

Oncor

West Texas Dynamic Line Rating (DLR) Project Update

ERCOT RPG Overview

November 15, 2013



West Texas DLR Project

DLR Applied to 5 Lines:

- ❖ Odessa – Odessa North 138 kV (4)
- ❖ Moss – Amoco Cowden North – Holt 138 kV (3)
- ❖ Holt – Emma Tap 69 kV (1)
- ❖ Moss – Odessa Southwest – Odessa EHV 138 kV (3)
- ❖ Midland East – Winwood 138 kV (1)

() Number of DLR units on line

West Texas DLR Project

DLR Installation Milestones

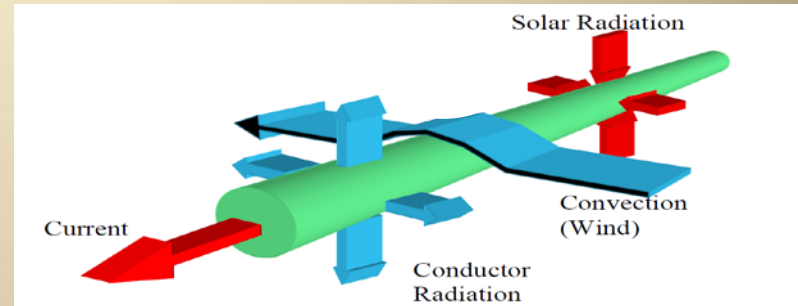
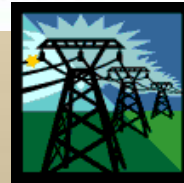
- Commitment to deploy Feb 14th
- Line Work Outages Requested start March 18th
- Install CAT1 Systems start May 7th
- Complete Installations June 7th
- Post DLR ratings Go-Live June 17th

Dynamic Line Rating

Transmission Line Ratings are governed by:

- Current flowing in the conductor
- Conductor size and resistance
- Conductor clearance to ground
- Ambient weather conditions:

