DEPARTMENT OF PUBLIC SERVICE REGULATI ON
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

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IN THE MATTER OF NorthWestern Energy's Application for Approval to Purchase and Operate PPL Montana's Hydroelectric Facilities, for Approval of Inclusion of Generation Asset Cost of Service in Electricity Supply Rates, for Approval of Issuance of Securities to Complete the Purchase, and for Related Relief	)	REGULATORY DIVISION DOCKET NO. D2013.12.85

DATA RESPONSES OF MONTANA CONSUMER COUNSEL TO PSC-196 THROUGH PSC-236 OF THE MONTANA PUBLIC SERVICE COMMISSION

PSC-196

Regarding: Electronic Files
Witnesses: Clark, Wilson

Please provide working electronic copies, with all links intact, of all exhibits, spreadsheets, and other files used to support your testimony.

RESPONSE:

Please see files in folder "JWW Exhibits and Workpapers" and Exhibit_(AEC-1) Hydro Assets (2) provided in the attached CD.

PSC-197

Regarding: Depreciation
Witness: Clark

a. Please explain your definition of intergenerational ratepayer inequity.

b. If applicable and based on that definition, how would you account for the company's possible re-investment in future assets to offset that inequity? Are you assuming the company does not grow or re-invest in new assets?

RESPONSE:

a. Intergenerational rate payer inequity occurs when one generation of ratepayers either under-pays or over-pays currently to the detriment or benefit of a future generation of ratepayers.

b. First, Mr. Clark does not assume that the Company does not grow or invest in future assets. There is no reason to attempt to account for possible re-investment in future assets at this time. Future customers, future load and future system requirements will dictate when and how the system requires future investment.

PSC-198

Regarding: Exhibits
Witness: Clark

a. Please explain how you accounted for John Wilson's recommended changes to capital expenditures in your revenue requirement.

b. Please provide the supporting workpapers.

RESPONSE:

a. Mr. Clark utilized the electronic version of Exhibit___(PJD-1) as the basis for Exhibit___(AEC-1). The capital structure and overall rate of return are shown on page 5 of 12 of both of these exhibits. Mr. Clark inserted a 9.0% return on equity in lieu of the Company's requested 10% return on equity. For the capital structure Mr. Clark changed Mr. DiFronzo's equity ratio from 48% to 45% and the debt ratio from 52% to 55%.

b. There are no supporting work papers.

PSC-199

Regarding: Revenue Requirement
Witness: Wilson or Clark

a. What would be the revenue requirement if the Consumer Counsel's recommendation on carbon price were adopted, in addition to adopting other recommendations made in Albert Clark's testimony?

b. What would be the revenue requirement if the Consumer Counsel's recommendation on carbon price were adopted, but other recommendations (a 10% ROE, instead of 9%, no adjustment for terminal value, etc.) were not adopted?

RESPONSE:

a. Mr. Clark has not made the requested calculation. All other things being equal, however, a rate base deduction of $247.4 million at the overall rate of return recommended by Dr. Wilson (6.53%) would result in a reduction of $16,155,220 before income taxes.

b. Mr. Clark has not made the requested calculation. It appears that the question wants a response based on the Company's case as filed. Under that assumption, a rate base deduction of $247.4 million at the Company's requested overall rate of return (7.14%) would result in a reduction of $17,664,360 before income taxes.

PSC-200

Regarding: Testimony p. 53 lines 19-20
Witness: Wilson

a. Please provide all workpapers supporting your testimony that a reasonable risk premium is 3 to 6 percent above the current cost of risk free debt, in EXCEL and paper formats.

b. Please explain your methodology supporting the workpapers.

RESPONSE:

a. I did not prepare work papers, but relied upon published studies, surveys and analyses by well recognized experts on this matter. Surveys and academic analyses indicate that the expected market risk premium R_m is in the range of 3% to 6%. For example, according to Dinson, March and Staunton ("Risks and Returns in the 20th and 21st Centuries," Business Strategy Review, Volume 11, Issue 2):

> "It has become clear that the current level of the equity risk premium is unlikely to be as high as was considered reasonable in the mid-1990s. The arithmetic mean of 8½% recommended by Ross, Westerfield and Jaffe (1993), the 8-9% suggested (with caveats) by Bealey and Myers (2000), and the 7½% recommended by Wetson, Chung and Sui (1997), and a similar figure inferred from the Copeland, Koller and Murrin (1995) geometric mean of 5-6%, all look excessive. The market is almost certainly building lower risk premia than this into stock prices….The cost of capital has thus fallen substantially in recent years."

Also, according to Eugene F. Fama of the University of Chicago and Kenneth R. French of The Massachusetts Institute of Technology, the risk premium over the past half-century was about 4%. Their calculation is based on going back to the past and analyzing what kinds of returns investors had a reasonable right to expect for the future, given companies' dividend yields and expected growth rates. Risk premiums exceeding 4% were, they say, the result of a series of surprises, such as the end of the Cold War and the development of the computer – windfalls that investors do not count on to repeat themselves. Fama and French expect stocks to outperform risk-free securities by only 3% to 3.5% a year in the long term. (See E.F. Fama and K.R. French, "Dividend Yields and Expected Stock Returns," Journal of Financial Economics, 22 (1), 3-25, and "Business Conditions and Expected Returns on Stocks and Bonds," Journal of Financial Economics, 25 (1), 23-49.)

PSC-200 continued

Among the people who have studied the equity premium closely, most think it is probably in the range of 3 to 5 percentage points above treasury bills. On the other hand, rank-and-file finance professors have often continued to peg the long-term premium at about 6 to 7%, according to a comprehensive survey published by Ivo Welch of Yale University. Welch, himself, agrees with the 3-5 percent range. According to his analysis, a 3% geometric equity premium estimate and a 5% arithmetic estimate are more accurate than the 6% to 7% consensus of the profession. (See Ivo Welch, "Views of Financial Economists on the Equity Premium and on Professional Controversies" (University of California, Los Angeles and Yale University, 2001)). More recent surveys indicate that, as of 2007-2008, finance professors estimated equity premiums in a slightly lower 4% to 6% range, centering around 5%. (See Ivo Welch, "The Consensus Estimate for the Equity Premium by Academic Financial Economists", National Bureau of Economic Research, January 18, 2008 and Pablo Fernandez, "Market Risk Premium Used in 2008", IESE Business School, 2009).

b. See attachment PSC-200.

