

## 27th Technical Convention 2019

The 4th Industrial Revolution (“4IR”) | *Building the Power Utility of the Future, Today*

**Condition Monitoring Developments for Asset Management in MV Switchgear  
within eThekweni Electricity**

**Presented by Sheila Cele  
Engineering Technician  
eThekweni Electricity**

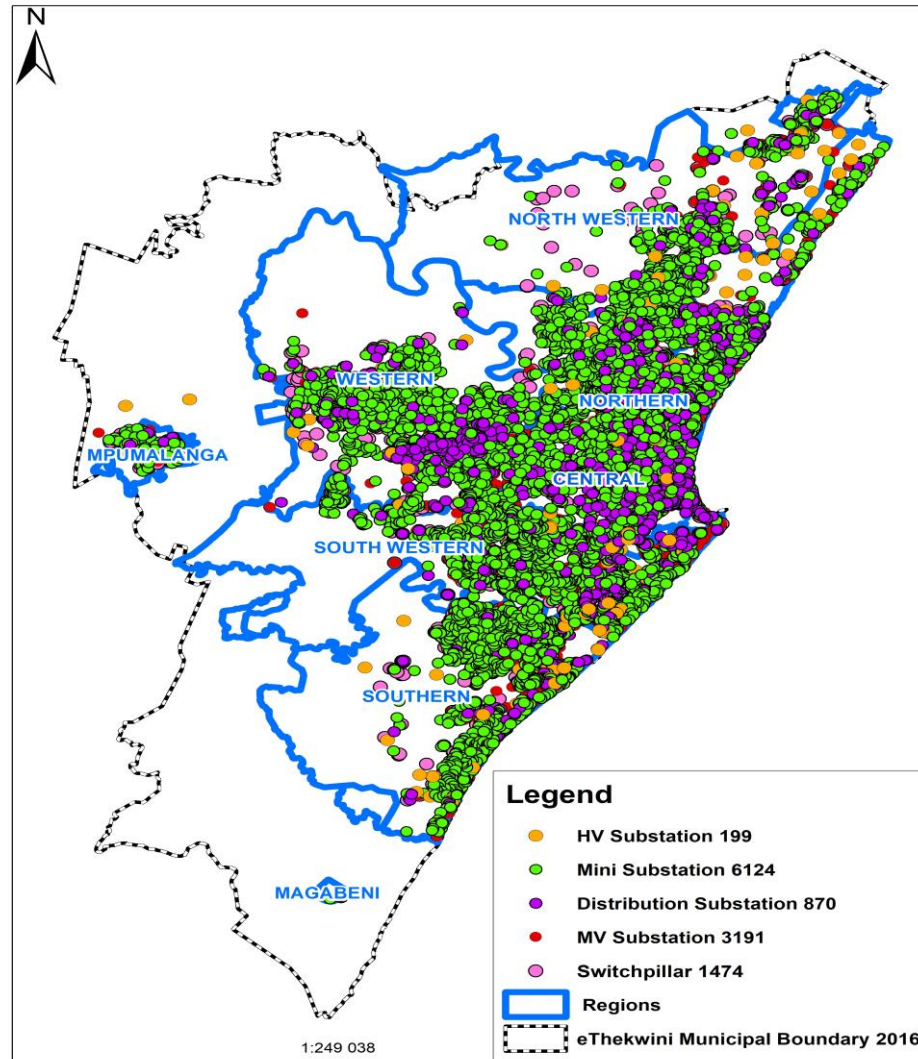
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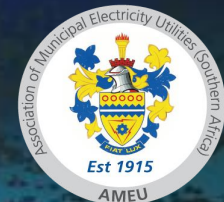
## eThekweni Electricity Area of Supply



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# Condition Monitoring Strategies



## Thermal Imaging/ Infrared Cameras

(Limited to specimen  
being visible)

## Tan Delta / Dissipation Factor

(Requires an outage)

## Visual Inspections

(Defects may not  
be visible)

## Partial Discharge Detection

(Most effective all-  
in-one test)

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# Why Partial Discharge

- Non-intrusive method
- No interruption of supply required.
- Prevents unnecessary breakdowns.
- Financial and maintenance planning is controlled.
- Allows for trending.

