

19.06.2025  
(1000 hrs - 1030 hrs)

# **Overcoming Challenges in Brownfield HV Sites- Navigating Risks and Legacy infrastructure**

by  
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Principal Electrical Engineer

# HVOs and SHVOs

- Stringent Training Procedures are in Place while making an Electrician a competent HVO and/or SHVO
- They write complex Switching Programs and execute critical Switching ops to Aus Regulatory requirement
- Strategic thinking

# Isolation Procedure and Switching Program

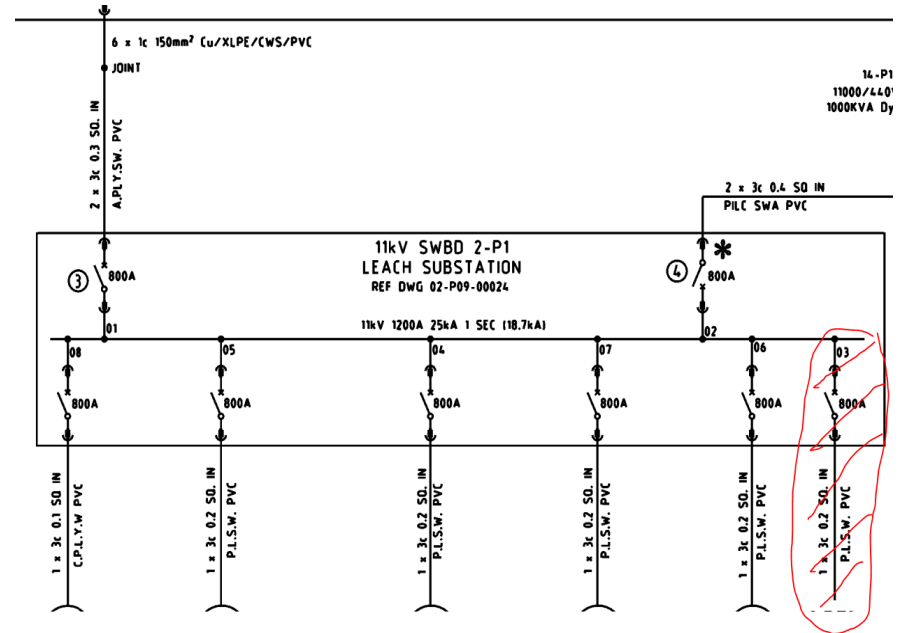


**HIGH VOLTAGE  
ISOLATION**

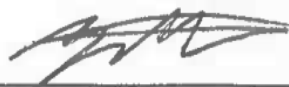


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Authorised Person
Date
Time
Isolation Point no.
Switching Program No

# Redundant Equipment, Isolation Tag and Updating the Blue Print



# HV Switching Program

Switching Level (Circle)	1	2	3
	Single Point, No Elect Access	Single Point, Elect Access	Complex
Approval Sequence	Print	Sign	Date
(1) Written By: (HVO)	Mark Patroni		6/9/21
(2) Checked By: (Alternate HVO)	Kane Robinson		6/9/21
(3) Final Check & Approval (SHVO)	Hoani Stevens		6/9/21

# Missing Steps in the Switching Program – 06.09.2021

6.	MP, 6A	33#3 Substation Switchgear Remote Operating Panel	11kV	VCB	33-B2 Bustie	Racked In	Remotely Rack OUT	Racked Out	0545
7.		33#3 Substation	11kV	VCB	33-B2 Bustie		Remove door, disconnect umbilical, remove breaker on trolley for testing		0547
8.		33#3 Substation	11kV	VCB	33-B2 Bustie		Replace door during testing		0547
9.									
RESTORATION									
10.	MP, 6A	33#3 Substation	11kV	VCB	33-B2 <del>33-B2</del> Bustie		Confirm breaker is open (OFF) prior to insertion	Open	0731

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**Title: HIGH VOLTAGE SWITCHING PROGRAM**