PSC-201

Regarding: Capital Structure
Witness: Wilson

In Brian Bird's direct testimony at 28:13, he proposed a 52/48 debt to equity capital structure. Please provide analysis and reference to direct testimony to support your proposed 55/45 debt to equity structure.

RESPONSE:

55/45 is the actual capital structure that the Company indicated that it intended to use to finance the hydros acquisition, as shown at page 30 of the Company's Application for Hydro Assets Purchase. Also note that a 55 percent debt ratio is less than the Company's currently perceived debt ratio when one recognizes that Power Purchase Agreements, which the hydros will replace, are viewed as quasi debt by the rating agencies. See BBB-40 at 20-22. In addition, the Company's ratemaking proposal shifts virtually all investment risks to ratepayers and assumes virtually no capital cost or recovery risks for investors. With this type of a regulatory guarantee of interest and capital cost recovery it would be possible and less costly to finance this investment with a capital structure that is substantially more leveraged with debt than 55/45.

PSC-202

Regarding: Implementing a Deferred Carbon Price
Witness: Wilson

a. Regarding your proposed rate base deferral described at 62:8-63:3, please describe the accounting details, with reference to GAAP.

b. How would a carbon tax trigger be identified? Would it require a liquid market for carbon credits, or would various state and federal carbon taxes qualify?

c. How would the impact of carbon taxes on market prices be estimated in order to calculate the appropriate level of deferred capital to enter into rate base?

d. What if carbon prices ended up being higher than NorthWestern has predicted? Would NorthWestern be entitled to book capital above the original deferred amount?

e. Under your proposal, do you expect NorthWestern would use a debt issue or equity issue to fund the hypothetical carbon price, separate from the debt-equity used to finance the bulk of the purchase price?

RESPONSE:

a. The proposed rate base deferral should be accounted for in a manner paralleling other ratemaking deferrals that are used regularly to realign the recovery of costs. Two well-known and frequently used methods are illustrated by the ratemaking treatment of (1) "allowance for funds used during construction" ("AFUDC") and (2) accumulated deferred income taxes. In my view the first of these, as reflected in the referenced testimony, would be preferable because it provides the greatest ratepayer protection. The second may also be an alternative compromise.

   Deferral paralleling AFUDC: Under this approach the portion of rate base reflecting the Company's proposed hypothetical carbon tax loading, while part of the asset purchase price, would not be included in rate base currently in the same manner as AFUDC is not reflected in the rate base until such time as the financed asset becomes used and useful. It would, however, accrue an associated balance reflecting the deferred return or capitalized interest on the excluded amount, which balance (or appropriate part thereof) would be added to rate base along with the appropriate part of the previously excluded carbon tax loading when actual carbon taxes are enacted.

   Deferral paralleling deferred income taxes: Under this approach, the full purchase price of the asset would be included in rate base, but revenues associated with the

PSC-202 continued

portion of rate base reflecting the Company's proposed hypothetical carbon tax loading would be considered consumer contributed capital (until such time as actual carbon taxes are enacted), and this cumulative balance would be subtracted from rate base in the same manner as the accumulated deferred income tax balance. If and when actual carbon taxes are enacted, an appropriate part of the deferral would reverse.

b. The proposed carbon tax trigger or penalty would be identified in concert with the actual effective date of carbon taxes. Carbon taxes that apply to the Montana market, including both federal and Montana state taxes would qualify.

c. Carbon taxes should be weighted in proportion to their actual impact on NWE's purchased power costs.

d. NorthWestern's rate base should be capped at its actual cost which, under the Company's proposal and MCC's proposed modifications, would be $900 million plus limited subsequent capital additions less accrued depreciation.

e. According to the Company's Hydro Assets Purchase Application at page 30, NWE intended to use 55 percent debt and 45 percent equity to fund its proposed $900 million purchase cost, which includes capitalized hypothetical carbon tax costs.

PSC-203

Regarding: Principal-Agent Problem and Moral Hazard
Witness: Wilson

a. Please describe the principal-agent problem and moral hazard.

b. Can the principal-agent problem and moral hazard be used to describe relations between a regulated utility and its customers?

c. Can the principal-agent problem and moral hazard be used to describe relations between a regulatory commission and the public?

RESPONSE:

This question (PSC-203) and the following question (PSC-204) identify and encompass the central dilemma that the Commission is facing in this case.

a. The "principal–agent problem" or "agency dilemma" occurs when one person or entity (the "Agent" – here NWE) is able to make decisions that impact, or are on behalf of, another person or entity ("the Principal" – here consumers). The dilemma exists because the agent's actions can be motivated by its own private interests rather than the interests of the principal.

   For example, consider a dental patient (the principal) wondering whether his dentist (the agent) is recommending expensive treatment because it is truly necessary for the patient's dental health, or because it will generate income for the dentist.

   The principal agent problem occurs where the agent and the principal have different interests and there is asymmetric information (the agent having more information), such that the principal cannot directly ensure that the agent is always acting in its (the principal's) best interests. The problem can become particularly acute, as here, when activities that are useful to the principal are costly to the agent, and where elements of what the agent does may be beneficial to the agent, but costly for the principal and/or difficult for the principal to observe or fully understand. In these situations "moral hazard" and "conflict of interest" are likely to arise.

