Response to Comments for the Federal Register Notice for
Air Quality State Implementation Plans; Approvals and Promulgations: Utah; Revisions to Regional Haze State Implementation Plan; Federal Implementation Plan for Regional Haze; Partial Approval and Partial Disapproval

Docket No. EPA-R08-OAR-2015-0463

June 1, 2016

*This Response to Comment Document was finalized on June 1, 2016. As shown in the "redline/strikeout" version of this document in the docket for this action, the Agency made non-substantive and formatting edits on June 9, 2016.

Table 1. Cost Effectiveness of SCR+LNB/OFA Using PacifiCorp's Annual Cost Numbers and Assuming Operation of All Units at 90% Capacity Factor[57].

	Hunter 1	Hunter 2	Huntington 1	Huntington 2
Maximum Hourly Heat Input, MMBtu/hr	4,750	4,750	4,960	4,960
Annual Heat Input at 90% CF, MMBtu/yr	37,449,000	37,449,000	39,104,640	39,104,640
PacifiCorp's Total Annual Costs of SCR+LNB/OFA at 90% CF, $/yr	$24,539,094	$24,144,098	$24,101,813	$24,129,266
Baseline NOx rate, lb/MMBtu	0.401	0.382	0.375	0.386
SCR+LNB/OFA NOx Rate, lb/MMBtu	0.050	0.050	0.050	0.050
Annual Tons of NOx Removed with SCR+LNB/OFA at 90% CF	6,572	6,217	6,355	6,570
Cost Effectiveness of SCR+LNB/OFA at 90% CF	$3,734	$3,884	$3,793	$3,673
PacifiCorp's Cost Effectiveness of SCR+LNB/OFA at 90% CF for costs and actual CF during 2001-2003 for NOx emission reductions	$4,462	$4,616	$4,733	$4,804

[57] All of the data in this table is from the tables in PacifiCorp's August 6, 2014 letter to UDAQ with its updated BART analysis, with the exception of the annual heat input at 90% capacity factor, the tons of NO_x removed from baseline at 90% capacity factor, and the Cost Effectiveness of SCR+LNB/OFA at 90% capacity factor which were calculated.

Response: This comment pertains to the costs that PacifiCorp submitted to UDAQ, and which UDAQ included in its SIP submittal to EPA. However, EPA developed separate costs to support our FIP, and has updated those costs in support of our final action. Accordingly, we are only responding to comments directed at the costs developed by EPA. Nonetheless, refer to our responses elsewhere where similar issues may be discussed. To the extent that this comment could be applied to EPA's cost estimates, we note that the comment generally attempts to show that SCR is more cost-effective than PacifiCorp estimated. As we find SCR to be reasonably cost-effective based on our estimates (which in any case we think are correctly derived), any comment intended to show that SCR is even more cost-effective would not change our BART determination.

Comment: [Conserv Orgs -- Stamper Report, pp. 14-19]

Correction of Some of the Deficiencies in PacifiCorp's SCR Cost Analyses Shows that the Cost Effectiveness of SCR+LNB/OFA is Much More Cost Effective than PacifiCorp's Cost Numbers Indicate.

As discussed above, we have identified several deficiencies in PacifiCorp's cost analyses for SCR at Hunter Units 1 and 2 and Huntington Units 1 and 2 that overestimate the costs of SCR at these units. To reiterate, those deficiencies include:

Calculation of indirect capital costs for SCR improperly based on the direct capital cost of SCR and LNB/OFA rather than just based on the direct capital costs of SCR.

- Sales tax was included in capital costs, but no sales tax applies in Utah for pollution control equipment.

- PacifiCorp appears to have improperly included or double-counted Owner's Costs in the capital costs.

- Assumption of 2 SCR reactors needed per EGU not justified.

- Calculated costs based on urea which has higher capital and operational expenses compared to anhydrous ammonia, which is more commonly used in SCR applications.

- Assumed costs per pound of urea were much higher than used by EPA in recent BART analyses.

- Assumed costs per cubic feet for SCR catalyst are much higher than used by EPA in recent BART analyses.

