent impact of Schneider ACR equipment during lifting and moving.	b. Harm to personnel, plant and equipment through uncontrolled discharge of kinetic and/or potential energy resulting in crushing.	Major	Possible	High
		Inadvertent damage to rigging equipment during lifting.	c. Damage to rigging equipment through oversteering;	Major	Possible	High
		Inadvertent release of a controlled gas.	d. Harm to the environment through the release of SF6 gas if the main tank is punctured.	Moderate	Unlikely	Medium
	Preliminary Checks - Power supply	Inadvertent damage to batteries and personnel.	e. Harm to personnel, plant and equipment caused through the shorting of batteries or alternative supply.	Moderate	Possible	Medium
		Inadvertent damage to the PTCC.	f. Harm to plant and equipment through reverse polarity of the batteries or alternative supply.	Minor	Possible	Medium
	Preliminary Checks - Gas pressure	Inadvertent workshop conditions.	g. Harm to personnel occurring from slips, trips and falls as a result of poor housekeeping.	Moderate	Possible	Medium
	Preliminary Checks - Switchgear information display.	Inadvertent workshop conditions.	h. Harm to personnel occurring from slips, trips and falls as a result of poor housekeeping.	Moderate	Possible	Medium
	Preliminary Checks - Physical damage	Inadvertent workshop conditions.	i. Harm to personnel occurring from slips, trips and falls as a result of poor housekeeping.	Moderate	Possible	Medium
3	Contact Resistance	Inadvertent contact with test equipment whilst energised.	a. Harm to personnel, plant and equipment through uncontrolled discharge of electrical energy causing minor shock and discomfort.	Major	Possible	High
		Inadvertent contact with heated equipment.	b. Harm to personnel, plant and equipment through contact with equipment heated by high test currents causing discomfort.	Moderate	Possible	Medium

Check this is the latest Process Zone version before use.

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Task No.	Task Step	Hazard	Associated Risk	Consequence	Likelihood	Inherent Risk Score (Without control measures)
4	Insulation Resistance	Inadvertent contact with test equipment whilst energised.	a. Harm to personnel, plant and equipment through uncontrolled discharge of electrical energy causing minor shock and discomfort.	Moderate	Possible	Medium
5	High Voltage Withstand	Inadvertent contact with test equipment whilst energised.	a. Harm to personnel, plant and equipment through uncontrolled discharge of electrical energy causing major shock and burns.	Major	Possible	High
6	Primary Injection	Inadvertent contact with test equipment whilst energised.	a. Harm to personnel, plant and equipment through uncontrolled discharge of electrical energy causing minor shock and discomfort.	Major	Possible	High
		Inadvertent contact with heated equipment.	b. Harm to personnel, plant and equipment through contact with equipment heated by high test currents causing discomfort.	Moderate	Possible	Medium
7	Secondary Tests	Inadvertent contact with live low test voltages and high test currents.	a. Harm to personnel, plant and equipment through discharge of electrical energy causing minor shock and discomfort.	Moderate	Possible	Medium
8	On Load Checks	Falls from height whilst accessing CaPM.	a. Harm to personnel, plant and equipment through the uncontrolled release of potential energy from working aloft.	Major	Possible	High
		Inadvertent impact from falling objects eg, hot tong and fuse holders.	b. Harm to personnel, plant and equipment through the uncontrolled release of potential energy from objects falling from above.	Major	Likely	High
		General environmental hazards.	c. Harm to personnel from extreme environmental elements such as sun burn, heat stress, cold, insect bites and stings.	Moderate	Likely	High
		Surface conditions	d. Harm to personnel occurring from slips, trips and falls from uneven and slippery surfaces.	Moderate	Possible	Medium
		Working near roadways.	e. Harm to personnel through contact with vehicles.	Major	Possible	High

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Control Measures

Task No.	Elimination	Isolation	Substitution	Engineering	Administration	Personal Protective Equipment	Consequence	Likelihood	Residual Risk Score (Control measures implemented)
1a			Carry out work in more suitable location.	Correct lighting levels; Appropriate work space and access requirements;	CS000501F115 Daily / Task Risk Management Plan; Complete a toolbox talk on activities being performed; ES000901R102 Health and Safety Risk Control Guide. SP0506R01 Carry Out Field Testing JSA. Appropriate house keeping.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
2a					Manual handling training.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
2b 2c			Plan test procedure to minimise use of heavy equipment	Use appropriate rigging and lifting aids such as forklifts, trolleys and cranes.	Manual handling training.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
2d						CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
2e				LV shrouding.	Secondary isolation.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low