   The deviation from the principal's interest by the agent is called "agency costs" and these can be remedied by aligning the interests of the agent with those of the principal. Various mechanisms may be used to align the interests of the agent with those of the principal. In employment, the interests of employers (principal) may be aligned with those of employees (agent) by devices such as profit sharing. In general,

PSC-203 continued

such realignment involves changing the rules of the game so that the self-interested rational choices of the agent coincide with what the principal desires. In this case, the ratemaking modifications that MCC has suggested for NWE's hydros ratemaking plan would achieve such realignment so that the interests of NWE and consumers would more nearly coincide.

In this case the principal-agent problem occurs because the agent (NWE) makes decisions (the terms for buying the dams) that are binding on the principal (ratepayers). The problem is that the agent is motivated to make decisions based on the agent's best interest (e.g., returns on investment to shareholders and the agent's desire to reacquire ownership of the dams) and not the principal's best interests (obtaining electric power at the lowest cost). Moral hazard arises in this situation because the agent is motivated to take risks, the adverse consequences of which will be imposed on the principal rather than on the agent. In this case NWE will not feel the effects of any mistaken estimation of costs of owning the dams or of overstating likely carbon costs because Montana ratepayers, rather than NorthWestern's shareholders, will be stuck with those costs when the dams are rate based.

b. Yes. That is precisely the problem here. See response 204b.

c. That is less clear, and it is not MCC's contention that there is a principal-agent or moral hazard problem between the Commission and the public in this case. In fact, it should be the case that a regulatory commission's agency interest is aligned with the interest of its principal (consumers), as commissions have been created for the explicit purpose of protecting ratepayer interests from the potential excesses of monopolies. That is not to say that this expected alignment could not be perverted by moral hazard in cases in which (hypothetically) Commissioners were motivated by political interest or the expectation of obtaining lucrative positions with the companies they regulate when their terms expire. Similar misalignment may occur more innocently, when asymmetric information (sometimes promoted by utility lobbying) clouds accurate recognition of principal interests or even results in a misinformed agent.

PSC-204

Regarding: Principal-Agent Problem and Moral Hazard
Witness: Wilson

For the following questions assume a principal-agent relation with NorthWestern as agent and its customer base as principal.

a. Do the principal and agent possess the same information, or is their information asymmetric?

b. Is the agent in a position to act to increase its own welfare at the expense of the principal?

c. Is the agent's action exposed to moral hazard? Please explain why or why not.

d. If your answer to part (c) is "yes", what actions may the Commission take to reduce the moral hazard?

RESPONSE:

a. The information is severely asymmetric. Customers have very little complete information. Although they could go to the Commission's website and obtain the Company's filing and testimony filed by parties to the case, it would require an immense investment of time and substantial specialized knowledge for them to gain information in that way. More customers would likely have heard something about the proposed acquisition in newspapers and news reports, but those sources too are limited by asymmetric knowledge. For example, most newspaper reports do not reflect a complete understanding of the economic costs and ratepayer risks inherent in the Company's proposal. They generally do not explain that the plants will physically continue to produce clean electric power for Montana consumers in the future with or without an ownership transfer to NWE, or that the ownership transfer will add no new renewable generation but simply cost the state's consumers hundreds of millions more for essentially the same renewable resources. Also, they seem to suggest that which corporation owns the plants will determine where the power generated there will go. In fact, while ownership will direct where the money goes and how much is paid for the power, the actual power flows from these plants will remain very much the same whether they are owned by PPL, NWE, or by another corporation. Ownership change will have a big impact on the size and destination of the money flows, but little or no impact on the power flows. It is questionable whether Montana consumers would be so approving of the proposed deal were this information more clearly understood (i.e., less asymmetric).

PSC-204 continued

b. Yes. NWE's proposal amounts to precisely that. As a result of this transaction, the ownership of Montana's primary renewable electric resource will transition from PPL to NWE, and the cost of that resource to consumers will increase dramatically (estimated by NWE to be $400 million above alternative market costs over the first eight years), but no new renewable resources will be created. This ownership change will also cause Montana's major market for new renewable generation development (i.e., NWE) to become saturated with nearly all of the State's renewable resources in NWE's portfolio so that market opportunities and incentives for new renewable resource development will be substantially curtailed. The end result will be that (1) the State's generation resource mix will be about the same as it is now, (2) consumer costs for electricity will increase dramatically, (3) incentives and market opportunities for new renewable generation development will be diminished, (4) PPL will gain a large windfall and (5) NWE's rate base will grow by $900 million and its investors' returns will increase by more than $60 million per year. Quite clearly the interests of the principal (consumers) and the agent (NWE) are in great need of the realignment that would be accomplished by NWE's acceptance of MCC's suggested modifications to its proposed ratemaking plan.

c. Yes. In economics, a "moral hazard" is a situation where the agent (here NWE) will have an incentive to take risky actions because, while NWE will reap potential gains, the costs that could result from taking those risks will not be borne by the agent (NWE) who is taking the risks, but will instead be transferred to the principal (here customers). In other words, the agent is more willing to take risks, knowing that the potential costs or burdens of taking such risks will be borne, in whole or in part, by others while the agent gains benefits without that risk exposure. In this case there is a major risk of uncertainty about the unknown need for future repair, maintenance, rehabilitation and renovation of the aging hydroelectric plants. Not only does the agent, NWE, plan to charge all of those costs to customers, it has not even considered them in its stochastic modeling, so they are entirely hidden from and unknown to the principal and to the Commission.

   Moral hazard arises because NWE is able to shift consequences and responsibilities of its actions, and it therefore has a tendency to act less carefully than it otherwise would, leaving the principal, consumers, to bear all responsibility for the consequences of those actions. This likely explains why there were so many unknowns and unaccounted for factors in NWE's due diligence results and why NWE's due diligence involved very little actual physical examination of the plants in favor of relying largely on PPL's own paper record. While the independent

PSC-204 continued

engineer's 200 page due diligence Report that was completed in January, 2013 documents an extensive review of documents provided by PPL, it reveals that there was only one day on which the independent engineer actually visited any of the dams in his preparation of that report. Later, in September a brief follow-up supplement to the Report was prepared, and in conjunction with that follow-up supplement, the independent engineer and certain NWE employees spent an additional six days visiting the twelve dams.

d. The Commission can greatly reduce the extreme moral hazard in this case by requiring the Company to accept the MCC's proposed modifications to it ratemaking plan for the hydros. This is especially so in view of the fact that virtually all of the real benefits of the acquisition (e.g., enhanced rate base, increased investor returns, etc.) accrue to the Company and its stockholders with relatively little real benefit (e.g., substantially higher prices, mere transfer of generation ownership from one corporation to another, and no new renewable resources) to consumers.

