

Title: NERC Facility Ratings Alert

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Recommendation to Industry: Consideration of Actual Field Conditions in Determination of Facility Ratings

I. Introduction

The Northeast Blackout of 2003 was a widespread power outage that occurred throughout parts of the Northeastern and Midwestern United States and Ontario, Canada on Thursday, August 14, 2003, just before 4:10 p.m. EDT. It was the third most widespread blackout in history, after the 1999 Southern Brazil blackout and the 2012 India black out. The blackout affected an estimated 10 million people in Ontario and 45 million people in eight U.S. states. The map below shows the areas affected.



In February 2004, the U.S.-Canada Power System Outage Task Force released their final report, placing the causes of the blackout into four groups.

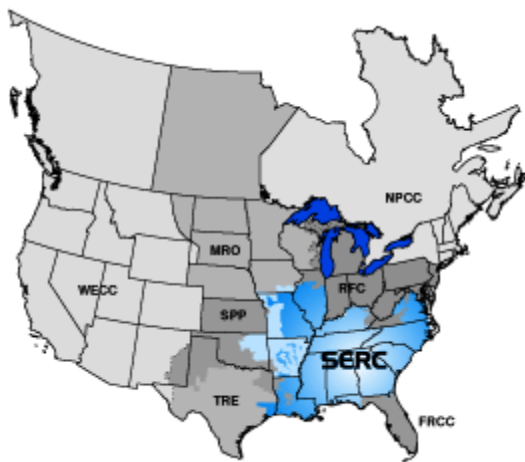
- First, that FirstEnergy (FE) and its reliability council "failed to assess and understand the inadequacies of FE's system, particularly with respect to voltage instability and the vulnerability of the Cleveland-Akron area, and FE did not operate its system with appropriate voltage criteria".
- Second, that FirstEnergy "did not recognize or understand the deteriorating condition of its system".
- **Third, that FirstEnergy "failed to manage adequately tree growth in its transmission rights-of-way".**

- Finally, the "failure of the interconnected grid's reliability organizations to provide effective real-time diagnostic support."

The report states that a generating plant in Eastlake, Ohio (a suburb of Cleveland) went offline amid high electrical demand, **putting a strain on high-voltage power lines (located in a distant rural setting) which later went out of service when they came in contact with "overgrown trees"**. The cascading effect that resulted ultimately forced the shutdown of more than 100 power plants.

II. NERC FAC for Actual Field Condition vs. Design Standards

In part the Northeast blackout and the reasons behind it, but mostly due to spot check results on an entity in SERC Reliability Corporation (SERC), where a vegetation contact by a Transmission Owner identified actual **field conditions that varied significantly from design assumptions** to the point where some facility ratings were considered inaccurate or in question. Where the follow-up resulted in the conclusion that this **situation was not restricted to one entity or region** and resulted in NERC's issuance of an Alert (Recommendation) to proactively identify other such conditions and **promote corrective actions**. The map below shows all eight of the NERC Regional Entities with SERC highlighted. SERC was not actually part of the 2003 Blackout affected areas.



On October 7, 2010 NERC provided a Recommendation to Industry entitled "Consideration of Actual Field Conditions in Determination of Facility Ratings" and was updated on November 30, 2010. NERC recommended to the Transmission Owners and Generator Owners of bulk electric system facilities a review of their current facility ratings methodology for their transmission lines. This was intended to verify the methodology used was based on actual field conditions and determine if their ratings methodology would produce appropriate ratings when considering differences between design and field conditions. If entities have not previously verified that the facility design, installation, and field conditions are within design tolerances when the facilities are loaded at their ratings, entities are required by January 18, 2011, to describe its plans to complete such an assessment of all its transmission lines, with the highest priority lines assessed by December 31, 2011, medium priority lines by December 31, 2012, and the lowest priority by December 31, 2013. At the conclusion of each year, each Transmission Owner and Generator Owner must report to its Regional Entity a summary of the assessments and identification of all transmission facilities where as-built conditions are different from design conditions, resulting in incorrect ratings, and their associated mitigation timelines. Remediation is expected within one year from identification of the issue or on a schedule approved by the Regional Entity if longer

than a year. Owners are also expected to coordinate with their respective operating and planning organizations to coordinate interim mitigation strategies.

III. Midwest Reliability Organization (MRO) Response

The MRO, one of NERC’s Regional Entities covering the upper Midwest and two Canadian provinces, has 25 distinct Transmission Owners who fall under the Alert’s Recommendation.

In July 2011 the MRO, received the first reports from the Transmission Owners on their findings from the review of clearances of their “High Priority” transmission lines. In January 2012 the final findings were due. In the MRO, 1381 discrepancies were reported over the 6497 miles of High Priority transmission lines which encompass 309 circuits. **A discrepancy is defined as a single span not meeting clearance requirements.**

The table shown below contains the July 2011 updated detailed finding in the MRO region for the 16 Transmission Owners who reported regarding High Priority lines.

Transmission Owner	HP Miles	HP Circuits	HP Discrepancies	# Lines De-Rated	Mitigation Complete	Mitigation In Process	Mitigation Not Started
1	284.32	27	10	8	7	3	0
2	825.19	3	0				
3	0.00	0	0				
4	0.38	1	0				
5	560.17	6	42	1	42	0	0
6	682.50	55	714	35	506	208	0
7	130.50	18	22	0	21	1	0
8	74.00	1	4	0	0	0	4
9	610.00	79	5	2	2	3	0
10	7.79	1	0				
11	288.00	6	0				
12	273.20	9	58	3	0	43	15
13	422.00	11	0				
14	453.80	27	199	17	90	109	0
15	309.31	3	13	5		13	
16	1576.00	62	314	29	129	145	40
	6497.16	309	1381	100	797	525	59

In July 2012 the MRO received the first reports from 14 Transmission Owners on their findings from the review of clearances of their “Medium Priority” transmission lines. The table below reflects the findings to date; final findings are due in January 2013. In the MRO, more than 207 discrepancies were reported on over the 9515 miles of Medium Priority transmission lines which encompass 306 circuits.

