Edison Electric
INSTITUTE

Power by Association

Subject: Potential Electric Reliability Risks Due to Cessation of Power Generation as a Result of the Closure Unlined Surface Impoundments Under 40 CFR Part 257.101 for the Failure to Meet Groundwater Protection Standards

EPA Docket ID: EPA-HQ-OLEM-2016-0274
Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Extension of Compliance Deadlines for Certain Inactive Surface Impoundments; Response to Partial Vacatur

Summary of EEI Findings

As part of an internal EEI review to assess the potential impacts on electric reliability due to the possible inability of affected resource owners to sufficiently remediate certain coal combustion residuals (CCR) surface impoundments by the dates set forth in the above reference EPA Final Rule, EEI developed the following high level evaluation of the reliability impacts associated with forcing affected coal fired resources into a "Forced Outage"[1] mode. While the term Forced Outage is more typically used to describe a generating unit, transmission line or other facility that is out of service due to an equipment failure, the impact of a forced outage due to an entity's inability to meet the EPA deadline would result in the same effect as an actual equipment failure since the resource would be unavailable for service.

Those reviewing the EEI findings should recognize that our findings were not part of any detailed planning study and provide a very high level review of possible worst case impacts on a regional level. Moreover, those reviewing our high level findings should consider the following:

1. This review only considered a worst case scenario due to the closure of unlined CCR impoundments not meeting groundwater protection standards. (i.e., all affected resources would be in a Forced Outage mode due to not meeting the compliance date for mitigating their CCR obligations).
2. When assessing the impact of CCR related outages, EEI utilized the published Anticipated Reserve Margin since this includes operable capacity expected to be available to serve load with firm transmission along with Tier 1 capacity and Firm Capacity Transfers.
3. No effort was made to consider the impact of "Prospective Reserves", which broadly represent the inclusion of operable capacity that may lack firm transmission, Tier 2 capacity additions and nonfarm Capacity Transfers (imports minus exports) without firm contracts.

[1] NERC Glossary of Terms; Forced Outage: 1. The removal from service availability of a generating unit, transmission line, or other facility for emergency reasons. 2. The condition in which the equipment is unavailable due to unanticipated failure.

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4. Reserve Margin impacts were only considered during "On Peak"[2] periods.
5. In the context of this review, it is considered that in order to maintain Reliable Operation[3] of the BES, the Anticipated Reserve Margin [4] as defined in sessional reliability assessments developed by NERC are to held be at or above the published Reference Reserve Margin[5].
6. For purposes of this review, EEI used data from the NERC 2017 Summer Reliability Assessment[6]. No effort was done to consider similar impacts during winter months which may be more or less severe by region.
7. EEI recognizes that the likelihood of all CCR impacted resources not meeting the EPA imposed compliance deadline is highly unlikely.
8. EEI does not have sufficient insights to accurately predict the resource mix by fuel type beyond what has been provided in the NERC 2017 Summer Reliability Assessment.
9. The contribution of Coal Fired resources as considered in this review is as indicated in the NERC 2017 Summer Reliability Assessment and as identified as "On-Peak Expected Capacity: Generation Mix".

EEI Findings:

Assessment Area	Potential Reliability Impact (*during "On-Peak" periods*)
ERCOT	Loss of Impacted CCR Coal Resources could result in the anticipated summer reserve margin for ERCOT dropping below the level identified as necessary to maintain regional reliability.
FRCC	Loss of Impacted CCR Coal Resources appears to be insufficient to affect regional reliability.
MISO	MISO is highly dependent on coal resources. The apparent affect resulting from the loss of CCR Resources could have significant impacts within this region, which could necessitate MISO to shed load, rely on imports or both in order meet their peak load demands as well as require additional resource contracts to support reliability reserves.
NPCC-Maritimes	No regional impacts
NPCC-New England	No regional impacts

[2] NERC Glossary of Terms; On-Peak: Those hours or other periods defined by NAESB business practices, contract, agreements, or guides as periods of higher electrical demand.