AMPS



- Temperature



- Wind speed and direction



- Solar radiation



Ambient Temperature:
3.6° F, 2°C change → +/- 2%

Solar Radiation:
Cloud shadowing → +/- a few

Wind increase 3.2 ft/sec (2.2 mph):
45 angle → + 35%
90 angle → + 44%

Line Ratings Terminology

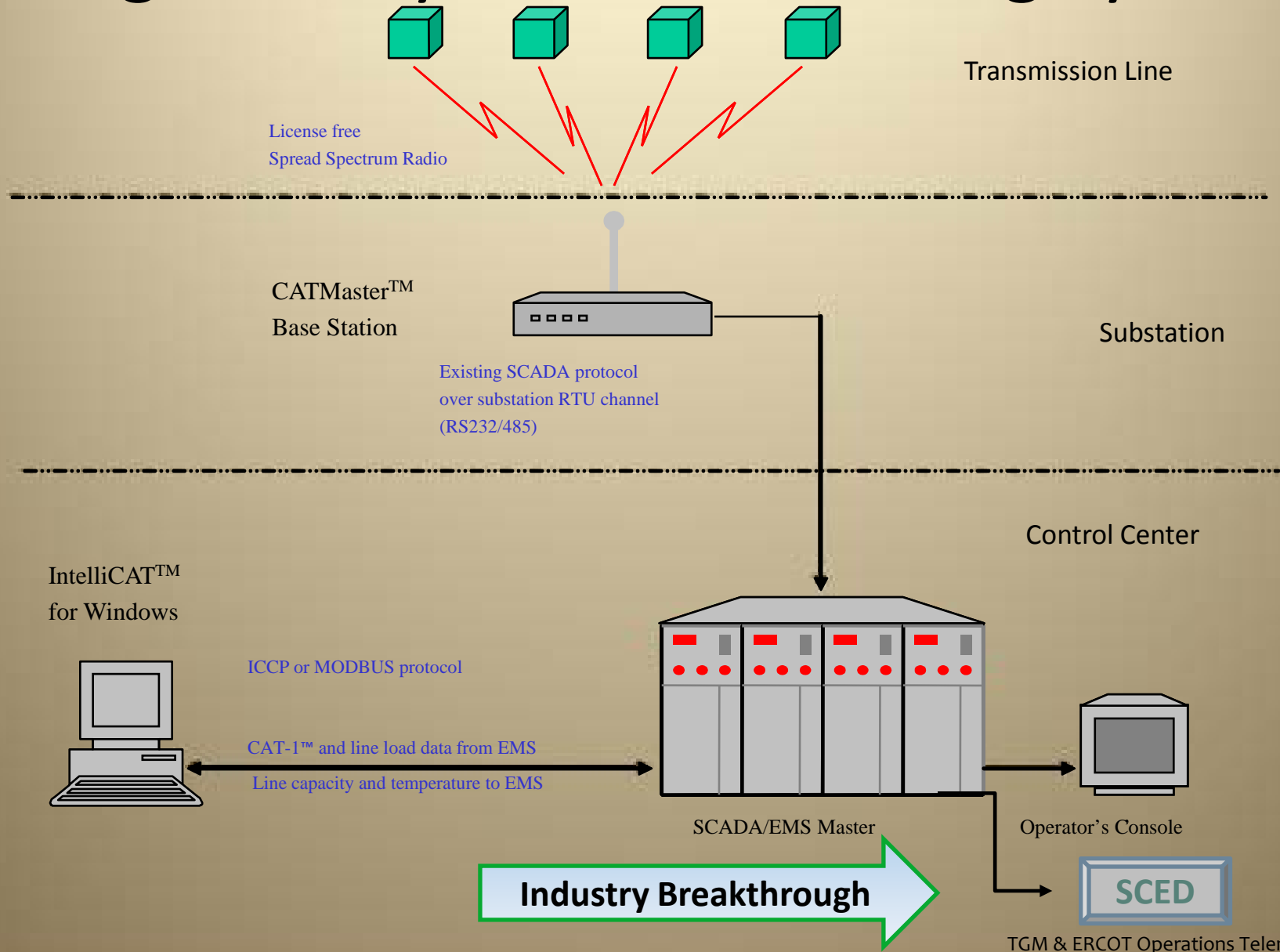
Static Rating – based on prescribed ambient conditions, i.e., full sun mid-day, 104°F, 2 foot per second wind

Ambient Adjusted Rating (AAR) – adjusted for ambient temperature other than Static Rating base temperature

Dynamic Line Rating (DLR) – adjusted rating based on actual measured ambient conditions

Conductor-Monitored Rating (CMR) – DLR posted to Oncor telemetry for ERCOT application in SCED