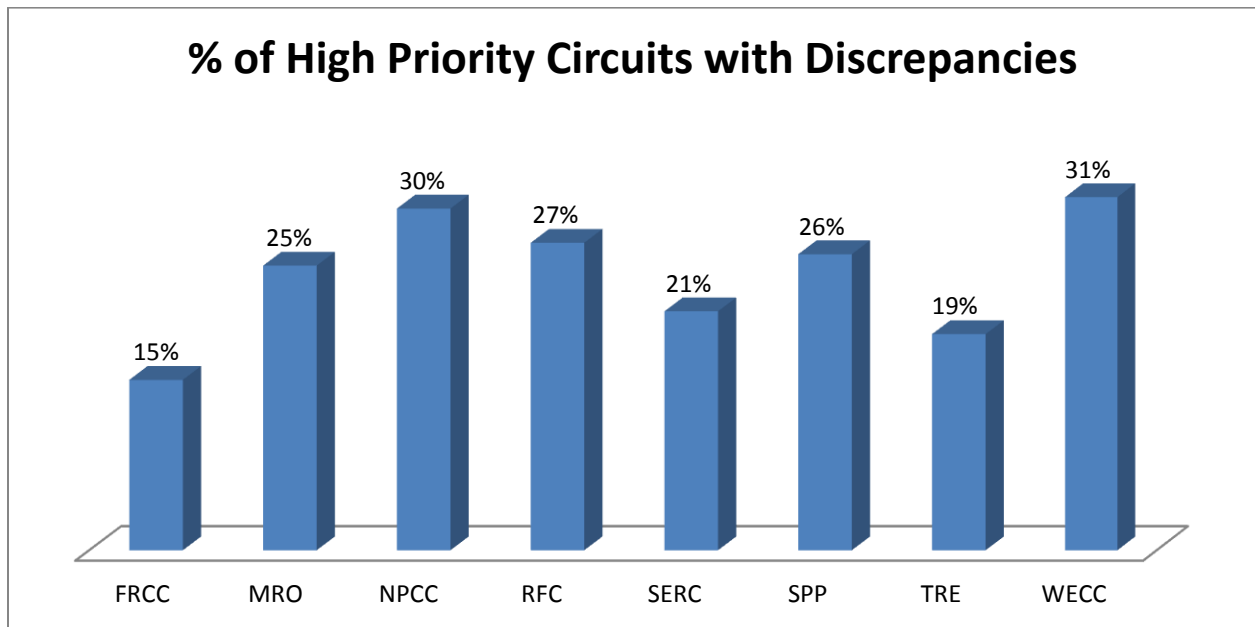
The table shown below contains the July 2012 details of the finding in the MRO region for Medium Priority lines.

Transmission Owner	MP Miles	MP Circuits	MP Discrepancies	# Lines De-Rated	Mitigation Complete	Mitigation In Process	Mitigation Not Started
1	197.98	6	6	4	1	5	0
2	577.44	30	0	0			
3	0.00						
4	523.40	23	128	3	7	121	0
5	699.40	45	9	4	9	0	0
6	0.00						
7	208.27	2	7	0	0	0	7
7	1092.67	19	7	0	7		
8	807.05	20	50	4	50		
9	336.00	0	0				
10	165.60	49	0				
11	482.16	13	0				
12	0.00						
13	3822.36	48	0				
14	603.00	51	0				
	9515.33	306	207	15	74	126	7

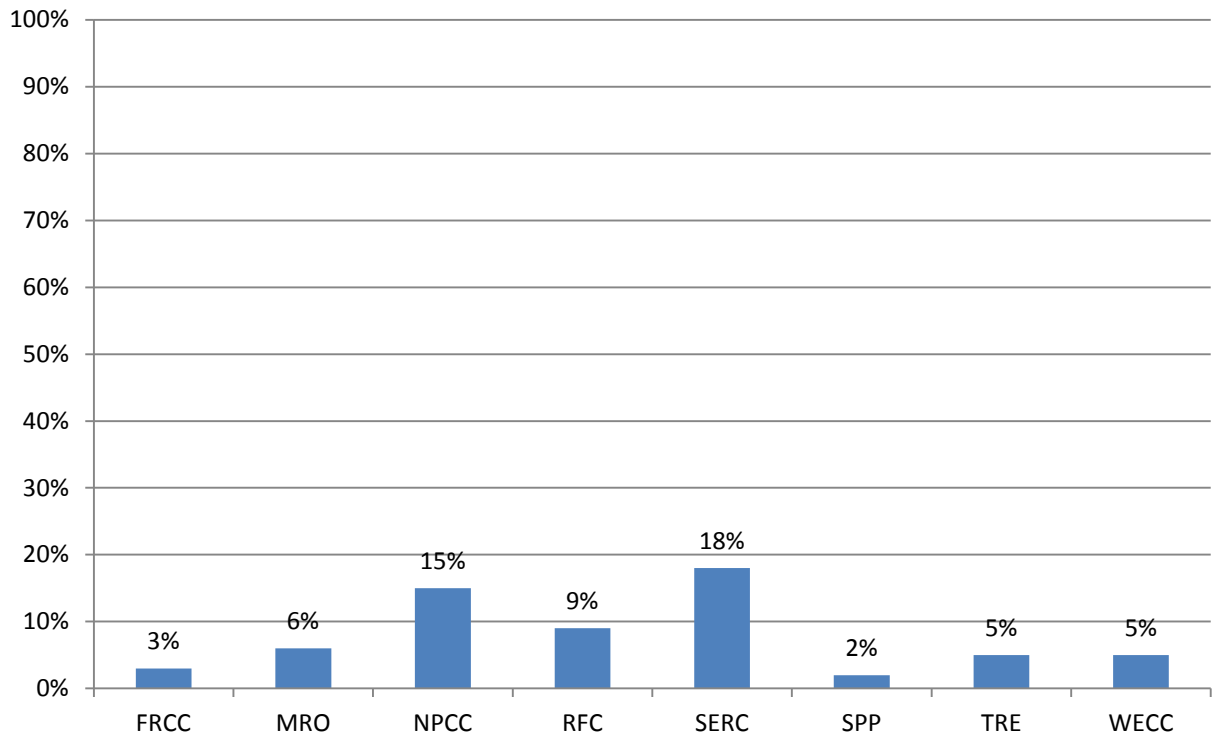
MRO has granted several Transmission Owners extensions to either complete their assessments or their mitigation efforts based on their specific needs or circumstances.