- Property taxes were greatly overstated in SCR direct annual cost analyses and should not have been included in the capital costs at all.

- PacifiCorp estimated SCR costs assuming 90% capacity factor but determined emission reductions to be achieved based on much lower capacity factors (overstating costs and understating the emission reduction benefits).

Below, we have corrected PacifiCorp's SCR cost analyses for those issues which could be more readily corrected, given that the public was not provided with PacifiCorp's cost spreadsheets that could be modified. We recalculated PacifiCorp's direct capital costs of SCR to exclude property taxed and capital costs of LNB/OFA that should not have been included in the direct capital costs of SCR, and we recalculated the indirect installation costs, project contingency, and pre-production costs based on the revised PacifiCorp capital cost of SCR. We also revised the property taxes to reflect the declining percent good value provided in Utah's tax regulations. And, after recalculating total annual costs, we divided the annual costs by the tons per year of NO_x reduced with each unit operating at 90% capacity factor.

We first re-calculated the direct capital costs for SCR at each unit by subtracting the capitalized property taxes that should not have been included in the capital costs, as shown in Table 2 below.

Table 2. Revised PacifiCorp Direct Capital Costs of SCR +LNB/OFA Excluding Capitalized Property Taxes[58]

	Hunter 1	Hunter 2	Huntington 1	Huntington 2
PacifiCorp Row 80 Direct Capital Costs	$124,875,935	$122,947,212	$121,673,816	$122,258,814
PacifiCorp Capitalized Property Tax	$2,764,009	$2,773,612	$1,864,732	$1,863,726
Recalculated Direct Capital Costs Excluding Capitalized Property Tax	$122,111,926	$120,173,600	$119,809,084	$120,395,088

[58] Cost data from PacifiCorp's August 2012 BART Update, Appendix B – Row 80 Direct Capital Costs- EPA Cost Effectiveness Comparison.

Next, we re-calculated the indirect capital costs of SCR by subtracting the capital costs of low NO_x burners and overfire air from the recalculated direct capital costs of SCR (i.e., excluding capitalized property taxes from Table 2 above). Then, we applied the percentages from the EPA's Control Cost Manual, as relied on by PacifiCorp, for projecting indirect

capital costs of SCR. We then calculated a revised Total Capital Investment for SCR plus LNB/OFA for each unit.[306] The results of these re-calculations are shown in Table 3 below.

Table 3: Recalculated Total Capital Investment of SCR plus LNB/OFA[60]

PacifiCorp August 2014, Appendix A Row Number	Description of Cost	Hunter 1	Hunter 2	Huntington 1	Huntington 2
	Recalculated Direct Capital Costs of SCR+LNB/OFA Excluding Capitalized Property Tax	$122,111,926	$120,173,600	$119,809,084	$120,395,088
	PacifiCorp's Capital Costs of LNB/OFA	$11,586,773	$8,872,212	$8,325,049	$8,562,067
80	Recalculated Direct Capital Costs of SCR (Excluding LNB/OFA and Excluding Capitalized Property Tax)	$110,525,153	$111,301,388	$111,484,035	$111,833,021
86	Recalculated Indirect Installation Costs Due to General Facilities (0.05 x Direct Capital Costs)	$5,526,258	$5,565,069	$5,574,202	$5,591,651
87	Recalculated Indirect Installation Costs Due to Engineering and Home Office Fees (0.10 x Direct Capital Costs)	$11,052,515	$11,130,139	$11,148,404	$11,183,302
88	Recalculated Indirect Installation Costs Due to Process Contingency (0.05 x Direct Capital Costs)	$5,526,258	$5,565,069	$5,574,202	$5,591,651
89	Recalculated Total Indirect Installation Costs (Direct Capital Costs x 0.05 x 0.10 x 0.05)	$22,105,031	$22,260,278	$22,296,807	$22,366,604
90	Recalculated Project Contingency (Direct Capital Costs + Total Indirect Installation Costs) x 0.15	$19,894,528	$20,034,250	$20,067,126	$20,129,944
91	Recalculated Total Plant Costs (Direct Capital Costs + Total Indirect Installation Costs + Project Contingency)	$152,524,711	$153,595,915	$153,847,968	$154,329,569
92	AFUDC (PacifiCorp did not include)	Not Used in Cost Effectiveness Analyses			
93	Recalculated Preproduction Costs (0.02x Total Plant Costs)	$3,050,494	$3,071,918	$3,076,959	$3,086,591
94	PacifiCorp's Inventory Capital	$69,376	$69,376	$72,443	$72,443
95	PacifiCorp's Initial Catalyst and Chemicals	$35,000	$35,000	$35,000	$35,000
96	**Recalculated Total Capital Investment of SCR plus LNB/OFA (Plant Costs + Preproduction Costs+Inventory Capital + Initial Catalyst and Chemicals + PacifiCorp's Capital Costs of LNB/OFA).**	**$167,266,354**	**$165,644,422**	**$165,904,583**	**$166,395,815**
Compare PacifiCorp's Row 96	plus LNB/OFA based on improper inclusion of LNB/OFA in indirect costs of SCR and including Owner's Costs	$180,791,743	$177,483,372	$176,287,506	$176,517,450