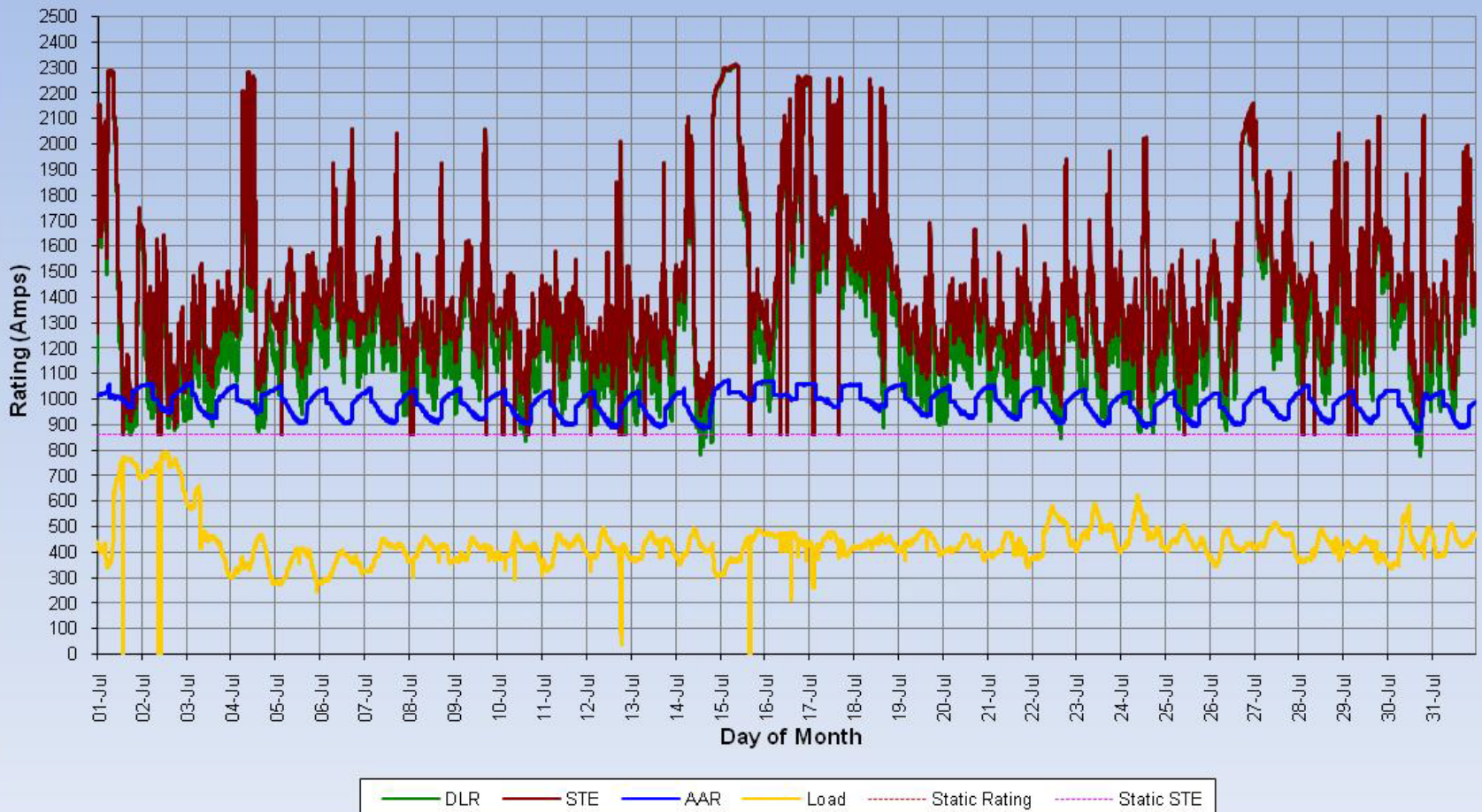
Integrated Dynamic Line Rating Systems



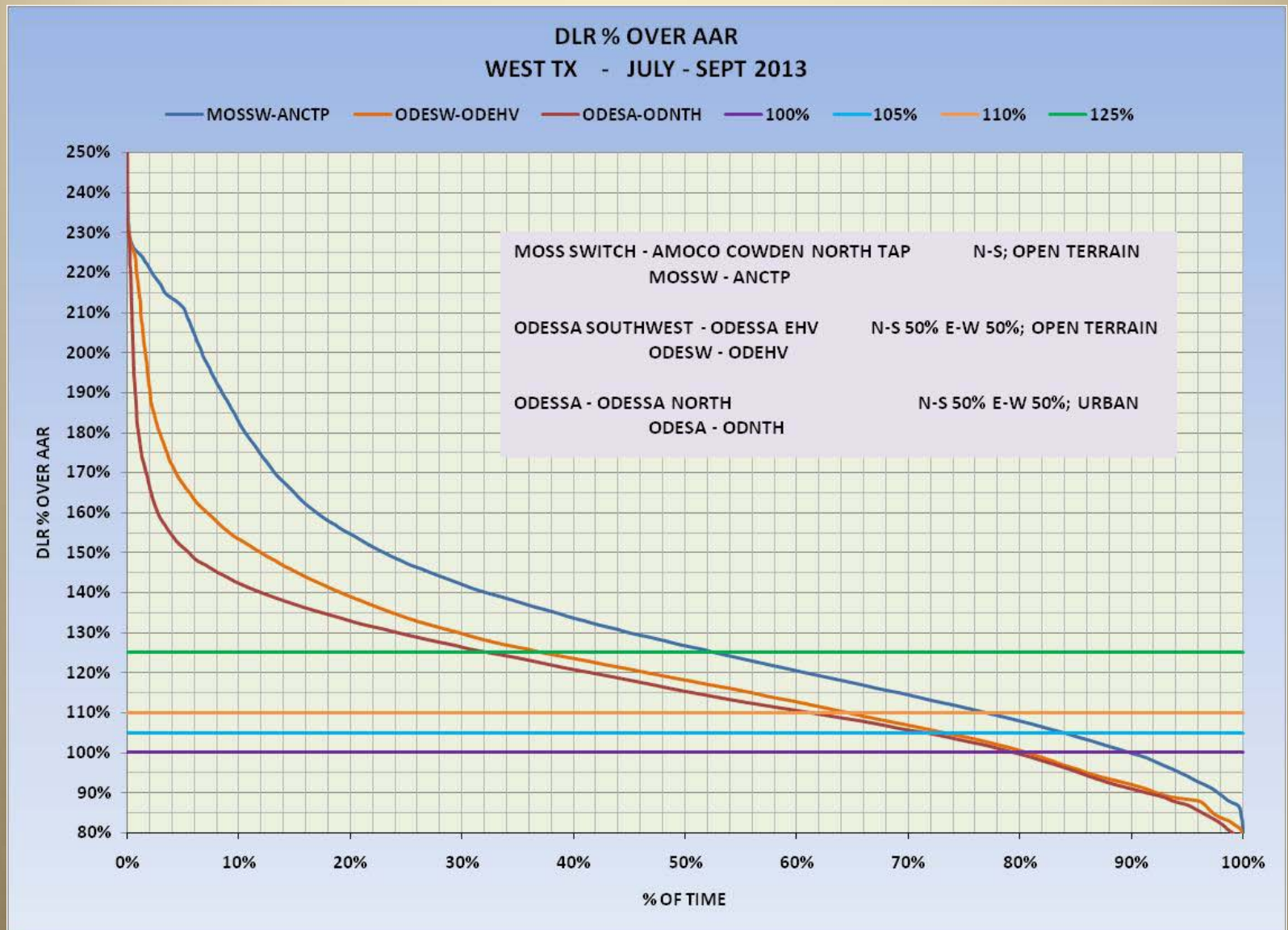
Example of Capacity Chart

Static, Ambient-Adjusted & DLR Ratings

Dynamic Line Rating (DLR), Short-term Emergency Rating (STE) And Ambient Adjusted Rating (AAR)
Amoco North Cowden-Moss, July, 2013
Time Series