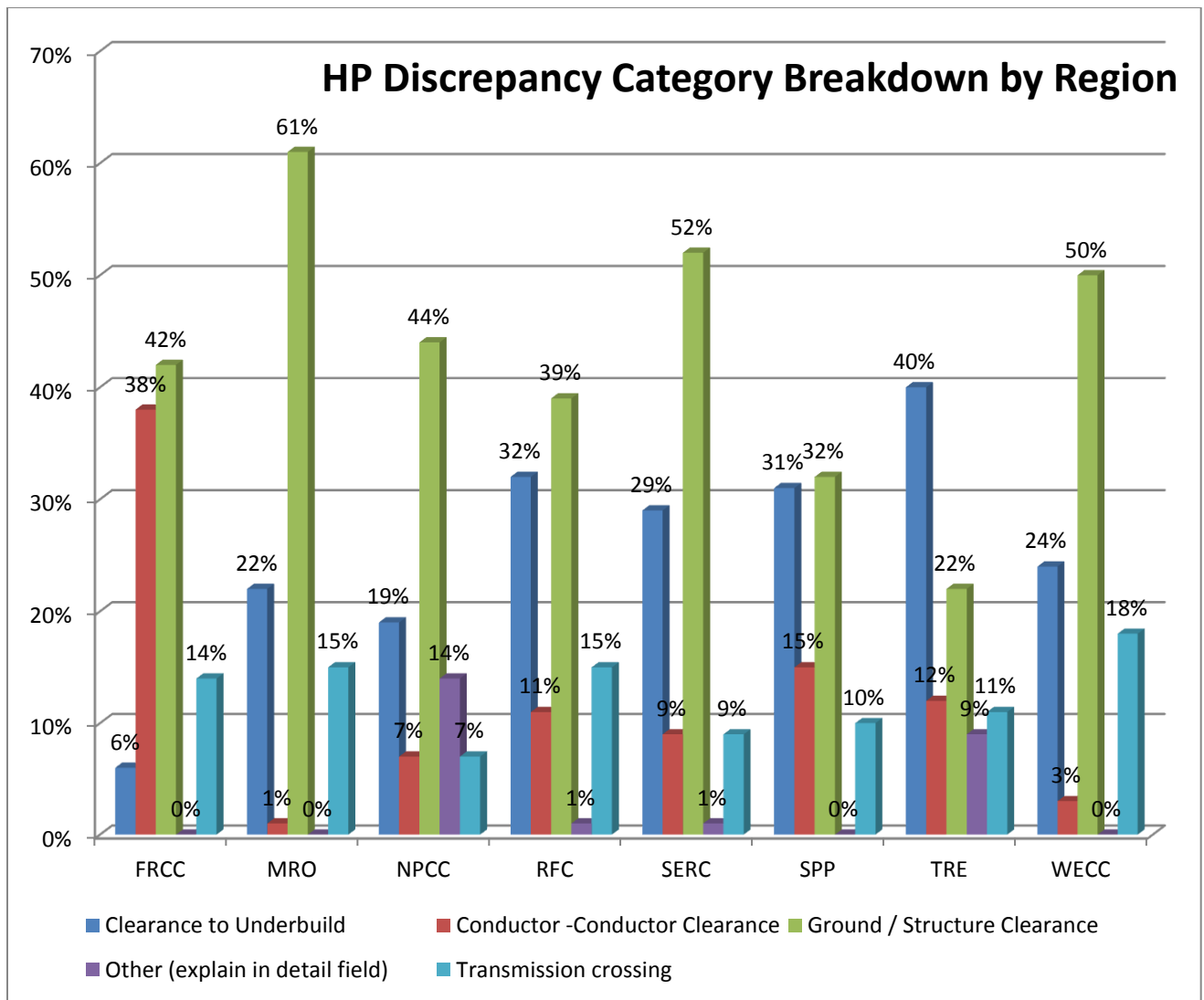
IV. NERC Wide Data

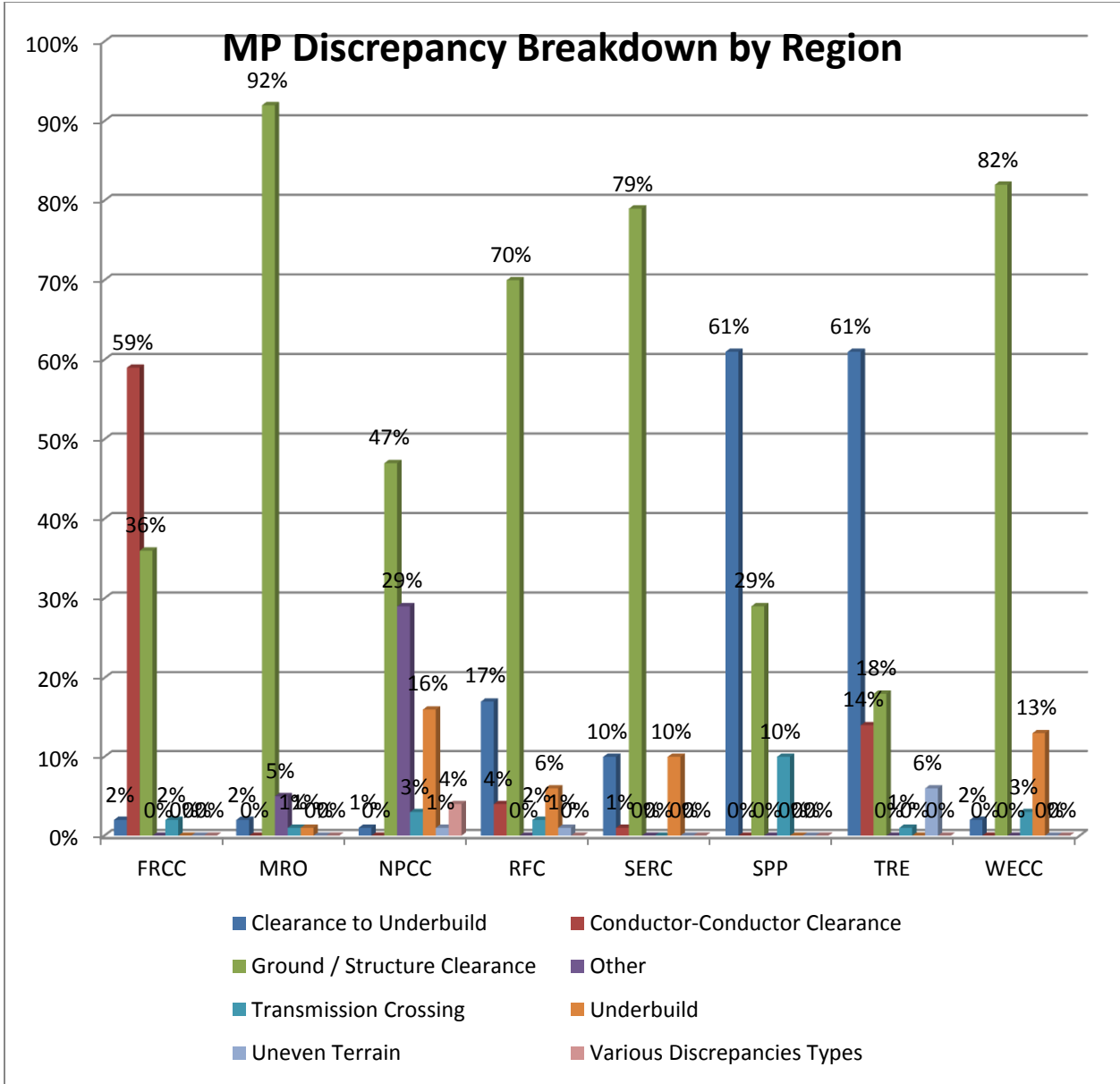
The next few pages include NERC's data from the February 2012 graphs for the High Priority lines as well as data from the August 2012 graphs for the Medium Priority lines, showing the