**Program eDOCS No: 10029972**

**Doc No: NIW-NWO-FRM-0021**

**Version: 3.0**

**Criticality Assessment: Critical**

**Next Review Date: 22.01.2022**

**Program No:** \_\_\_\_\_

**Sheet** 3 **of** 3

Item	HVO	Location	Volt	Type	Identification	Current Status	Instruction	Verified Status	Time
11.	MP, 6A	33#3 Substation	11kV	VCB	33-B2 <del>33-B2</del> Bustie		Insert breaker, connect umbilical and replace door		0731
12.		33#3 Substation Switchgear Remote Operating Panel	11kV	VCB	33-B2 <del>33-B2</del> Bustie	Racked OUT	Remotely rack IN	Racked IN	0732
13.		33#3 Substation Switchgear Remote Operating Panel	11kV	VCB	33-B2 <del>33-B2</del> Bustie	OFF	Remotely close	ON	0732

# Risk with Unfamiliar people – Network Issue

- RA of incompetencies and unfamiliar people
- Significant Risk due to unfamiliarity
- Losing the people and their experience
- Partner with a Certified HV Trainer
- Court of Law – Severe Penalty
- Utilities (TA /WP) have no visibility

# How to Assess the competencies of Contractors HV Operator –Strategic Thinking

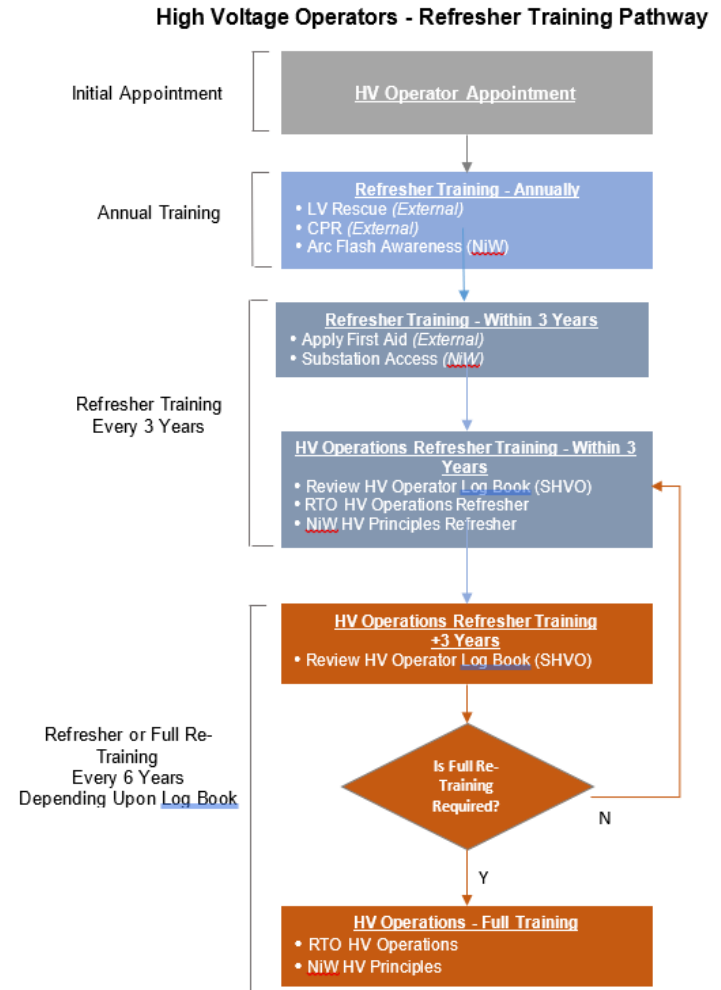
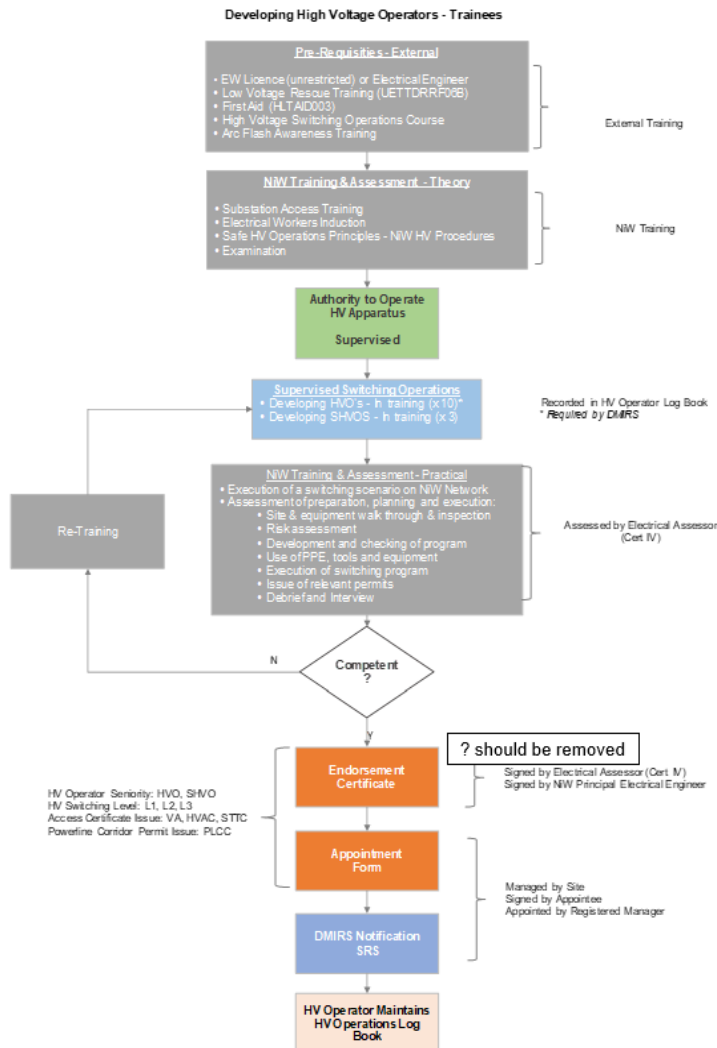
- How many Switching Ops ?
- Regulators - Temporary suspension (Logbooks and PIMS)