[60] If a row is not identified as "recalculated," the cost is from PacifiCorp's August 2014 Appendix A worksheet.

[306] Although it appears that PacifiCorp double-counted or otherwise improperly included some Owner's Costs in the direct capital costs as discussed above, we did not exclude those costs in this analysis, because PacifiCorp's seems to indicate in its discussion of this issue that it only included Owner's Costs in the indirect installation costs for Engineering and Home Office fees.

As Table 3 above demonstrates, the recalculated capital investment of SCR plus LNB/OFA are about 6% lower when capitalized property tax and owners costs are excluded and when indirect capital costs of the SCR are calculated just based on the direct capital costs of SCR.

Next, we recalculated the annual property taxes for the SCR plus LNB/OFA based on PacifiCorp's stated property tax rate of 0.94% and based on the Percent Good valuation required by the Utah Property Tax Regulations. As previously stated, for Class 8 equipment such as pollution control equipment, Utah Property Tax Rule R884-24P-33 provides that the taxable value of Class 8 property is calculated by applying the percent good factor against the acquisition cost of the property.[307] The State Tax Commission's 2014 Recommended Personal Property Valuation Schedules indicate the following percent good factors for Class 8 equipment:

Utah Percent Good Valuation Schedule for Class 8 Property[62]

Year	Percent Good of Acquisition Cost
2014	
2013	93%
2012	87%
2011	80%
2010	71%
2009	64%
2008	57%
2007	50%
2006	42%
2005	34%
2004	23%
2003	12%

[62] *See* Table 1 of 2014 Recommended Personal Property Valuation Schedules And Registered Vehicle Uniform Fees, Utah State Tax Commission, Property Tax Commission, Ex. 4.

Based on this percent good valuation schedule and a 0.94% property tax rate, we recalculated property tax for the SCR plus LNB/OFA for the assumed 20 year life of the controls, assuming the property taxes are based on a valuation of the total capital investment costs using 100% for the 1st year, 93% for the second year, 87% for the third year, and so on with a 12% percent good factor applied in the 12th through 20th year. Then we took the annual average of these annual property taxes to reflect the declining property taxes over time. This is a much more appropriate level of property taxes to include in the indirect operation costs as compared to PacifiCorp's

[307] Utah Rule 884-24p-033(2)(g)(ii).

approach of assuming 1% of the total capital investment of the pollution controls would apply every year. However, our analysis of property taxes is likely overestimated because we based the tax on the total capital investment (recalculated as show in Table 3 above), whereas property taxes are based on the "acquisition cost" which does not include indirect costs.[308]

Table 4 below shows the recalculated average annual property taxes using the declining percent good method for each of the BART-subject units.