aggregate of findings across the NERC (some are depicted by Regional Entity) foot print with all NERC Regional Entities reporting. These graphs are fairly self explanatory.



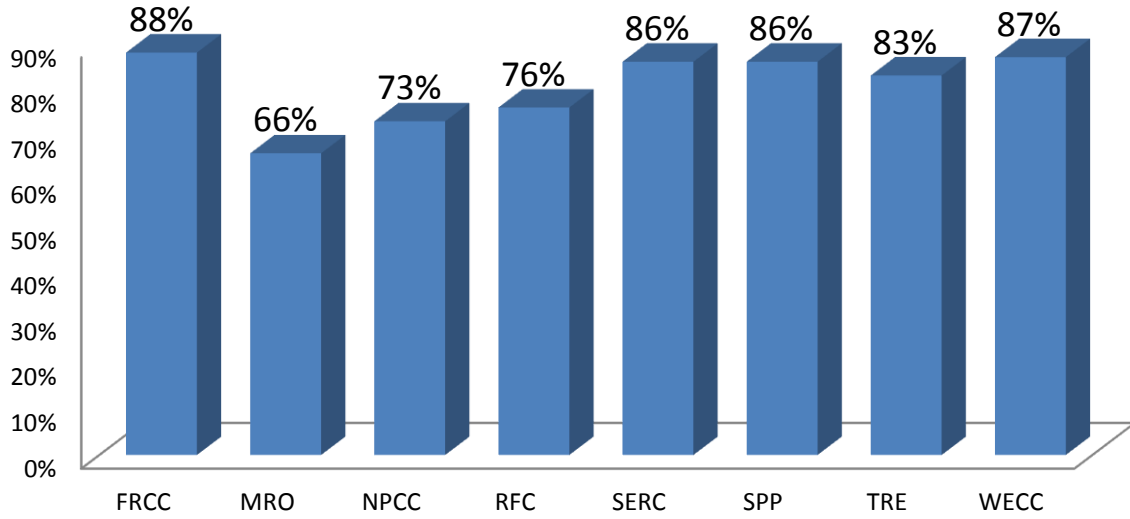
% of Medium Priority Circuits with Discrepancies Through July 16, 2012