PSC-205

Regarding: Principal-Agent Problem and Moral Hazard
Witness: Wilson

For the following questions assume a principal-agent relation with the Commission as agent and the Montana public as principal.

a. Do the principal and agent possess the same information, or is their information asymmetric?

b. Is the agent in a position to act to increase its own welfare at the expense of the principal?

c. Is the agent's action exposed to moral hazard? Please explain why or why not.

d. If your answer to part (c) is "yes", what actions may the Commission take to reduce the moral hazard?

RESPONSE:

a. There is some obvious asymmetry. The Commission has and is being provided with far more information than the public, and it should be far less susceptible to be swayed by the misinformation and nostalgic emotionalism (e.g., "chance of a lifetime") that is being provided to the public.

b. The Commission (agent) is in a position to act to increase its own welfare (given its express purpose to function as the ultimate protector of consumer interests) as well as the welfare of the public (principal). Even if one were to assume perverse interests (which we do not) it is hard to see how the Commission, as an institution (as opposed to individuals), could increase its own welfare at the expense of the public. To engage in such public abuse would undermine the Commission's credibility, reputation and standing to such an extent that the institution's welfare would be severely damaged.

c. The agent (Commission) may be exposed to moral hazard in conjunction with its disposition of the hypothetical carbon tax issue in this case -- though this could cut two ways. By approving the Company's ratemaking plan, which imposes a large carbon tax burden on ratepayers immediately (because the proposed $900 million rate base includes a $247 million hypothetical carbon tax loading) the Commission would be largely and prematurely shifting the burden of this issue to ratepayers. The Commission would then have a reduced issue to deal with in the future if and when actual carbon taxes of the magnitude assumed here by NWE are ever implemented.

PSC-205 continued

While that would be very costly to ratepayers, it could gain the Commission some applause in some political circles and from NWE. Conversely, if the Commission's current implementation of a large carbon tax burden is understood by ratepayers, and especially if actual carbon taxes are later implemented at a lower rate or at a later date (if at all), there would likely be substantial ratepayer dissatisfaction. This is especially so because once implemented by accepting the proposed $900 million rate base, this hypothetical carbon tax burden could not be reduced to a lower level if actual carbon taxes are less. A further complication in assessing this moral hazard is that the current Commissioners are not likely to be in office and personally accountable if and when actual carbon taxes are ever implemented.

d. The best way to reduce this moral hazard would be for the Commission to require NWE to accept corporate accountability and to financially stand behind the assumptions and projections that it uses to justify a purchase of the hydroelectric facilities at $900 million. Adoption of the MCC's proposed modifications in whole or in part would advance that objective.

PSC-206

Regarding: DCF analysis, Carbon costs
Witness: Wilson

a. At 35:15-17 you state that NorthWestern's DCF analysis includes $247.4 million of assumed hypothetical capitalized CO2 tax costs in the $826 million amount. Did you calculate the $247.4 million amount by following the instructions NorthWestern provided in data response PSC-160? If not, how did you estimate the $247.4 million amount?

b. Your Exhibit_(JW-1) shows NorthWestern witness Stimatz's Exhibit__(JMS-1) modified so that the net present value calculation reflects market prices with the carbon adder removed. Exhibit_(JW-1) shows that you left the value for depreciation calculations, in cell B6, equal to the original value in Exhibit_(JMS-1), which is $896 million. Would it be reasonable to set the value for depreciation calculations equal to the value in cell B10? If not, please explain why.

c. If you set the value for depreciation calculations equal to the value in cell B10 in your Exhibit_(JW-1), how does the estimated effect of the carbon adder change?

d. NorthWestern witness Stimatz's Exhibit_(JMS-1) assumes that the Kerr conveyance price is $25 million, although NorthWestern and PPLM have agreed to a $30 million conveyance price. Would it be reasonable to make this adjustment in your Exhibit_(JW-1)? If so, how does that adjustment change the estimated effect of the carbon adder?

RESPONSE:

a. Yes. Following NWE's instructions provided in PSC-160, CO2 pricing assumptions were entered in the "GHG15 Carbon" Tab of the file "Curve Calculator 6-7-13.xls" and the resulting forward prices were used in the modified NWE's DCF.

b. Normally the value to be depreciated over time is the prudently incurred acquisition cost of the property. In Exhibit JW-1 it was assumed that the full purchase price of the assets would be depreciated. If it is determined that the portion of the purchase price reflecting the present value of the Company's hypothetically assumed carbon taxes is not a prudent expenditure for these plants the value in cell B10 should be used to calculate depreciation expense. Also, even if an imprudence determination is not made at this time, it would be reasonable to defer recovery (in allowed depreciation) of the carbon tax portion of the purchase price until (if and when) actual

PSC-206 continued

carbon taxes are enacted. In that case it is also true that the value in cell B10 would be used to calculate current depreciation expense.

c. If the value for depreciation calculation in Exhibit_(JW-1) is set equal to the value in cell B10, the estimated carbon adder will be $313.186 million

d. That adjustment would not be unreasonable. I did not make it because the impact was small and I was trying to focus the Commission's attention on certain specific and important modifications. By using $30 million for the Kerr conveyance rather than $25 million, the carbon adder changes from $247.379 million to $243.023 million.