Capacity Cumulative Probability Curves



DLR % OVER AAR ODESSA - ODESSA NORTH 138 kV

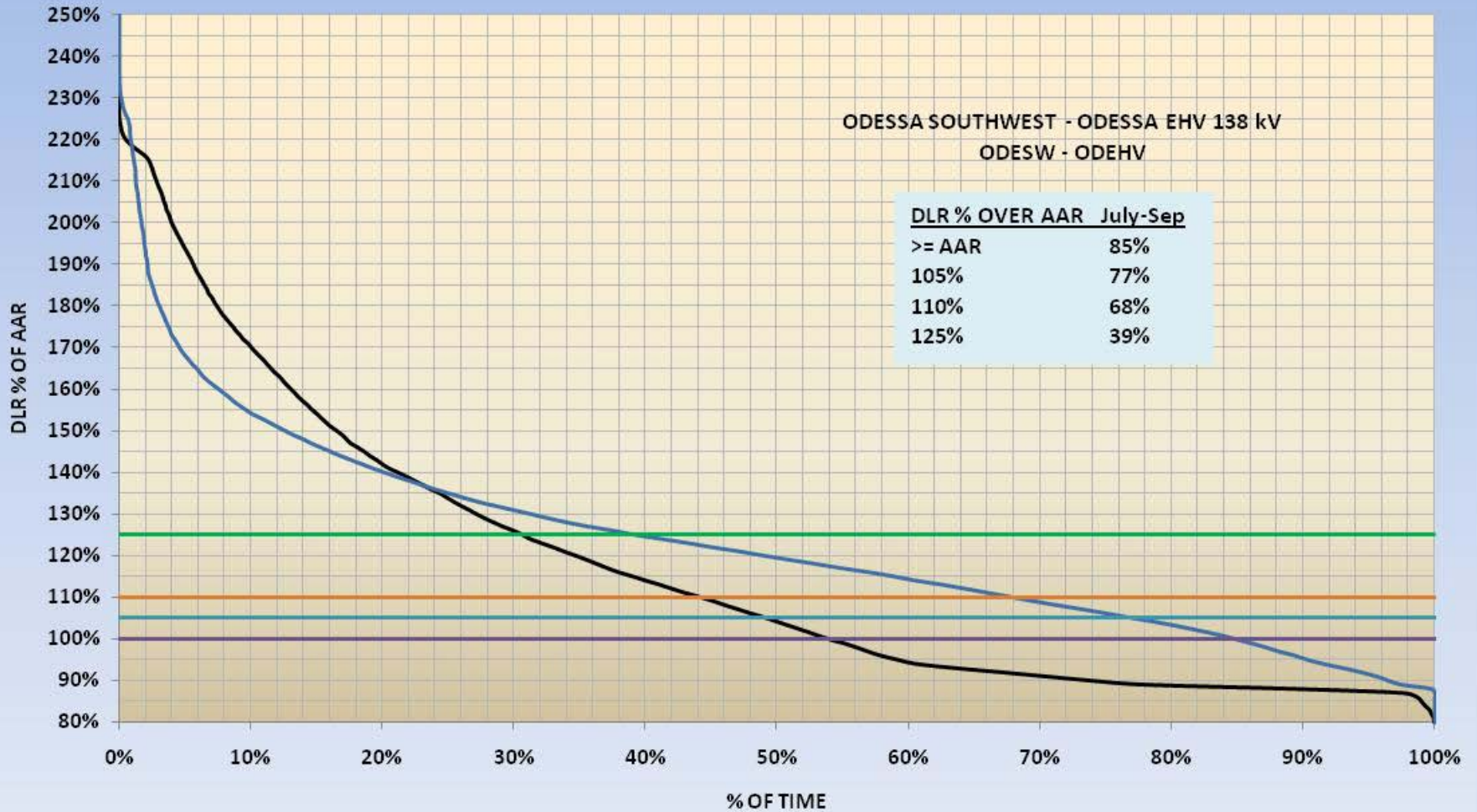
— Initial Calibration
 — First Season Refinement
 — 100%
 — 105%
 — 110%
 — 125%