[3] NERC Glossary of Terms; Reliable Operation: Operating the elements of the [Bulk-Power System] within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements.

[4] Anticipated reserve margin is quantify of resource reserves that has been identified through a detailed planning assessments which can be expected to support BES reliability in the event of an unanticipated failure of a system element. (See NERC Reliability Standard: TPL-001-4)

[5] The reference reserve margin is the reserve margin that has been identified by the regional planner as necessary to ensure Reliable Operation.

[6] http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2017%20Summer%20Assessment.pdf

NPCC-New York	No regional impacts
PJM	Loss of Impacted CCR Coal Resources would result in the anticipated summer reserve margin for PJM dropping below the level identified as necessary to maintain regional reliability.
SERC	SERC is highly dependent on coal resources. The impact resulting from the loss of CCR Resources would be significant potentially requiring SERC to shed load, rely on imports or both in order meet their peak load requirements and reliability reserves.
SPP	Loss of Impacted CCR Coal Resources would result in the anticipated summer reserve margin for SPP dropping below the level identified as necessary to maintain regional reliability.
WECC	Loss of impacted CCR coal reserves would have marginal impacts on WECC reliability. While the loss of these reserves would cause WECC to fall below the reference reserve level, it would only fall slightly below that level.

Generating Capacity of Units with Unlined Surface Impoundments

NERC Assessment Area and State	Nameplate Capacity (MW): All Generating Units	Nameplate Capacity (MW): All Coal-Fired Generating Units	All Generating Units at Plants with Unlined Surface Impoundments (MW)	All Coal-Fired Generating Units at Plants with Unlined Surface Impoundments (MW)	On-Peak Expected Capacity Of Coal by Region (NERC Summer Reliability Assessment)	Percent of Coal Fired Generating Capacity at Risk due to Unlined Surface Impoundments	Estimated Reserve Impact	2017 Summer Reference Margin Level	2017 Summer Anticipated Reserve Margin	Potential Reserve Margin due to CCR Forced Outages	Notes
ASCC	**3,209**	**164**	**81**	**81**	**3%**	**50%**	**1%**		**NA**	**NA**	
Alaska	3,209	164	81	81	3%	50%	1%				
ERCOT	**114,149**	**21,177**	**7,469**	**7,470**	**25%**	**35%**	**9%**	**13.75%**	**18.90%**	**10.1%**	Loss of impacted CCR Resources could result in having inadequate reserves during peak periods.
Texas	114,149	21,177	7,469	7,470	25%	35%	9%				
FRCC	**66,818**	**10,010**	**6,162**	**5,855**	**9%**	**58%**	**5%**	**15.00%**	**23.43%**	**18.0%**	No impact
Florida	66,818	10,010	6,162	5,855	9%	58%	5%				
HCC	**3,146**	**203**	**0**	**0**	**0%**	**0%**	**0%**		**NA**	**NA**	
Hawaii	3,146	203	0	0	0%	0%	0%				
MISO	**198,989**	**72,230**	**46,419**	**41,321**	**43%**	**57%**	**25%**	**15.80%**	**18.77%**	[illegible]	MISO is highly dependent of coal resources. The loss of impacted CCR Resources could have substantial impacts during peak periods.
Arkansas	12,489	4,320	0	0	0%	0%	0%				
Illinois	18,722	9,686	7,684	6,801	41%	70%	29%				
Indiana	21,217	13,747	11,989	10,231	57%	74%	42%				
Iowa	18,144	6,325	4,240	4,161	23%	66%	15%				
Kentucky	2,650	2,255	781	682	29%	30%	9%				
Louisiana	27,758	4,207	721	721	3%	17%	0%				
Michigan	30,162	10,704	7,548	5,821	25%	54%	14%				
Minnesota	18,134	4,835	3,542	3,542	20%	73%	14%				
Mississippi	7,935	400	400	400	5%	100%	5%				
Missouri	9,804	5,430	5,772	5,378	59%	99%	58%				
Montana	241	54	0	0	0%	0%	0%				
North Dakota	4,897	1,894	450	450	9%	24%	2%				