PSC-207

Regarding: Modified comparative cost analysis
Witness: Wilson

a. At 42:16-43:11 you describe your Exhibit_(JW-3), which substitutes an alternative CO2 cost for NorthWestern's original assumption in Exhibit_(TEM-2). To modify Exhibit_(TEM-2), did you first create an alternative market price forecast using the method described in data response PSC-160 and your alternative CO2 tax, and then input that alternative market price forecast into the "Carbon Tax and Mid-C Curve" tab in Exhibit_(TEM-2)? If not, please explain the underlying steps for your modification to Exhibit_(TEM-2).

b. On p. 45:3-6 you state that your CO2 tax modification in Exhibit_(JW-3), while not factual, reflects possibly more realistic assumptions regarding carbon taxes. Do you consider your modification to Exhibit_(TEM-2) to be a reasonable way to evaluate the risk of a future CO2 cost?

RESPONSE:

a. Yes.

b. Yes. It is a reasonable way to quantify the hypothetical carbon tax loading that NWE has included in its proposed rate base in this case. It does not address any questions about the likelihood of an actual carbon tax of this amount, other than preserving the Company's ability to recover and the Commission's ability to permit the recovery of such taxes if and when they are ever implemented.

PSC-208

Regarding: Influence of Carbon Price on Market Alternative
Witness: Wilson

You assert that "The Company's analysis assumes that total carbon tax penalties for the competitive market purchased power alternative will be $1.375 billion over the period 2021-2043" (41:8-10). Please demonstrate this derivation.

RESPONSE:

Please see attachment PSC-208.

PSC-209

Regarding: Difference in Proposed Price and DCF Price
Witness: Wilson

Regarding the difference between the proposed purchase price of $900 million and the DCF value of $826 million; should the difference of $74 million be recoverable in rates?

RESPONSE:

$900 million is the price that NWE has proposed to pay PPL for the hydros. This was above the Company's DCF market value estimate (which is itself too high because of the carbon loading and the likelihood that a competitive merchant buyer of the hydros would presume higher ongoing repair, rehabilitation and renovation costs for these old and aging plants and a terminal value well below NWE's assumed billion dollars). In any event, NWE offered this price to foreclose any likelihood of PPL seeking competing bids from others. As such, the $900 million is, by design, greater than the competitive market value of the plants. While this underscores the excessive ratepayer cost resulting from the moral risk and principal-agent problems discussed above, it is the amount that NWE proposes to pay for the plants, and that amount, rather than the method and strategy used to derive it, generally defines rate base, unless, as may be the case here, the amount is itself imprudent. To the extent that the Commission considers the $900 million amount proposed to be imprudent, it should so notify NWE and advise the Company to renegotiate a more appropriate amount with PPL.

PSC-210

Regarding: Carbon Price Forecasts
Witness: Wilson

a. Figure 6-11 shown on p. 6-27 in Volume 1 of NorthWestern's Electricity Supply Resource Procurement Plan shows a number of carbon price forecasts projected by public and regulated investor owned utilities. In your opinion, how many of these utilities are at risk of serious financial loss if their projected price levels and escalation rates are not realized?

b. In your opinion, would a regulated utility benefit from projected carbon prices that exceed realized carbon prices to the extent that the inflated carbon price projections justify investment in expensive resources that provide increased profit opportunities?

c. In your opinion, are the carbon price projections of regulated utilities exposed to moral hazard? If so, should the Commission discount the carbon price projections made by regulated utilities?

RESPONSE:

a. Dr. Wilson has not researched this matter. However, unless these utilities have agreed in advance to pay prices inclusive of these amounts, they would not be at risk. In its proposal in this case NWE does propose to lock ratepayers into its hypothetical carbon cost assumptions in advance, but under NWE's proposal this is a substantial financial risk to ratepayers, not to NWE.

b. Yes. However note that in such cases the result is typically the construction of new renewable resource additions, which may have value to ratepayers – albeit at a high cost. In contrast, in this case, despite the exceedingly high cost, there are no new resource additions and the excess cost is simply a dead weight loss to ratepayers.

c. Yes, but the hazard can run either way and must be evaluated given the specific considerations of each utility. Rather than relying on the projections of other utilities in other states, the Commission may be better advised to rely on its own knowledge and analysis by its own staff. At the present time there is great uncertainty about the amount and timing of such taxes or of alternative carbon penalties. Surely, across the board taxes or penalties of the magnitude assumed by NWE would have a major impact on the economy and, for that reason alone, would be very politically controversial. Also, it seems increasingly likely that any taxes or other mitigation measures that are implemented may vary between states, rendering projections by utilities in other states a questionable standard for this Commission to rely on.

PSC-211

Regarding: Carbon Price Forecasts
Witness: Wilson

a. NorthWestern compared its carbon price forecast with that of other Western electric utilities. (See Figure 6-11, 2013 RPP). It appears that NorthWestern eliminated certain forecasts that these other utilities used from the estimation of the mean values that NorthWestern presents, even when those forecasts were "base" cases (Power, 12:30-13:1). Should this figure be relied upon as a credible representation of what other utilities forecast for their future carbon prices, and are there other problems with NorthWestern's representations of other utilities carbon forecasts? Explain.

b. Have you conducted an analysis of what Figure 6-11 would look like if only the base or expected case of the sample utilities were used, rather than an average of those utilities' carbon forecasts which includes zero-cost cases? Please provide if you have.

c. Have you conducted an analysis of what Figure 6-11 would look like if an average of those utilities' carbon forecasts were used, rather than an average which excludes zero-cost cases? Please provide if you have.

d. Do you have any elaboration on the Consumer Counsel's comments relative to the 2013 RPP and do you plan to testify on this topic?

RESPONSE:

a. NorthWestern's calculated figure should not be relied upon because it is obviously distorted by biased and one-sided elimination of low values. There are also other problems as discussed in the response to PSC-210 (c).

b. No. See response to PSC-210 (c).

c. No. See response to PSC-210 (c).

d. I have referred to and quoted from MCC's comments relative to the 2013 RPP in my direct testimony. I have also referred to the 2013 RPP in answering PSC-227b and PSC-230b. Other than the comments in my direct testimony and in these responses, I do not presently intend to testify further on this topic.