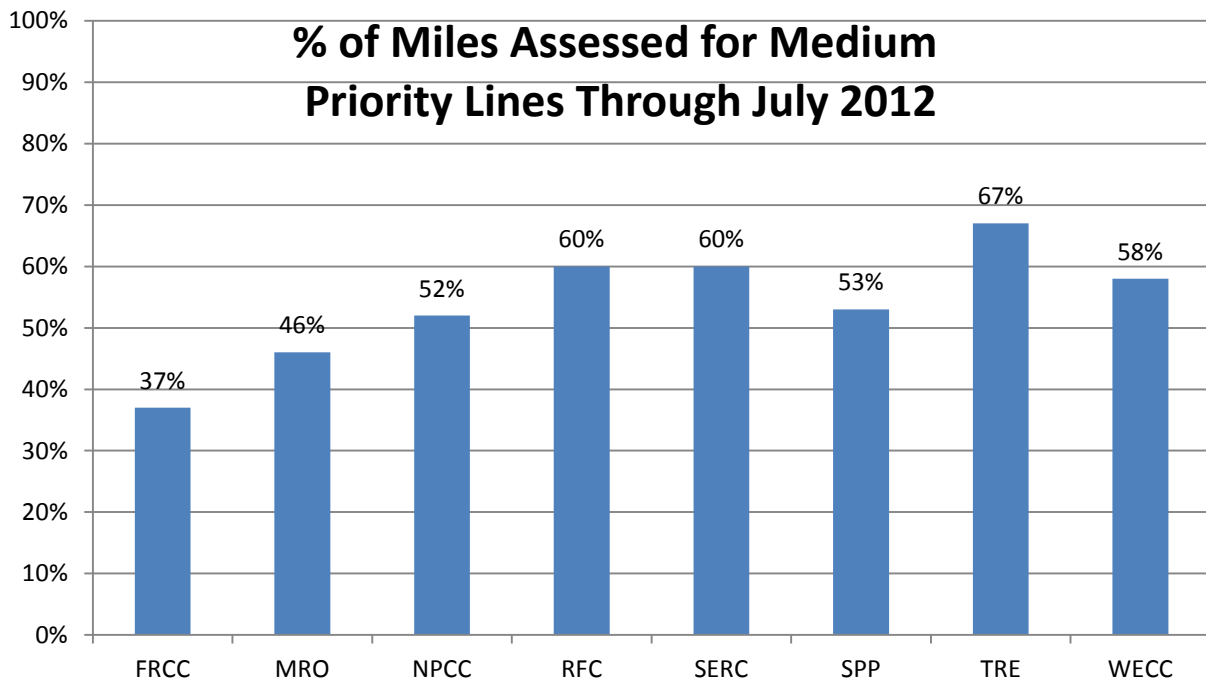




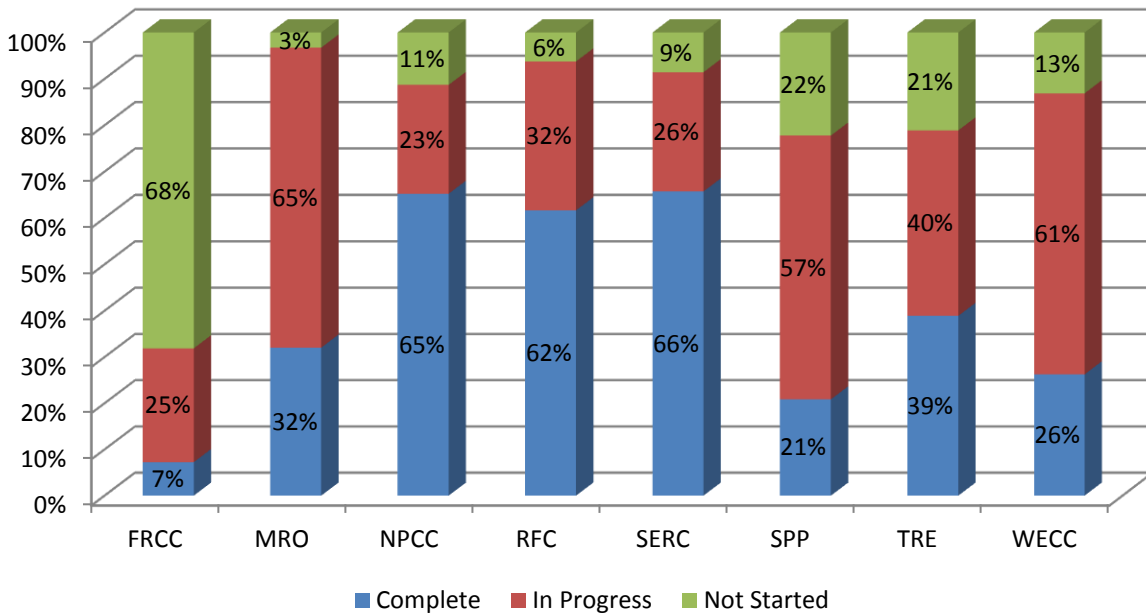
% of Mile Assessed for High Priority Lines



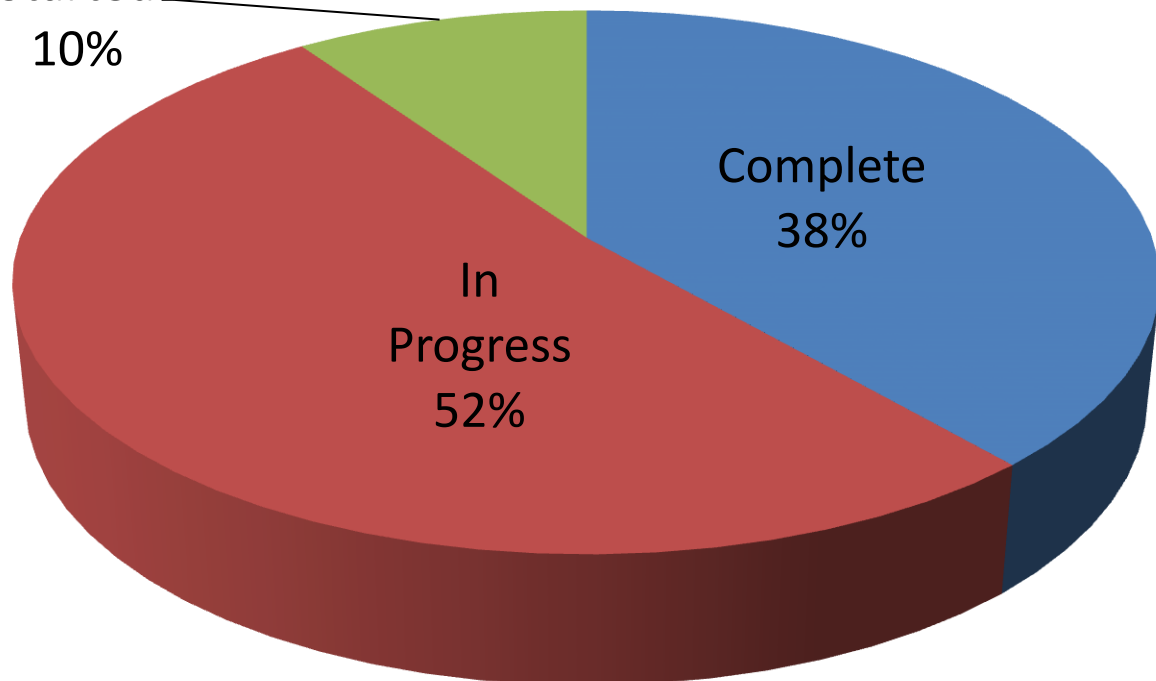
% of Miles Assessed for Medium Priority Lines Through July 2012



