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Assurance Penalty Level Analysis Final Rule TSD

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This Technical Support Document (TSD) supports EPA's determination that the final Transport Rule's assurance provision penalty requirement provides sufficient deterrence against a state exceeding its assurance level. Section VII.E in the final Transport Rule preamble discusses the assurance provisions, including the allowance surrender penalty analyzed in this TSD. This TSD is organized as follows:

1. Background
2. Approach
3. Results

1. Background

The final Transport Rule's limited interstate trading programs include assurance provisions to ensure that the necessary reductions will occur within each covered state. The assurance provisions limit emissions from covered units in a state to the state's emissions budget plus variability limit, i.e., the state's assurance level.

As described in preamble section VI.D, EPA used a multi-factor analysis to determine each state's emissions budget. Subsequently, as described in VI.F, EPA determined variability limits for each state that reflect a percentage of the state's budget (e.g., 10%). This variability limit is then added to the state budget to yield the state's assurance level. If emissions from covered sources in a state in a compliance period exceed the state's assurance level, then EPA applies additional criteria to determine which owners and operators of units in the state will be subject to an allowance surrender penalty of two allowances per ton for their share of the emissions over the assurance level.[1] This penalty is in addition to the standard program requirement that owners and operators of covered units hold one allowance for each ton emitted; therefore, for any emissions identified by EPA as being over the state's assurance level, the relevant owners and operators must submit a total of three allowances per ton – one of which is for standard compliance for emitting under the program, and two of which are for the assurance provision penalty.

As discussed in preamble section VI.F, EPA does not find reason to expect that emissions from covered sources in any state will exceed that state's assurance level. The description and tables below describe a sensitivity analysis EPA conducted to determine whether the two-for-one

[1] The assurance provision allowance surrender penalty addressed in this TSD is distinct from the penalties, discussed in preamble section VII.F, that apply to the trading program requirement to hold allowances sufficient to cover emissions for each compliance period.

allowance surrender penalty provides a sufficient deterrent to keep emissions from covered sources in each state from exceeding the assurance levels.

2. Approach

To determine if a penalty of two allowances for every ton of excess emissions would be sufficient, EPA used the Integrated Planning Model (IPM) to assess a "TR_Penalty_Scenario" whose results, along with the results of other IPM model runs for the Transport Rule, can be found in the docket. More information on IPM can be found in the Documentation Supplement for EPA Base Case v.4.10_FTransport – Updates for Final Transport Rule, which is also in the docket. This penalty scenario offered covered sources in each state the choice to emit beyond the state's assurance level and incur a fine for each excess ton worth twice the value of an allowance (in addition to having to submit one allowance for emitting each ton, per standard compliance procedures). In this analysis, the "state assurance level" is the state's emissions budget plus the state's variability limit and corresponds to the "state emissions assurance level" in tables VI.F-1 and VI.F-2 of the preamble**.** The size of the penalty was calculated as twice the allowance price for the relevant pollutant taken from the IPM analysis of the final rule's remedy (TR_Limited_Trading_Final), as shown in Table 1.

Table 1. Allowance prices (2007$) in the final remedy (TR_Limited_Trading Final) and Penalty Costs in the "assurance penalty sensitivity" run (TR_Penalty_Scenario)

	Emission Allowance Prices ($/Ton) from final remedy run		Emission Penalty Costs ($/Ton) in the assurance penalty sensitivity run	
	2012	2014	2012	2014
SO_2 Region 1 (TR)	971	1,127	1,942	2,254
SO_2 Region 2 (TR)	576	663	1,152	1,327
NO_x Annual (TR)	497	577	994	1,153
NO_x Ozone Season (TR)	1,321	1,532	2,642	3,064

It is important to consider that while the effective fine in this scenario (twice the value of the relevant pollutant's allowance price) is a technically valid representation of the final rule's penalty structure, it is an analytic understatement of the actual deterrence value of this penalty in practice. The penalty in practice will have more of a deterrent effect than what this scenario models it to have for two reasons. First, the penalty cost as modeled is fixed at twice the allowance price in the final remedy scenario (TR_Limited_Trading_Final) for every ton of emissions in excess of a state's assurance level. In reality, excess emissions would increase the allowance price (and therefore the cost of the penalty itself) since allowances would have to be

bought and surrendered for the penalty, raising allowance demand and thus making them more valuable. The modeling imposed a fine and did not adjust the allowance pool to account for penalty surrenders, and so it understates the cost of the penalty incurred. Second, the model has perfect foresight of all future emitting behavior and thus does not take any "risk" into account when determining whether excess emissions are "worth it" at the penalty cost modeled. In reality, owners and operators of covered units will assign a risk premium to the nominal penalty consequence because they do not have perfect foresight and cannot be sure of their precise emissions until the compliance period is complete. Therefore, program participants can be expected to act more "conservatively" than the modeling would suggest when determining whether excess emissions are "worth it" at the penalty cost modeled, which suggests again that this analysis understates the deterrence value of the penalty in practice.