South Dakota	1,162	456	356	355	31%	78%	24%				
Texas	6,624	0	0	0	0%	0%	0%				
Wisconsin	19,050	7,917	2,936	2,779	15%	35%	5%				
NPCC-Maritimes	**323**	**0**	**0**	**0**	**0%**	**0%**	**0%**	**20.00%**	**90.99%**	**90.9%**	No impacted resources
Maine	323	0	0	0	0%	0%	0%				
NPCC-New England	**36,225**	**965**	**0**	**0**	**0%**	**0%**	**0%**	**15.10%**	**14.88%**	**14.9%**	No impacted resources
Connecticut	9,816	400	0	0	0%	0%	0%				
Maine	5,000	0	0	0	0%	0%	0%				
Massachusetts	13,675	6	0	0	0%	0%	0%				
New Hampshire	4,797	559	0	0	0%	0%	0%				
Rhode Island	2,124	0	0	0	0%	0%	0%				
Vermont	814	0	0	0	0%	0%	0%				
NPCC-New York	**44,191**	**1,738**	**0**	**0**	**0%**	**0%**	**0%**	**18.00%**	**28.54%**	**28.54%**	No impacted resources
New York	44,191	1,738	0	0	0%	0%	0%				
PJM	**213,685**	**65,046**	**45,563**	**43,556**	**33%**	**67%**	**22%**	**16.60%**	**28.4%**	**6.3%**	Loss of impacted CCR Resources could result in having inadequate reserves during peak periods.
Delaware	3,543	446	0	0	0%	0%	0%				
District of Columbia	25	0	0	0	0%	0%	0%				
Illinois	32,838	4,437	2,288	1,917	7%	43%	3%				
Indiana	7,450	3,960	3,904	3,904	52%	99%	52%				
Kentucky	5,302	2,622	2,549	2,278	48%	87%	42%				
Maryland	14,736	5,127	0	0	0%	0%	0%				
Michigan	2,469	0	0	0	0%	0%	0%				
New Jersey	19,887	691	0	0	0%	0%	0%				
North Carolina	1,666	137	0	0	0%	0%	0%				
Ohio	31,807	16,537	15,512	15,262	49%	92%	45%				
Pennsylvania	49,249	14,139	10,788	10,391	22%	73%	16%				
Virginia	29,120	3,701	2,921	2,220	10%	60%	6%				
West Virginia	15,594	13,250	7,602	7,584	49%	57%	28%				
SERC - Combined	**188,899**	**56,130**	**68,810**	**48,960**	**32%**	**87%**	**27.91%**	**15.00%**	**23.35%**	[illegible]	SERC is highly dependent of coal resources. The loss of impacted CCR Resources could have substantial impacts during peak periods.
SERC-E	**57,645**	**16,156**	**19,551**	**14,921**	**32%**	**92%**	**29.55%**	**15.00%**	**17.17%**	[illegible]	SERC-E is highly dependent of coal resources. The loss of impacted CCR Resources could have substantial impacts during peak periods.
Georgia	18	0	0	0	0%	0%	0%				
North Carolina	33,201	10,527	14,051	10,499	42%	100%	42%				
South Carolina	24,425	5,629	5,500	4,422	23%	79%	18%				
SERC-N	**59,565**	**20,708**	**22,753**	**16,282**	**32%**	**79%**	**25.16%**	**15.00%**	**22.01%**	[illegible]	SERC-N is highly dependent of coal resources. The loss of impacted CCR Resources could have substantial impacts during peak periods.
Alabama	7,175	0	476	0	7%	0%	0%				
Arkansas	679	0	0	0	0%	0%	0%				
Georgia	47	0	0	0	0%	0%	0%				
Kentucky	15,820	9,446	12,730	9,445	80%	100%	80%				
Mississippi	5,443	514	0	0	0%	0%	0%				
Missouri	4,309	2,482	2,482	2,482	58%	100%	58%				
North Carolina	688	53	0	0	0%	0%	0%				
Oklahoma	1,066	0	0	0	0%	0%	0%				
Tennessee	24,336	8,215	7,065	4,355	29%	53%	15%				
Virginia	4	0	0	0	0%	0%	0%				
SERC-SE	**71,689**	**19,265**	**26,506**	**17,757**	**32%**	**92%**	**29.50%**	**15.00%**	**36.35%**	**6.9%**	Loss of impacted CCR Resources could result in having inadequate reserves during peak periods.
Alabama	24,619	6,745	10,040	6,562	41%	97%	40%				
Florida	2,376	1,135	662	0	28%	0%	0%				
Georgia	40,325	10,289	12,575	10,098	31%	98%	31%				
Mississippi	4,370	1,097	2,229	1,097	51%	100%	51%				
SPP	**90,560**	**26,561**	**10,577**	**9,402**	**38%**	**35%**	**13%**	**12%**	**26.60%**	**11.1%**	No impact
Arkansas	3,231	1,167	558	558	17%	48%	8%				
Iowa	918	0	0	0	0%	0%	0%				
Kansas	17,210	5,235	3,820	3,820	22%	73%	16%				
Louisiana	1,002	0	0	0	0%	0%	0%				
Minnesota	165	0	0	0	0%	0%	0%				
Missouri	9,658	4,498	1,374	1,374	14%	31%	4%				
Montana	220	0	0	0	0%	0%	0%				
Nebraska	8,999	3,983	324	324	4%	8%	0%				
New Mexico	2,272	0	0	0	0%	0%	0%				