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Task No.	Elimination	Isolation	Substitution	Engineering	Administration	Personal Protective Equipment	Consequence	Likelihood	Residual Risk Score (Control measures implemented)
2f					SP0506R01 Carry Out Field Testing JSA. Appropriate house keeping.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
2g 2h 2i						CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
3a					Use of barricades and barriers, warning signs; Only staff actually conducting test permitted within test area; Isolate all test equipment from supply prior to attaching, adjusting or removing any test connections.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
3b					Use of barricades and barriers, warning signs; Allow equipment to cool.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
4a					Use of barricades and barriers, warning signs; Discharge stored energy.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low

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Task No.	Elimination	Isolation	Substitution	Engineering	Administration	Personal Protective Equipment	Consequence	Likelihood	Residual Risk Score (Control measures implemented)
5a				High Voltage test bay interlocking.	Use of barricades and barriers, warning signs; Discharge stored energy; High Voltage test bay procedures.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Rare	Very Low
6a					Use of barricades and barriers, warning signs; Only staff actually conducting test permitted within test area; Isolate all test equipment from supply prior to attaching, adjusting or removing any test connections.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
6b					Use of barricades and barriers, warning signs; Allow equipment to cool.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
7a					Use of barricades and barriers, warning signs; Only staff actually conducting test permitted within test area; Isolate all test equipment from supply prior to attaching, adjusting or removing any test connections.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low

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Task No.	Elimination	Isolation	Substitution	Engineering	Administration	Personal Protective Equipment	Consequence	Likelihood	Residual Risk Score (Control measures implemented)
8a					Working at heights training; Site specific WHS plans; Work activity assessments, routine inspection and maintenance of equipment.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
8b			Use EWP instead of ladder	Use appropriate link stick fittings.		CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
8c					SP0506R01 Carry Out Field Testing JSA.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
8d					Work activity assessment.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants.	Minor	Unlikely	Low
8e					Plan work to avoid roadways and other work crews; Level 2 Traffic Control training; BS001409R100 Working On Roadways manual; Local induction. Accompanied by site representative; Site specific WHS plan.	CS000501R110 Field / Workshop Personal Protective Equipment; Long cotton shirt / pants; High Visibility attire.	Minor	Unlikely	Low

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Risk Likelihood Table

Likelihood Rating	Definition of Likelihood of Occurrence Rating
Almost Certain	(1) Reasonably expected to occur (<12 months) (2) Will occur in most circumstances
Likely	(1) Likely to occur within next 3 years (2) Probably occur in near future
Possible	(1) Likely to occur within next 10 years (2) Might occur at some time
Unlikely	(1) Not specifically expected to occur but may occur some time in future (<10 years) (2) May occur in exceptional circumstances
Rare	(1) Foreseeable but not normally expected to occur (>10 years) (2) Requires a chain of related unlikely events to occur