The sensitivity analysis presented in this TSD was based off of the main remedy analysis presented throughout the preamble and Regulatory Impact Analysis for this final rule. In common with that main remedy analysis, this sensitivity analysis assumed preliminary variability limits that were smaller than the variability limits finalized in this rule. Because the final rule's variability limits are larger than those analyzed in this sensitivity, the results presented below overstate each state's economic interest in violating its assurance levels. In other words, the analysis examined whether or not states have an economic interest in surpassing an upper bound in permissible emissions in 2012 and 2014 (budget plus assumed variability limit) that is less than the actual upper bound (budget plus finalized variability limit) imposed on states in 2012 and 2014 under the final rule. It therefore follows that the state's actual economic interest in surpassing the actual upper-bound would be less than the projected results presented below analyzed for the modeled (lower than actual) upper-bound. This relationship further increases EPA's confidence in the conclusions it draws from the results presented below.

3. Results

EPA compared the state-level emissions in 2012 and 2014 in this analysis to the state assurance levels to determine whether the penalty level deterred excess emissions. Tables 2 through 5 show the state assurance levels and modeled emissions from covered sources in each state. The modeled allowance prices in 2012 and 2014 for each pollutant are shown at the bottom of each table. The penalty for exceeding the assurance level would be equal to twice the allowance price.

In no case do the covered emissions in a state exceed that state's assurance level in 2012 or 2014. This result indicates that the penalty offers a sufficient deterrent to ensure emissions do not exceed assurance levels in 2012 and 2014. Even though the modeling of this scenario understated the actual value of the deterrent in practice, in no state did the covered sources find it economic to exceed the states' assurance levels in 2012 and 2014.

In some states, the covered sources in a state are modeled to have collective emissions that are exactly equal to the state's assurance level. These projections occur because the model operates under perfect foresight and perfect information, and it therefore allows sources in the modeling to emit up to the state's assurance level with full certainty that emissions will respect that constraint to the last ton emitted, successfully avoiding additional emissions which are shown to be uneconomic under the assurance penalty. In reality, the deterrence value of the penalty would likely lead a state's covered sources to act conservatively by emitting below a state's assurance level (rather than exactly up to it) to ensure that unexpected fluctuations in emissions do not result in a penalty.

In some cases, notably SO_2 Group 1 states, the covered emissions are projected to be significantly lower than the states' assurance levels in 2012. This would occur if covered sources decide to reduce their emissions beyond what is required so they can bank the excess allowances. These banked allowances could then used to cover emissions in future years. Specifically, the SO_2 Group 1 state budgets were determined by the feasible emission reductions at \$500/ton SO_2 in 2012 and \$2300/ton SO_2 in 2014 (see Significant Contribution and State Emissions Budgets Final Rule TSD). Covered sources in these states may decide to reduce their emissions further than required in 2012 and 2013 and bank the unused allowances for use in 2014 and later years. This pattern effectively smoothes their emission reductions over time to minimize total compliance costs in those states. The modeled allowance prices in those states also reflect this smoothing of emission reduction patterns. For example, as seen in Table 2, the 2012 and 2014 projected allowance prices for Group 1 SO_2 states are closer to each other than the marginal cost thresholds used to formulate their budgets in those years (\$500 per ton in 2012 and \$2,300 per ton in 2014). This banking behavior to smooth emission reductions over time is shown in this analysis to be entirely consistent with each state's assurance levels in both 2012 and 2014.

As noted above, EPA's modeling of this scenario projects no instance in which covered sources would find it economic to exceed a state's assurance level in any of the programs in 2012 or 2014. This analysis also projects that the penalty provides sufficient deterrence for virtually all states in these programs over the 2020-2030 timeframe as well. However, the projections appear to suggest small exceedances in two states in 2020 and in three states in 2030.[2] In most of these cases, the projected exceedances are marginal – on the order of two

[2] As previously noted, these findings are based on lower variability limits than included in the final rule. EPA conducted a separate sensitivity analysis on the remedy (with results presented in Appendix F of the RIA) incorporating the final variability limits. This analysis shows a dramatic reduction in the number of states projected to approach their assurance levels in the 2020 and 2030 projections. For example, while the original remedy analysis (on which this TSD's sensitivity analysis is based) projected in 2020 that 11 states would approach their assurance levels for SO2, 2 states for annual NOX, and 1state for ozone-season NOX, the revised remedy

hundred tons of pollutant. EPA does not believe that these longer-run results actually indicate a likelihood of these exceedances occurring. It is important to note that this modeling assumes perfect foresight and perfect information, even into the 2020-2030 timeframe, and that under those assumptions, unit owners and operators would be willing to expend banked allowances in those years even to the point of paying assurance penalties on them. In reality, operators of covered units do not have perfect foresight or perfect information and will therefore act more conservatively than "optimal" banking patterns from IPM modeling would indicate.