PSC-212

Regarding: Carbon Price Forecasts
Witness: Wilson

a. Do you believe it is possible to make reasonable predictions about how the EPA's plan to regulate existing point sources of carbon dioxide through Section 111(d) of the Clean Air Act will affect wholesale prices for electricity in the Northwest? Please explain.

b. Are there other ways that could reasonably be expected to lead to a carbon price (such as Congressional action) in the markets on which NorthWestern relies, other than the EPA regulation described in sub-part (a)? If so, what are they, and how should their expected costs be forecast and quantified?

c. NorthWestern arrived at a deterministic forecast of a $15 per ton carbon price, escalating 5% and coming into effect in 2021 at about $21 per ton. What, in your view, is the most realistic carbon price expectation, if NorthWestern's is not realistic?

RESPONSE:

a. No. See my response to PSC- 210 (c).

b. Yes; other ways, including Congressional action and State action could lead to a substantially different carbon tax result. Such a result would likely be tempered by considerations of economic impact. See responses to PSC-210 (c) and PSC-207 (b).

c. See response to PSC-210 (c).

PSC-213

Regarding: NorthWestern's Electricity and Natural-Gas Price Forecasts
Witness: Wilson

a. Other than your disagreement over carbon prices, do you believe NorthWestern's market price forecast for electricity is a realistic price forecast? Explain.

b. Do you believe that NorthWestern's natural gas price forecast is realistic? Explain.

RESPONSE:

a. A realistic energy price forecast is one that produces estimates of future energy prices that have a realistic chance of being realized. NorthWestern's market price forecast for electricity, excluding NWE's hypothetical carbon tax loading, is a realistic electricity price forecast as it reflects actual forward strip prices through 2020 (which can be locked into today and which are inclusive of the market's actual carbon tax expectations) with a 2.1percent annual escalation thereafter.

b. A realistic energy price forecast is one that produces estimates of future energy prices that have a realistic chance of being realized. NorthWestern's natural gas price forecast is one of several reasonably realistic natural gas price forecasts as it reflects actual forward strip prices through 2018 (which can be locked into today and which are inclusive of the market's actual carbon tax expectations) with a 2.1 percent annual escalation rate thereafter. Others include recent natural gas price forecasts prepared by the U.S. Energy Information Administration and the Northwest Power and Conservation Council. See attachment.

PSC-214

Regarding: Market valuation assumptions
Witness: Wilson

a. At 12:7-13:18 you identify three assumptions on which NorthWestern's market valuation depends: CO2 taxes, capital expenditures, and terminal value. Are NorthWestern's assumptions regarding the alternative market purchase costs also important to the valuation? If not, please explain why.

b. At 42:10-11 you state that in the exhibits you prepared to show cost comparisons between the hydro purchase and market purchase costs you used NorthWestern's projections for market purchases. Was your decision to use NorthWestern's projections for market purchases based on an independent assessment of the reasonableness of these projections?

c. If the answer to part (b) is "yes," please provide that assessment.

d. If the answer to part (b) is "no," would it be reasonable for the Commission to consider how the valuation would change under different projections?

e. Did you analyze how alternative natural gas price projections, such as those from the Energy Information Administration or the Northwest Power and Conservation Council, may affect NorthWestern's market projections? If so, please provide that analysis.

RESPONSE:

a. Yes. But see response to PSC-213.

b. Yes. See response to PSC-213.

c. See response to PSC-213.

d. N.A.

e. Yes. I considered these alternatives. See attachment PSC 213b. The attachment also presents NorthWestern's updated natural gas price forecast, as of April 7, 2014. As shown there, NorthWestern's forecasted natural gas prices are somewhat lower than EIA's and NPCC's. In NorthWestern's electricity market purchases analysis, natural gas prices are used only to calculate carbon taxes, and higher natural gas prices

PSC-214 continued

produce lower carbon taxes and lower total electricity market purchases prices. This means that substituting EIA or NPCC natural gas price forecasts for NorthWestern's forecasted natural gas prices in the Company's comparison of future market purchases costs with future hydros costs would result in somewhat lower estimates of future carbon taxes and electricity market purchases prices.

PSC-215

Regarding: Market Valuation and Carbon Costs
Witness: Wilson

In your testimony, you note that a merchant buyer of the facilities would not be able to capture the future value of the product (in this case, the avoidance of carbon) in today's market, from today's consumers. (35:15-36:4).

a. Are there market examples where a future value of a product is factored into today's prices? Or is this, generally, an anomaly?

b. NorthWestern added its projected carbon price to a forward market curve to derive its electricity price forecast. Do the forward market curves for electricity available for the next decade typically include a carbon price that is internalized within the price offered to and taken by purchasers?

c. Would it be reasonable for the Commission to impute any value to the hydro purchase based on the risk that market prices could reflect CO2 costs in the future, to the extent that purchasing the hydros would allow NorthWestern to avoid CO2 costs? Please explain why or why not.

d. At 19:15-17 you seem to agree that it is reasonable to consider risks such as possible CO2 costs in resource planning. To the extent that resource planning attempts to minimize the total present value cost of service, is it possible for the least costly plan to involve acquiring resources with higher near-term costs than those in an alternative, higher overall-cost plan?