## Recommendations

- Schedule 26 positions. Not to be taken lightly
- Notify the Regulatory w.r.t Nominees and HVOs / SHVOs
- NMK and NLN have one set of HVO / SHVO (4 or 6 people)
- NKC and NKS have one set of HVO / SHVO (4 or 6 people)
- NKW shall have one set of HVO / SHVO (4 or 6 people)
- 7 Switching - 2 Complex (Reasonable Risk)
- Certified RTO and Trainer
- Strategically think on 01.02.2024
- Protection Relay settings to be downgraded after the study including .PFD
- Blueprint to be upgraded
- Reg 641 page 416 Work Health Safety (Mines) – Regulations



# Pathway to HVO & Training



**Figure 7 – Refresher Training Pathway**

# Catastrophic Failure – Arc Flash

- **20,000 Deg C**
- Arc Plasma
- Vaporised metal

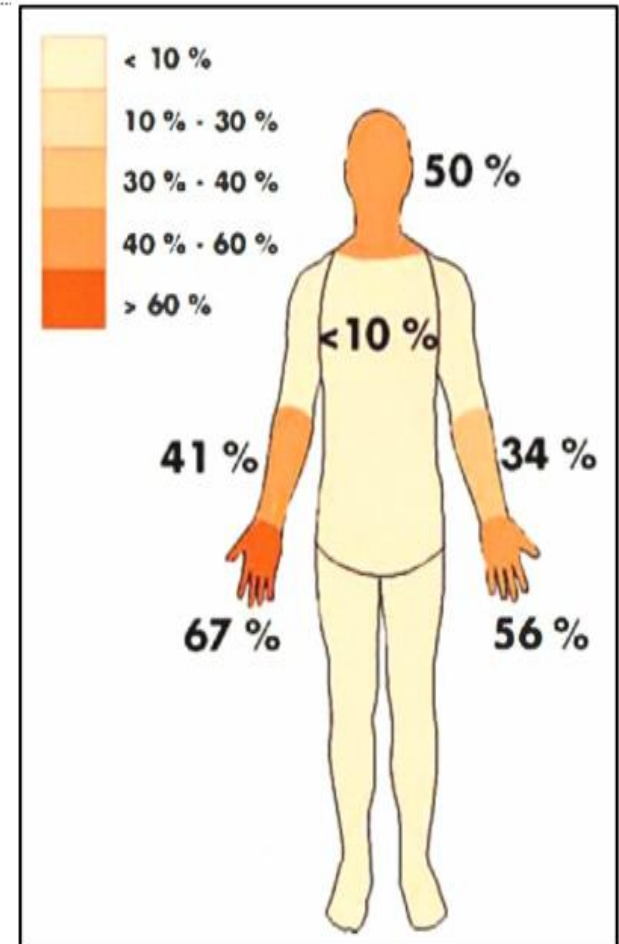
## Hazards

- Electric Shock
- Burns
- Blast trauma
- Respiratory trauma

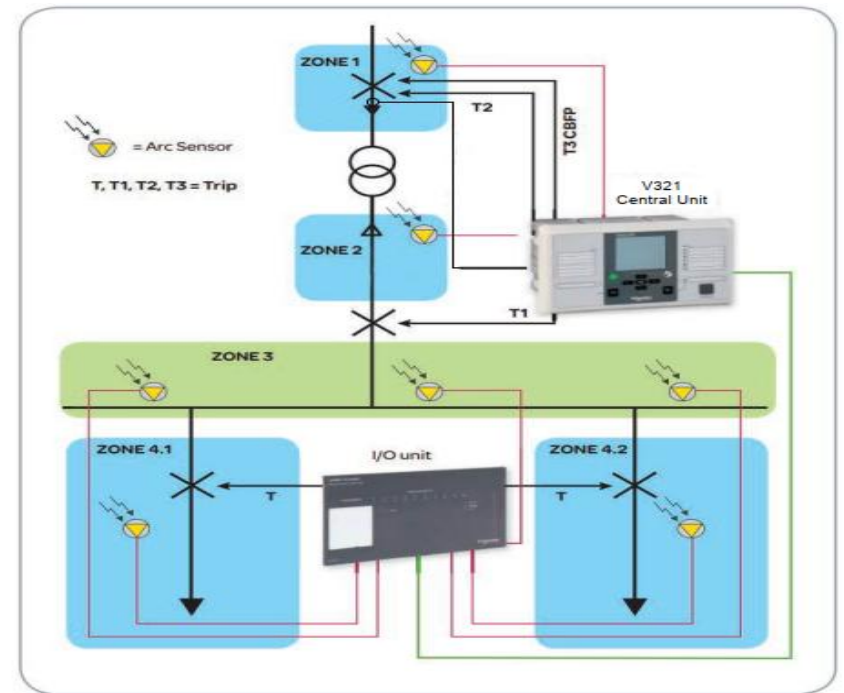


# Admin Control

- Use Effective Controls
  - Apply the Hierarchy of Controls
  - Elimination of the hazard is best
  - PPE is the lowest level of control
- Don't work live!
  - Isolate
  - Lock out and tag
  - Test for dead



# Arc Flash Protection Relays



Zone 1	Cable compartment of the incoming feeder
Zone 2	Circuit-breaker compartment
Zone 3	Busbar compartment
Zone 4.1 / Zone 4.2	Combined circuit-breaker and cable termination compartment

# 66/11kV Substation





# Substation Fence





# Power Trf challenges



# 11 and 33 kV Pole structure





# Pole Top insulators in Fragile condition



# Underground Mine Site Substation