Table 4: Recalculated Annual Average Property Taxes for SCR plus LNB/OFA Assuming Tax Rate of 0.94%[64]

	Hunter 1	Hunter 2	Huntington 1	Huntington 2
Recalculated Average Annual Property Taxes Per Year, Based on the Recalculated Total Capital Investment of SCR plus LNB/OFA.	**$635,997**	**$629,830**	**$628,739**	**$631,508**
Compare to PacifICorp's Assumed Property Tax Cost Per Year (Row 109 of Appendix A of August 2014 BART Update)	$1,807,917	$1,774,834	$1,762,875	$1,765,174

[64] The details of these calculations are provided in Ex.5, Worksheet entitled Revised Calculation of Annual Property Taxes.

As Table 4 demonstrates, PacifiCorp has greatly overstated the annual property taxes by not accounting for the fact that Utah tax rules provide for a declining value of pollution controls over time.

Last, we recalculated cost effectiveness of SCR plus LNB/OFA for the Hunter Units 1 and 2 and Huntington Units 1 and 2 using the corrected total capital investment costs of these controls from Table 3 above, using the recalculated annual average property taxes from Table 4 above, and using the annual tons of NO_x removed with SCR plus LNB/OFA with all units operating at 90% capacity factor from Table 1 above.

To determine the annualized capital costs, the total capital costs are multiplied by the cost recovery factor. The capital recovery factor (CRF) is based on the following equation:

$$CRF = [i(1+i)^n]/[(1+i)^n - 1]$$

where i is the interest rate and n is the life of the pollution control equipment. In essence, annualization establishes an annual payment sufficient to finance the capital investment for its entire life.[309] PacifiCorp assumed an interest rate of 7% and a 20 year life of the pollution control

[308] Utah Rule 884-24p-033(1)(a)(i).
[309] US EPA Air Pollution Control Cost Manual, EPA/452/B-02-001, Section 2, at 2-21 (January 2002), available at https://www3.epa.gov/ttncatc1/dir1/c_allchs.pdf.

equipment, for a CRF of 0.094. Although we think a 7% interest rate is too high as will be discussed in Section II of this document, for the purpose of this recalculation of PacifiCorp's cost effectiveness of SCR plus LNB/OFA, we did not change the assumed interest rate. The annualized capital costs, also called the indirect capital costs, of LNB/OFA plus SCR were calculated based on the revised total capital costs from Table 3 above and the CRF of 0.094.

The recalculated annual average property taxes were used in lieu of PacifiCorp's calculated annual property tax in recalculated total direct annual costs for the four units. The total direct annual costs are based on the maintenance cost + the total variable direct cost + property tax. The maintenance costs were calculated based on 1.5% of the Total Capital Investment of SCR. Therefore, because we recalculated the total capital investment, we also recalculated the maintenance costs. The total variable costs include the costs for electricity, reagent, catalyst, and water. Even though we have shown above that PacifiCorp assumed too high of costs for urea and catalyst, we did not revise these costs.

Table 5 below shows the specific costs that we revised, recalculated total annual costs, and recalculated cost effectiveness with the tons of NO_x removed at 90% capacity factor.

Table 5. Revised Total Annual Costs and Cost Effectiveness of SCR plus LNB/OFA at 90% Capacity Factor

PacifiCorp August 2014, Appendix A Row Number	Description of Cost	Hunter 1	Hunter 2	Huntington 1	Huntington 2
96	Recalculated Total Capital Investment of SCR plus LNB/OFA (Total Capital Investment of SCR + PacifiCorp's Capital Costs of LNB/OFA)	$167,266,354	$165,644,422	$165,357,420	$166,085,670
97	Recalculated SCR Maintenance Cost (0.015 x Total Capital Investment of SCR)	$2,508,995	$2,484,666	$2,480,361	$2,491,285
107	PacifiCorp's Total Variable Direct Cost	$2,953,839	$2,953,839	$3,054,331	$3,054,331
108	Recalculated Total Direct Annual Cost (Maintenance Cost + Total Variable Direct Cost + Property Taxes)	$6,098,831	$6,068,335	$6,163,431	$6,177,124
109	Recalculated Average Annual Property Tax Factor	$635,997	$629,830	$628,739	$631,508
111	Capital Recovery Factor (interest = 7%, N = 20 years)	0.0944	0.0944	0.0944	0.0944
112	Recalculated Indirect Annual Costs (CRF x Total Capital Investment)	$15,788,761	$15,635,662	$15,608,571	$15,677,312
113	Recalculated Total Annual Costs (Direct Annual Costs + Indirect Annual Costs)	$21,887,592	$21,703,997	$21,772,001	$21,854,436
114	Recalculated Annual NOx Removed from baseline (2001-2003 average) at 90% Capacity Factor	6,572	6,217	6,355	6,570
115	Recalculated Cost Effectiveness of SCR plus LNB/OFA	$3,330	$3,491	$3,426	$3,327