RESPONSE:

a. My testimony noted that a merchant buyer would not be able to include NWE's assumed hypothetical carbon taxes in today's prices. There is no evidence that NWE's assumed hypothetical carbon taxes reflect the market's perception of the future value of the product. That said, there are some markets (e.g., futures markets) where expected future value is factored into futures prices. Note, however that the futures prices for electricity (which NWE uses through 2020 to depict alternative market purchase costs) are inclusive of any market-expected carbon tax costs and those are a very small fraction of NWE's assumed hypothetical carbon tax loading. Expected future market value may also be factored in or considered in setting today's prices for investments such as stocks or real estate. If the market expects the value of one $10 (book value) stock to double in a year and the price of another $10 (book value) stock to remain stable, it is likely that the market price of the first will rise to a

PSC-215 continued

level above the price of the second. The same would likely be true of two otherwise identical houses.

b. Yes. They do.

c. Especially at the present time when there is so much uncertainty and widely differing expectations as to the magnitude timing and form of any such tax or penalty costs, it is difficult to impute any value accurately. As NWE argued in its most recent QF case: "Although it is prudent to consider the possibility of greenhouse gas costs in planning, it is not appropriate to include such costs in avoided costs. Currently, NorthWestern is not incurring any greenhouse gas costs and cannot avoid any such costs by purchasing electricity from Qualifying Facilities ("QFs"). Including such costs would violate the customer indifference requirement of the Public Utility Regulatory Policies Act of 1978."

   In this case, it would be preferable to defer charging for such costs until it is clear that they will actually occur. For specific suggestions on deferral approaches please see response to PSC-202a.

d. Yes. That is possible in some cases, even though it is not the case here. For example, the Commission has permitted the addition of relatively expensive wind resources to NWE's resource plan. However, note that the approval of these resources involved the actual addition of new renewable assets to the State's generation resource pool. This is in contradiction to NWE's proposal in this case, which would simply replace one set of investor-owners with another set of investor-owners with no addition of renewable generation assets, but considerably higher costs and charges to ratepayers for already existing assets.

PSC-216

Regarding: Value of the PowerSimm Model
Witness: Wilson

Should the Commission discount the value of the PowerSimm model for the purpose of evaluating whether preapproval of the Hydros acquisition is in the public interest, given that the Commission and intervening parties did not have access to the model for the purpose of checking the sensitivity of outcomes to alternative parameter and probability distribution specifications?

RESPONSE:

Yes.

PSC-217

Regarding: Stochastic Modeling of Carbon Prices
Witness: Wilson

a. In your opinion, given that an extensive body of carbon price data does not exist, does stochastic modeling of carbon prices provide significant additional value compared to deterministic modeling of a range of potential carbon prices?

b. The Commission's consultant Evergreen Economics suggested that NorthWestern did not include a full range of scenarios (e.g., low, medium, high) of values for carbon price in its analysis. Do you agree with this criticism? Please explain.

c. Ascend Analytics modeled carbon prices stochastically in PowerSimm using a triangular distribution in each period; with the mode pegged to NorthWestern's carbon price forecast, the lower limit equal to zero, and the upper limit equal to twice the mode. In your opinion, does this "triangular" carbon price model include information that is not included in the deterministic model?

d. In your opinion, is a triangular distribution more plausible or useful in this case than a uniform distribution or a discrete distribution with positive point probabilities?

RESPONSE:

a. No.

b. Yes. The Company refused to provide specific runs that the Commission requested. This included a refusal to include a zero carbon tax scenario even though the high assumed hypothetical carbon taxes that NWE would like the Commission to rely on are likely to be far less realistic than a zero value.

c. While it includes a range, I do not believe that it includes more useful information.

d. No.

PSC-218

Regarding: Modeling of Risk in PowerSimm
Witness: Wilson

a. You criticize NorthWestern for optimistic projections of risk associated with the Hydros. How could NorthWestern and Ascend Analytics have modeled the risks associated with the possibility of large and unanticipated capital expenditures that could be necessary to keep the dams operating?

b. Do you believe that river flows are effectively modeled using a 30 year history? Is there reason to assume that flows may depart from a 30 year model? Please explain what factors could influence river flows.

c. In your opinion, does PowerSimm appropriately estimate downside risk, *i.e.*, the risk that locked in cost-of-service-based supply rates for a very large asset like the Hydros might exceed supply rates based on market purchases?

RESPONSE:

a. By testing a range of higher cost assumptions such as PPL's actual average capital expenditures over the past decade and/or assumed major repair and rehabilitation projects or early retirement for these old and aging dams in the future.

b. Changing climate conditions could very well cause future river flows to depart significantly from their 30-year history. In this regard, many utilities are now advocating departure from 30-year historical weather experience in forecasting future energy consumption levels for heating and cooling purposes.

c. No. This is a serious problem in this case.

PSC-219

Regarding: Major Capital Addition Scenario
Witness: Wilson

a. What is the source data for the $114 million in additions in 2024-26 in the major capital addition scenario represented on Exhibit_(JW-4)? Please provide it or identify where it is located in this docket.

b. The time frame for this addition occurs near when the Thompson Falls re-licensing is scheduled. Is this scenario intended to be a proxy for a major, unanticipated re-licensing cost?

RESPONSE:

a. This is the cost of the Rainbow project escalated to 2024.

b. No. It is not that specific. However, Thompson Falls costs in the future, including the costs of matters related to relicensing are a relevant unknown that this modification to the analysis may help to capture.

PSC-220

Regarding: Rainbow Upgrade
Witness: Wilson

a. Part of the large cap-ex budget over the past number of years is attributable to the Rainbow Dam upgrade, as you observe at 29:2-4. Do you have information or belief as to why this upgrade (which cost tens of millions of dollars per additional MW of generating capacity) was undertaken?

b. Do you have reason to doubt NorthWestern's contention that the Rainbow Upgrade was undertaken as a cost-effectiveness project? (See NWE response to DR PSC-079).

c. If the Rainbow Upgrade was a cost-effectiveness project and not needed for other reasons, why would it be appropriate to assume a similar cap-ex contingency now (as does your Exhibit_(JW-4) rather than at the time of the go/no-go decision to undertake such an upgrade?