As a result, EPA expects sources will collectively continue to respect their states' assurance levels in those instances by sustaining the Transport Rule emission reductions into the 2020-2030 timeframe and banking allowances further into the future to guard against unanticipated developments that the model does not capture. Consequently, EPA does not believe that these limited small instances of projected exceedances in 2020 or 2030 are likely to occur in the actual operation of these programs. However, EPA will monitor the pattern of compliance with these programs over the long-run and will be prepared to adjust the penalty accordingly if evidence suggests that increased deterrence would be necessary at those later stages to encourage states to respect their assurance levels. At this point, EPA believes that it is best to be sure in the initial years that the assurance penalty is effective in keeping emissions within variability limits, while encouraging trading to lower costs and increase flexibility and avoiding actions that have a chilling effect on activities. While doing this, EPA believe it is important to remain mindful that we do want assurance of meeting emission reductions over time.

EPA believes these findings support a determination that the penalty requirement of surrendering two additional allowances for each ton of excess emissions provides a sufficient deterrent in the final Transport Rule such that EPA does not expect the covered sources in any state to exceed the state's assurance levels under these programs.

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sensitivity analysis (including the larger, finalized variability limits) saw only 5 states approach assurance levels for annual SO2, no state for annual NOX, and 1 state for ozone-season NOX. With many fewer states even approaching their assurance levels in the long term with the final rule's variability limits, states are even less likely to exceed assurance levels in the 2020-2030 timeframe than the findings presented in this TSD's sensitivity analysis based on lower variability limits originally modeled.

Table 2. Annual SO_2 Group 1 State Assurance Levels and Emissions in 2012 and 2014 (TR_Penalty_Scenario)

	2012		2014	
	State Assurance Level (thousand tons)	Penalty Case Emissions (thousand tons)	State Assurance Level (thousand tons)	Penalty Case Emissions (thousand tons)
Illinois	258	210	137	128
Indiana	314	241	177	177
Iowa	118	75	83	78
Kentucky	208	146	117	117
Maryland	33	27	31	30
Michigan	214	190	158	158
Missouri	228	182	183	177
New Jersey	7	6	7	7
New York	23	20	13	13
North Carolina	151	117	63	63
Ohio	341	229	151	151
Pennsylvania	307	250	123	123
Tennessee	163	97	65	65
Virginia	78	67	39	39
West Virginia	161	119	83	83
Wisconsin	87	77	44	44

Table 3. Annual SO_2 Group 2 State Assurance Levels and Emissions in 2012 and 2014 (TR_Penalty_Scenario)

	2012		2014	
	State Assurance Level (thousand tons)	Penalty Case Emissions (thousand tons)	State Assurance Level (thousand tons)	Penalty Case Emissions (thousand tons)
Alabama	238	219	235	173
Georgia	174	159	105	93
Kansas	46	41	46	46
Minnesota	46	43	46	45
Nebraska	72	65	72	70
South Carolina	97	85	97	97
Texas	268	244	268	266

Table 4. Annual NO_X State Assurance Levels and Emissions in 2012 and 2014 (TR_Penalty_Scenario)

	2012		2014	
	State Assurance Level (thousand tons)	Penalty Case Emissions (thousand tons)	State Assurance Level (thousand tons)	Penalty Case Emissions (thousand tons)
Alabama	80	74	79	68
Georgia	68	61	45	40
Illinois	53	48	53	49
Indiana	121	110	119	110
Iowa	42	37	41	38
Kansas	34	31	28	24
Kentucky	94	84	85	76
Maryland	18	16	18	17
Michigan	66	59	64	57
Minnesota	33	31	33	31
Missouri	58	52	54	49
Nebraska	29	26	29	27
New Jersey	8	7	8	8
New York	20	18	20	17
North Carolina	56	48	46	42
Ohio	102	85	96	84
Pennsylvania	132	118	131	117
South Carolina	36	33	36	36
Tennessee	39	33	21	20
Texas	147	133	147	137
Virginia	37	33	37	35
West Virginia	65	56	60	53
Wisconsin	35	31	33	30

Table 5. Ozone Season NO_X State Assurance Levels and Emissions in 2012 and 2014 (TR_Penalty_Scenario)*

	2012		2014	
	State Assurance Level (thousand tons)	Penalty Case Emissions (thousand tons)	State Assurance Level (thousand tons)	Penalty Case Emissions (thousand tons)
Alabama	35	32	35	30
Arkansas	18	15	18	17
Florida	31	28	31	29

Georgia	32	27	21	18
Illinois	23	21	23	21
Indiana	52	47	51	47
Iowa	18	16	18	16
Kansas	15	13	12	10
Kentucky	40	35	36	32
Louisiana	16	14	16	14
Maryland	8	7	8	7
Michigan	28	25	27	24
Mississippi	12	11	12	11
Missouri	25	22	23	21
New Jersey	4	3	4	4
New York	10	8	10	8
North Carolina	24	21	20	18
Ohio	44	35	42	36
Oklahoma	24	21	24	21
Pennsylvania	57	50	57	50
South Carolina	15	14	15	15
Tennessee	17	14	9	8
Texas	69	63	69	64
Virginia	17	14	17	15
West Virginia	28	23	26	22
Wisconsin	16	13	15	13

*As discussed in section III of the Transport Rule preamble, the final rule does not include the states of Iowa, Kansas, Michigan, Missouri, Oklahoma, or Wisconsin in the ozone season program. EPA issued a supplemental proposal to include these six states in the Transport Rule ozone season program.