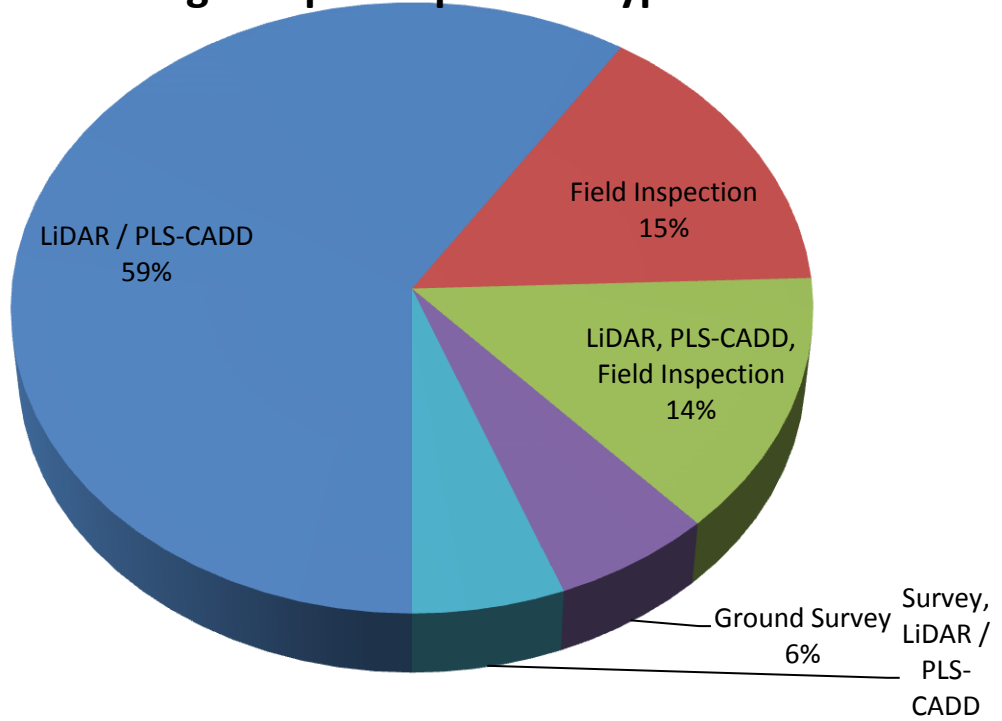
Remediation Status by Region



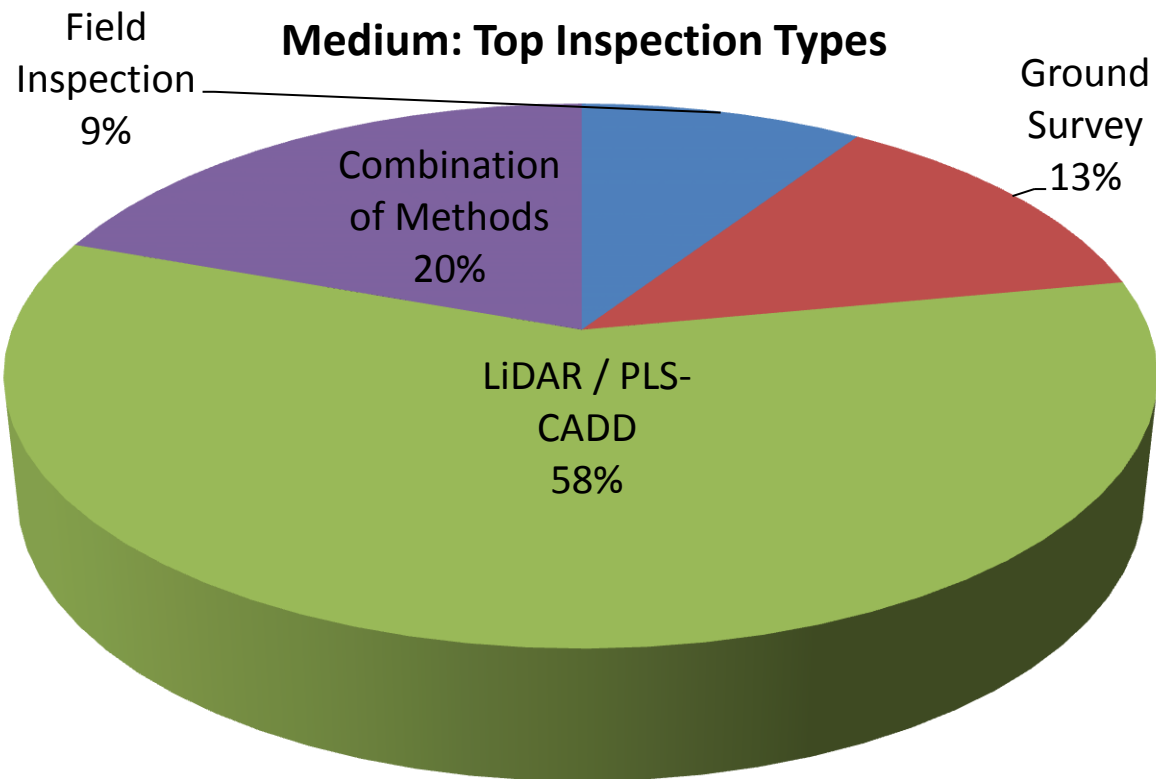