As Table 5 demonstrates, the correction of just come of the more significant flaws in PacifiCorp's cost analysis results in much lower total annual costs and much lower cost effectiveness values than PacifiCorp's overstated SCR cost analysis does.

In the next section of these comments, we have presented an independent cost analysis of SCR for Hunter 1 and 2 and Huntington 1 and 2 which demonstrates that the costs of SCR and cost effectiveness of SCR plus LNB/OFA are even lower than our recalculation of parts of PacifiCorp's SCR cost estimate shows in Table 5.

Response: This comment pertains to the costs that PacifiCorp submitted to UDAQ, and which UDAQ included in its SIP submittal to EPA. However, EPA developed separate costs to support our FIP, and has updated those costs in support of our final action. Accordingly, we are only responding to comments directed at the costs developed by EPA. Nonetheless, refer to our responses elsewhere where similar issues may be discussed. To the extent that this comment could be applied to EPA's cost estimates, we note that the comment generally attempts to show that SCR is more cost-effective than PacifiCorp estimated. As we find SCR to be reasonably cost-effective based on our estimates (which in any case we think are correctly derived), any comment intended to show that SCR is even more cost-effective would not change our BART determination.

Comment: [Conserv Orgs -- Stamper Report, p. 20]

Analysis of SCR Plus LNB/OFA Cost Effectiveness for Hunter Units 1 and 2 and Huntington Units 1 and 2 Using the Sargent & Lundy Integrated Planning Model SCR Cost Module

We used the Sargent & Lundy SCR cost module that was developed for estimating SCR costs for the Integrated Planning Model (IPM)[310] to estimate the costs of SCR at the BART-subject units at the BART-subject EGUs in Utah, with some important modifications to ensure more realistic costs and consistency with the methodology of the EPA's Control Cost Manual. EPA has used the Sargent & Lundy cost module to estimate the cost for SCR in its evaluation of NO_x BART for the BART-subject EGUs in Arizona[311] and in Wyoming.[312] EPA also relied on the Sargent & Lundy SCR cost module to estimate capital costs of SCR in its proposed federal implementation plan (FIP) addressing regional haze in Montana.[313] According to EPA, the IPM controls costs are based on databases of actual SCR project costs and take into consideration coal type, boiler type, and NO_x reduction efficiency.[314]

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[310] *See* Documentation for the EPA Base Case v.4.10 Using the Integrated Planning Model, August 2010, EPA #430-R-100/10 and, in particular, see Appendix 5-2A SCR, available at http://www.epa.gov/airmarkets/progsregs/epa-ipm/docs/v410/Appendix52A.pdf. A copy of Appendix 5-2A, IPM Model – Revisions to Cost and Performance for APC Technologies, SCR Cost Development Methodology, August 2010, prepared by Sargent & Lundy, is attached as Ex. 6.

[311] 77 Fed. Reg. 42852 (July 20, 2012).

[312] *See* February 7, 2013 Memo from Jim Staudt, Andover Technology Partners, to Doug Grano, EPA, at 3 (in Docket for EPA's rulemaking on the Wyoming Regional Haze Plan at Docket ID: EPA-R08-OAR-2012-0026-0086, available at www.regulations.gov).

[313] 77 F.R.24044 (April 20, 2012).

[314] *Id.*