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North Dakota	3,670	2,279	0	0	0%	0%	0%				
Oklahoma	26,633	4,777	2,094	919	8%	19%	2%				
South Dakota	3,120	0	0	0	0%	0%	0%				
Texas	12,890	4,053	1,837	1,837	14%	45%	6%				
Wyoming	570	570	570	570	100%	100%	100%				
WECC-Combined	245,088	32,199	15,034	13,462	18%	41%	8%	15.40%	22.10%	14.57%	Loss of impacted CCR Resources could result in relatively minor impacts, but nevertheless inadequate reserves during peak periods.
WECC--CAMX-US	84,675	131	0	0	0%	0%	0%	16.14%	18.71%	18.71%	No impact
California	84,672	131	0	0	0%	0%	0%				
Nevada	3	0	0	0	0%	0%	0%				
WECC--NWPP	86,405	13,474	5,297	5,297	18%	39%	7%	16.56%	23.03%	16.0%	No impact
California	113	0	0	0	0%	0%	0%				
Idaho	5,305	19	0	0	0%	0%	0%				
Montana	5,907	2,518	2,272	2,272	38%	90%	35%				
Nevada	13,213	809	0	0	0%	0%	0%				
Oregon	17,393	642	0	0	0%	0%	0%				
Utah	9,602	4,930	0	0	0%	0%	0%				
Washington	31,351	1,460	0	0	0%	0%	0%				
Wyoming	3,520	3,096	3,025	3,025	86%	98%	84%				
WECC--RMRG	23,060	8,625	5,685	4,459	18%	52%	9%	14.17%	27.41%	18.10%	No impact
Colorado	18,025	5,535	3,728	2,502	21%	45%	9%				
South Dakota	145	0	0	0	0%	0%	0%				
Wyoming	4,890	3,090	1,957	1,957	40%	63%	25%				
WECC--SRSG	40,947	9,970	4,052	3,706	18%	37%	7%	15.83%	28.82%	22.1%	No impact
Arizona	31,897	6,229	2,416	2,070	8%	33%	3%				
New Mexico	7,485	3,741	1,636	1,636	22%	44%	10%				
Texas	1,566	0	0	0	0%	0%	0%				
Grand Total	1,195,281	286,420	200,115	170,107	17%	59%	10%		NA	NA	