Medium: Remediation Status Breakdown

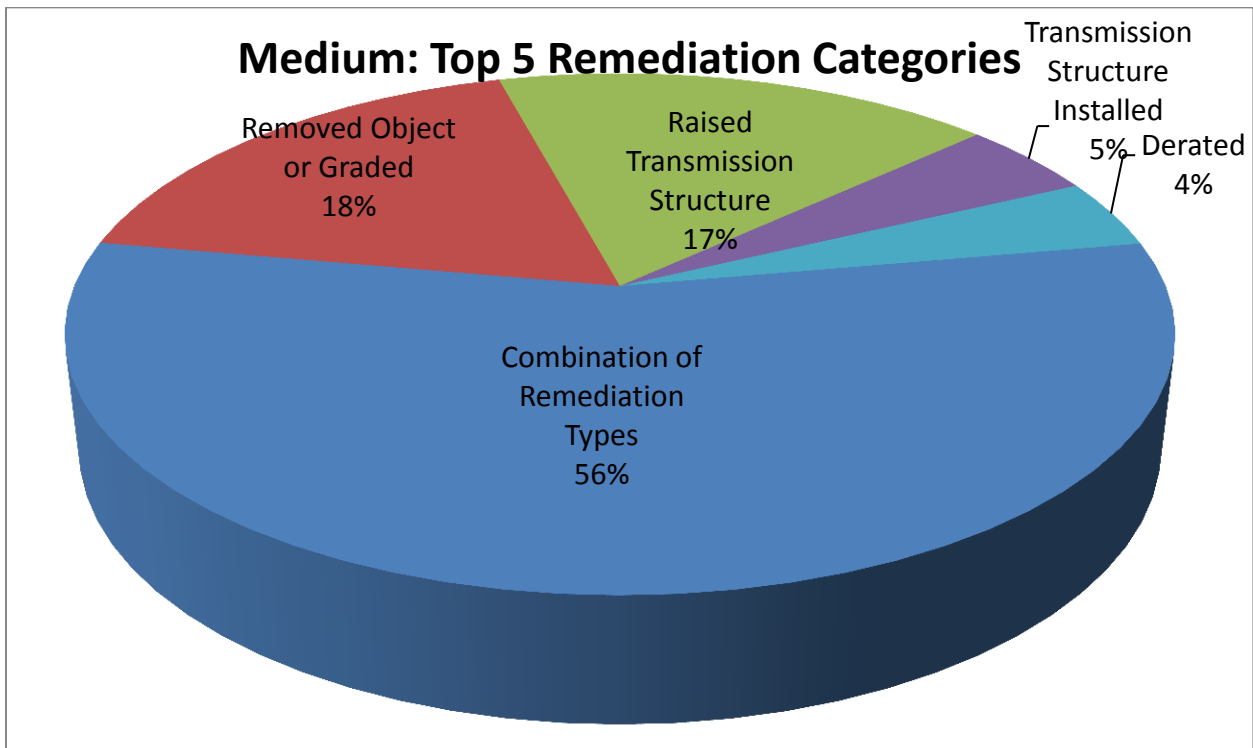
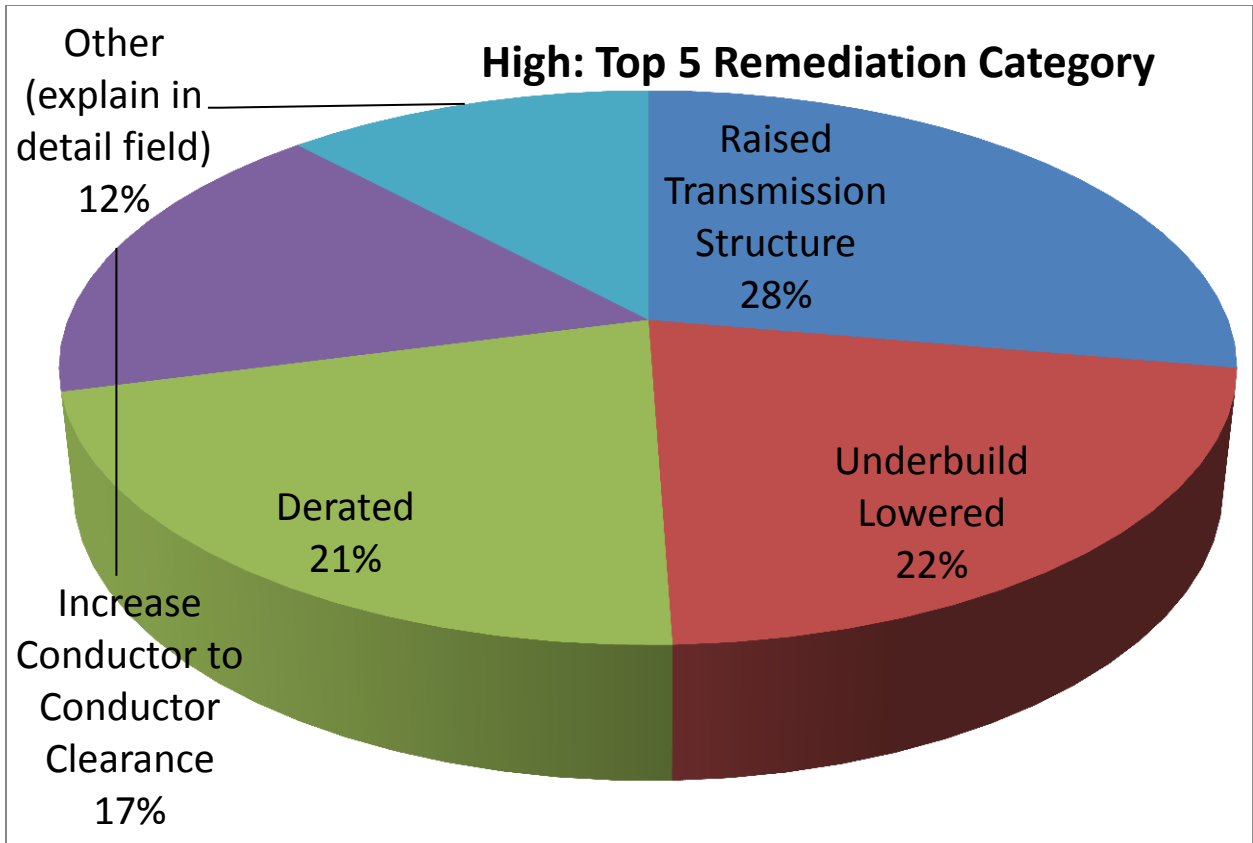