DLR% OVER AAR

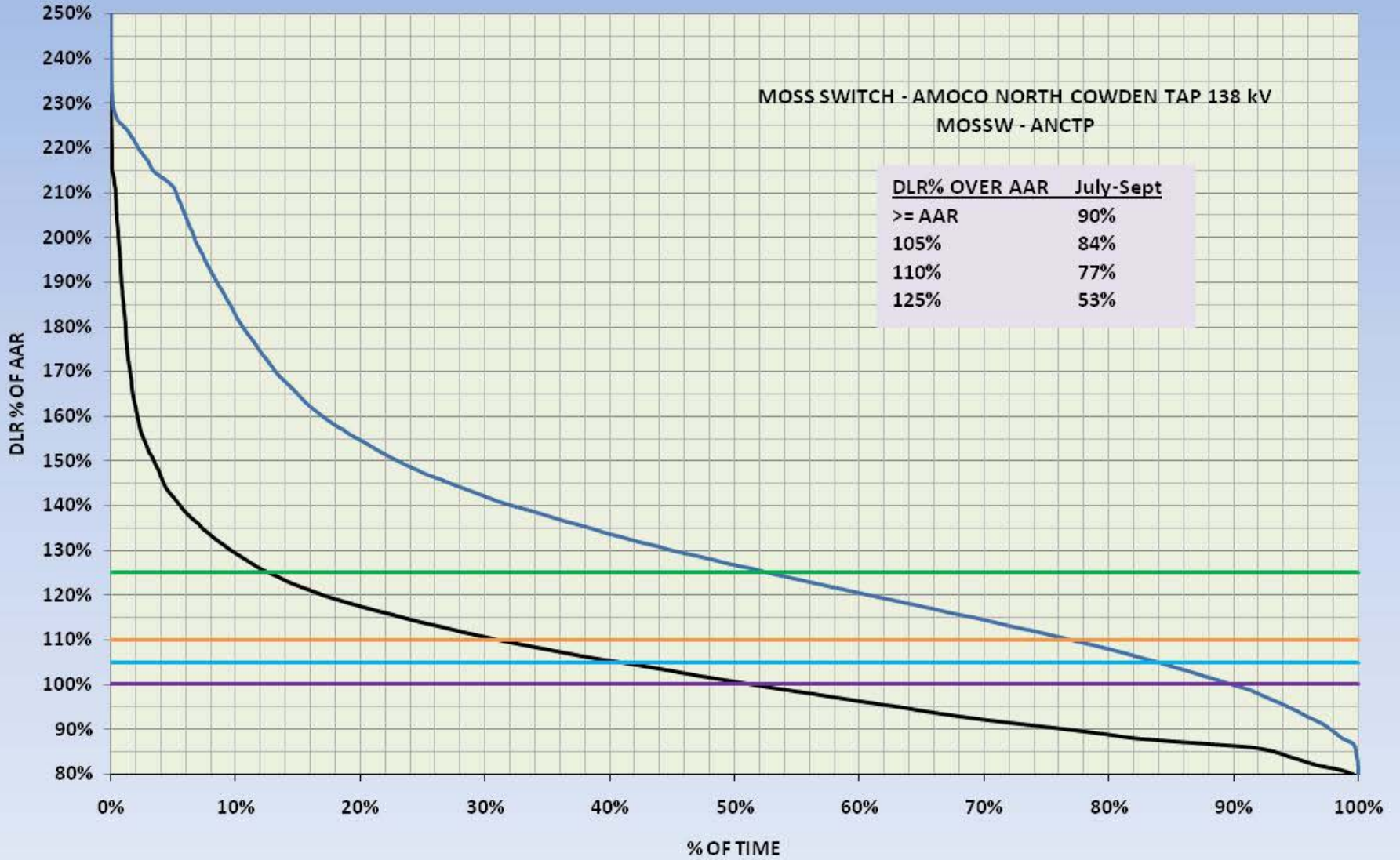
Odessa Southwest - Odessa EHV 138 kV

— Initial Calibration
 — First Season Calibration
 — 100%
 — 105%
 — 110%
 — 125%



DLR % OVER AAR MOSS SWITCH - AMOCO NORTH COWDEN TAP 138 kV

— Initial Calibration
 — First Season Calibration
 — 100%
 — 105%
 — 110%
 — 125%



Side Notes – Loose Strings

- AMI Radio Interference – shared unlicensed frequency range
- Next Limiting elements replaced – 2 wavetraps, 2 disconnects & 1 air switch
- RTU Capabilities – finding nearby stations or installing upgrades
- Elapsed time 18 weeks – caveats – had just done a deployment and EMS configured.

Contacts

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