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Consequence Table

Primary Impacts	Definitions of Consequence Impact Rating				
	Catastrophic	Major	Moderate	Minor	Insignificant
Health & Safety	<ul style="list-style-type: none"> • Circumstances that lead to a Single Fatality. 	<ul style="list-style-type: none"> • Circumstances that lead to Serious Injury, Hospitalisation, Lost Time Injury. 	<ul style="list-style-type: none"> • Circumstances that lead to First Aid being required. 	<ul style="list-style-type: none"> • Circumstances that lead to a Near Miss. 	<ul style="list-style-type: none"> • Not applicable.
Environmental	<ul style="list-style-type: none"> • Long term impact to sensitive environments. Negative widespread national and international media coverage. • Emergency response involving external emergency services. 	<ul style="list-style-type: none"> • Medium term impact to sensitive or non-sensitive environments. • Negative state media coverage. 	<ul style="list-style-type: none"> • Moderate impacts to non-sensitive environments or minor impact to sensitive environments. • Many complaints received from community and customers. 	<ul style="list-style-type: none"> • Minor impacts to non-sensitive environments. • Isolated community and customer complaints. 	<ul style="list-style-type: none"> • Incident contained on-site. • Impact tolerated without complaints.
Financial	<ul style="list-style-type: none"> • >\$20M 	<ul style="list-style-type: none"> • \$5M to \$20M 	<ul style="list-style-type: none"> • \$1M to \$5M 	<ul style="list-style-type: none"> • \$200,000 to \$1M 	<ul style="list-style-type: none"> • <\$200,000
Corporate Reputation	<ul style="list-style-type: none"> • Parliamentary inquiry. • Shareholder intervention. 	<ul style="list-style-type: none"> • Formal ministerial direction. • Highly critical and sustained publicity. • State-wide media coverage. 	<ul style="list-style-type: none"> • Negative questions on notice in Parliament. • Negative questions at local council. • Critical but not sustained publicity and media coverage. 	<ul style="list-style-type: none"> • Single local issue that has potential to spread if not managed quickly. • Community outrage results in reprioritising work program. 	<ul style="list-style-type: none"> • Low level Parliamentary question. • GM Service Delivery involvement and adverse media reports.
Legal & Regulatory	<ul style="list-style-type: none"> • Prosecution of Directors & or Managers. • Loss of operating licence. 	<ul style="list-style-type: none"> • Prosecution of Company / Regulatory Penalty. 	<ul style="list-style-type: none"> • Major Adverse Audit Report leading to significant works required. • Regulatory Improvement Notice or Fine. 	<ul style="list-style-type: none"> • Minor Adverse Audit Report leading to minor works required. 	<ul style="list-style-type: none"> • Minor Adverse Audit Report with no material ongoing impact.
Reliability & Service Delivery	<ul style="list-style-type: none"> • Outage duration greater than 40,000,000 customer minutes. • Business terminating interruption to major customer (>10MW). 	<ul style="list-style-type: none"> • Outage duration 5,000,000 to 40,000,000 customer minutes. • Major financial loss (>\$5M) to major customer. 	<ul style="list-style-type: none"> • Outage duration 1,000,000 to 5,000,000 customer minutes. • Significant financial loss (\$1M to \$5M) to major customer. 	<ul style="list-style-type: none"> • Outage duration 200,000 to 1,000,000 customer minutes. • Financial loss (<\$1M) to major customer. 	<ul style="list-style-type: none"> • Outage duration less than 200,000 customer minutes.

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Level of Risk Matrix

Likelihood \ Consequence	Rare	Unlikely	Possible	Likely	Almost Certain
Catastrophic	Medium	High	High	Extreme	Extreme
Major	Medium	Medium	High	High	Extreme
Moderate	Low	Medium	Medium	High	High
Minor	Very Low	Low	Medium	Medium	Medium
Insignificant	Very Low	Very Low	Low	Medium	Medium

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Risk Tolerance / Acceptability Table

RISK TOLERABILITY CRITERIA, APPROVAL & ACTION REQUIREMENTS					
LEVEL of RISK	RISK APPROVAL		ACTION REQUIREMENTS		
	POSITION	REPORTING	ACTION		
Extreme - Intolerable (stop exposure immediately)			Immediate action required, needs active management - introduce new or changed risk controls to reduce the RESIDUAL level of risk to the Tolerable Range.		
Tolerable Range	High	ALARP (Risk in this range managed to "as low as reasonably practicable")	Executive General Manager Approval (required to continue High RESIDUAL risk exposure)	Monthly Report	High INHERENT Risks and above to be reported monthly to Business Risk & Compliance for inclusion in a Consolidated Business Unit / Corporate Risk Profile. Needs active management - introduce new or changed risk controls based on Cost-Benefit Analysis and ALARP to reduce level of risk.
	Medium		Group / General Manager Approval (required to continue Medium RESIDUAL risk exposure)	Monthly Report	Medium INHERENT Risks and above to be reported monthly to Business Unit EGM for inclusion in Business Unit Risk Profile. Needs regular monitoring - monitor risks in conjunction with review of the effectiveness of the existing controls. Introduce new or changed risk controls based on Cost-Benefit Analysis and ALARP.
	Low		Line Manger Approval (required to continue Low RESIDUAL risk exposure)		Monthly risk review at workgroup level of all Low risks and above. Needs control review - monitor risks in conjunction with review of existing control procedures.
	Very Low	No Approval Required		Periodic review of the risk and effectiveness of the existing controls.	