High: Top 5 Inspection Type

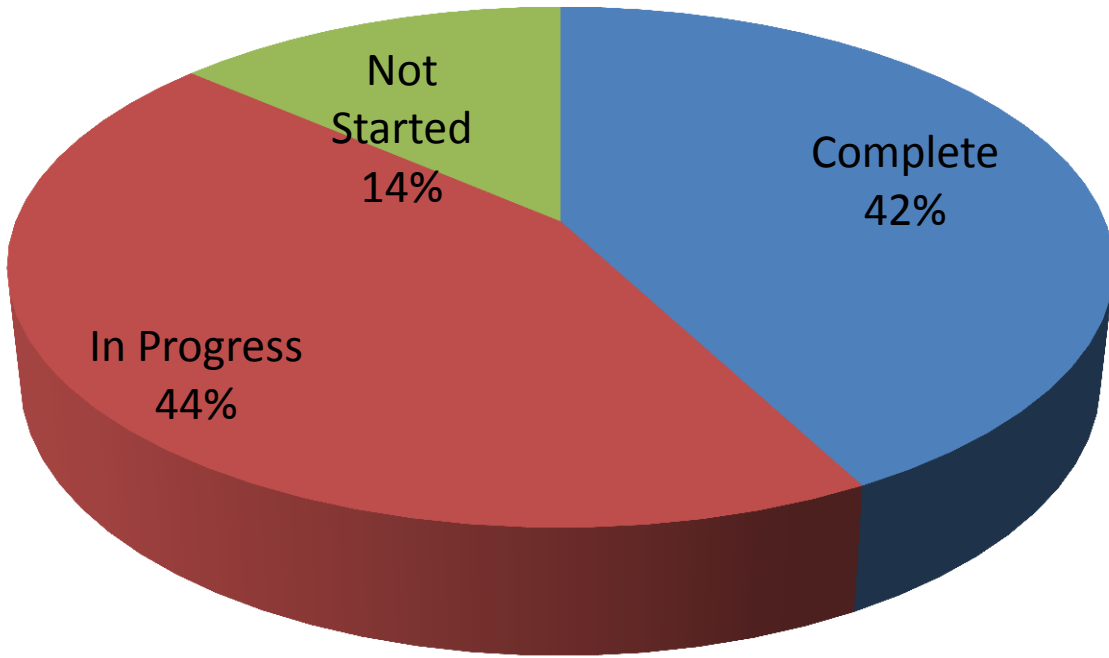


Medium: Top Inspection Types

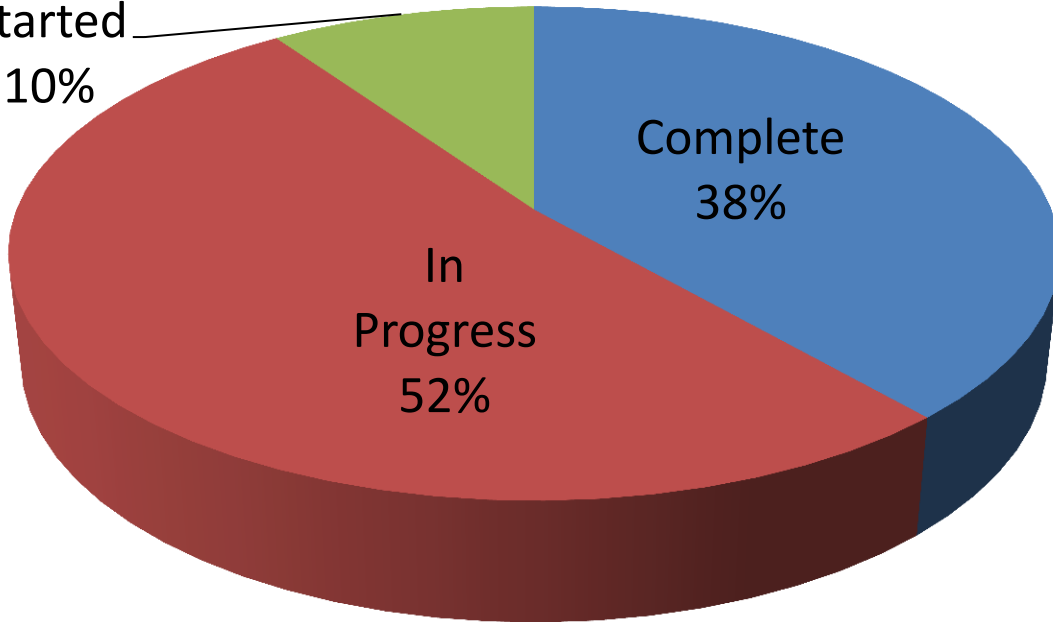




High Remediation Status Breakdown



Not Started Medium: Remediation Status Breakdown



In conclusion, overall, the MRO is on schedule and on par with the other Regional Entities in NERC for this NERC Alert.