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# How Do We Measure It



**Ultrasonic**  
(Surface PD)

**Transient Earth  
Voltage (TEV)**  
(Internal PD)



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# How Do We Measure It

Ultra dB	Category	Comments	Action
< 10	Good	No measurable deterioration	Trend & Monitor
10 - 20	Poor	Moderate deterioration	Attend within 30days
> 20	Bad	Serious Deterioration	Urgent action required

## Measurement guideline

Panel Number	Partial Discharge Records		Comments
	Front dBμV	Back dBμV	
Inyoni Rocks / Calyle DSS 543	10	10	
Plangweni Major	8	17	Cable termination, - tracking ??
371 Kingsway	40	22	Cct. breaker & Cable termination- tracking
7 Raleigh Rd	6	10	
Raleigh & Drake 5710	8	10	
393 Kingsway Rd MSS 2466	6	10	

## Sample of measurements (Ultrasonic)

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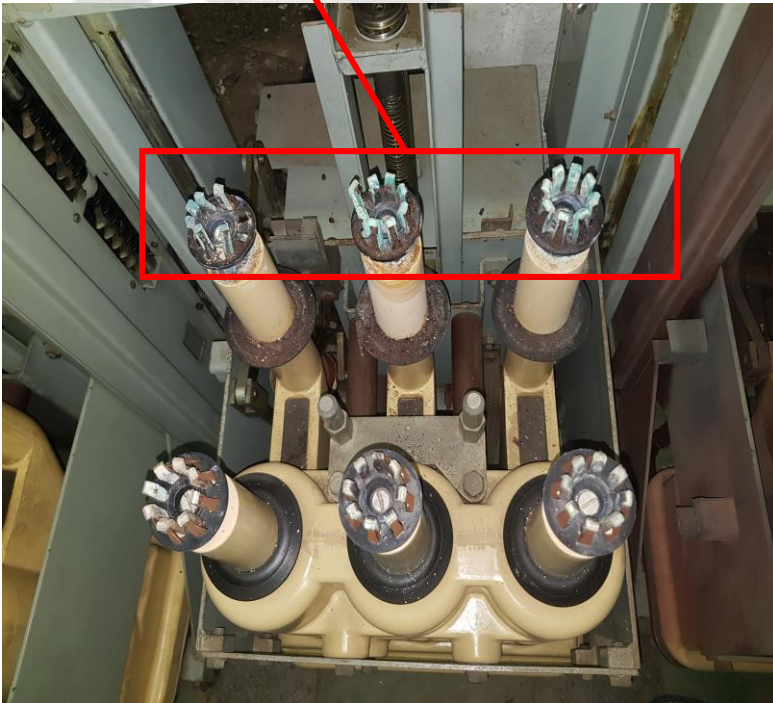
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# 323 Kingsway Distribution Substation



Busbar side clusters: corroded, loose and mechanically damaged



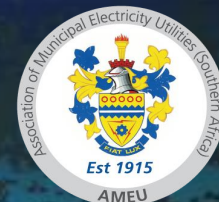
Loose connections



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# Harwadeen Distribution Substation



Rodents and Humidity



Poor Workmanship



Aging of Equipment



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# Natal Underwear DSS



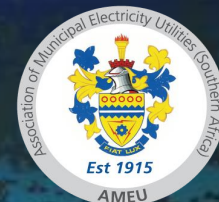
Environmental  
Conditions  
(Priority 1 type)



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# Conclusion

**Assets Prioritised  
(Risk Based)**

**Retrain &  
Develop**

**Trend & Monitor**

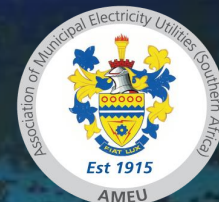
**Consequential  
Management  
(No reoccurrence  
expected)**

**Significant  
Saving**

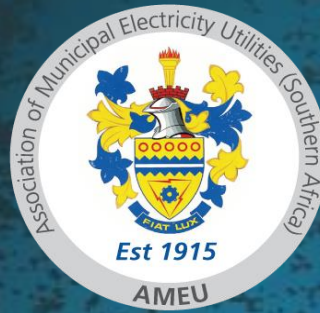
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## Thank you

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