RESPONSE:

a. The Rainbow project was undertaken by PPL because the facility was 100 years old and in need of renovation and redevelopment. Indeed, when it was undertaken it was referred to as the Rainbow Renovation and Redevelopment Project. The Rainbow renovation and redevelopment project did increase the dam's generating capacity from 36 MW to 60 MW. At $245 million, that is about $10,000 per additional kilowatt (or $10 million per MW) compared, to less than $2,000 per kilowatt for alternative capacity. Clearly, economic justification of the Rainbow redevelopment and renovation project involved far more than this additional generating capacity. At the time of its replacement the old Rainbow powerhouse had been in operation for more than 100 years – an age now being approached by facilities at several of the other dams at issue here, which will likewise require future decisions regarding the economic justification of additional major costs for needed renovation and redevelopment.

b. Again, while there was a 24 MW upgrade in generating capacity, the project was undertaken because of the renovation and redevelopment requirements for a 100 year old plant. I do not doubt that PPL determined that the renovation and redevelopment project was cost effective. Likewise, it may very well be determined that similar renovation and redevelopment projects for the other old and aging hydro plants will be determined to be cost-effective in the future. That, of course, does not change the fact that the funding of those future renovation and redevelopment projects will add

PSC-220 continued

very substantially to the proposed $900 million rate base cost. These future renovation and redevelopment cost requirements for the aging plants (as well as the very high price that NWE was willing to pay to preempt any competitive bids – at expense to its ratepayers) was very likely a key economic consideration in PPL's decision to give up its ownership at this time.

c. While agreeing that PPL's decision to renovate and redevelop Rainbow was determined by PPL to be cost effective, I am not sure what is meant by "a cost effectiveness project." Clearly, the project was not undertaken merely to add 24 MW of generating capacity, if that is what is implied. More generally, it is reasonable to assume that most or all major expenditures undertaken by business firms are expected by those firms to be cost effective. Even the proposed hydros purchase in this case is, no doubt, seen by NWE to be cost effective ***for NWE***. That is so because the Company's proposal will place all cost risks squarely on the backs of ratepayers while gaining NWE hundreds of millions in additional low risk profits. That is also why NWE continues to see its previous addition of CU4 to rate base at more than $400 million as a valuable asset ***to the Company***, despite its excessive cost to ratepayers.

If one assumes that the future capital costs required for renovation, repair and redevelopment will be undertaken as cost-effective projects, they must be included in the analysis in order to reasonably assess the economics of the proposed deal. If these costs are not included in the analysis, ratepayer costs over time would be severely understated. Alternatively, if it is assumed that "no go" decisions may be made for needed future renovation and redevelopment costs, then the expected output and revenue value of the facilities to ratepayers as well as terminal value must be reduced accordingly in order to have a meaningful cost/benefit analysis.

PSC-221

Regarding: Cap-Ex Estimates
Witness: Wilson

a. You write "Even PPLM's budgeted capital expenditures over the next five years (2013-2017) average $11.6 million per year – well above NWE's corresponding assumption from 2018 going forward." (29:8-11) Please identify which document you use to make this claim.

b. You write "Indeed, there is not even a single year in the last ten when the actual or budgeted capital expenditure total was as low as the $8.5 million amount that NWE assumes (with 2.5% inflation) for all future years." (29:18-30:2). Please identify which document you use to make this claim.

RESPONSE:

a. Please see Section 8. Pro Forma Assessment, Capital Expenditure of Exhibit__(WTR-2.1), page 191 of 205.

b. See response to PSC-221 (a).

PSC-222

Regarding: Regulatory Approach to Cap-ex Questions
Witness: Wilson

a. Did the Consumer Counsel retain an engineering expert to consult on due diligence matters? If so, why is the expert not appearing as a witness in this proceeding?

b. Has the Consumer Counsel conducted a thorough review of NorthWestern's due diligence activities, or is it simply declining to do so, in preference of adopting the proposed ceiling on rate recovery to allay concerns?

c. Should the Commission, where it doubts NorthWestern's estimated costs of capital expenditures and O&M, seek to substitute NorthWestern's judgment for a number it finds more appropriate?

RESPONSE:

a. No.

b. Yes. A thorough review was conducted. See, for example, pages 28-33 of my prepared direct testimony. Also note that NWE's due diligence "activities" were relegated largely to reviewing documents provided by PPL and that very little time was devoted to actual physical inspection and evaluation of the facilities. While the independent engineer's 200 page due diligence Report that was completed in January, 2013 shows an extensive review of documents provided by PPL, it also reveals that there was only one day on which the independent engineer actually visited any of the dams in his preparation of that due diligence Report. Later, in September, a follow-up supplement to the Report was prepared, and in conjunction with that follow-up supplement, the independent engineer and certain NWE employees spent an additional six days visiting the twelve dams.

c. Where NWE's estimated costs and capital expenditures are doubtful, the conclusions that NWE draws from its analyses using these costs and expenditures should be rejected, and, where possible, more likely costs and expenditure estimates should be relied upon in establishing rate base value. In the alternative, if the Company's conclusions drawn from its estimated costs and capital expenditures are relied upon, the Company should be required to financially support upward deviations from the estimates it uses to justify the purchase.

PSC-223

Regarding: Consumer Counsel's Cap-Ex Proposal
Witness: Wilson

a. In the Consumer Counsel's proposal to cap the recovery of capital expenditures, would the capital additions up to the proposed ceiling still be subject to a used and useful review in the context of periodic rate cases?

b. You testify that you regard it as unlikely that the currently budgeted cap-ex will be sufficient to meet the requirements of the dams. But suppose that the actual amount of cap-ex is significantly lower than the $10 million or even the $8.5 million (escalating at 2.5% annually) that NorthWestern suggests. If the Consumer Counsel's approach is adopted, would it be appropriate to try to adopt a system of symmetrical incentives, and award NorthWestern the difference between what they spend and the $10 million as a reward for, in essence, over budgeting cap-ex in this original proposal?

c. Certain costs that are sometimes booked into hydroelectric stations' capital budgets (such as for re-licensing) are treated as O&M expenses by NorthWestern in this application. Does this affect your recommendation in any way?

d. Would the Consumer Counsel's proposed treatment of cap-ex require a provision to strictly specify the classes of capital expenditures?

e. Should the Commission be concerned that capping the recovery of capital expenditures might discourage NorthWestern from prudent capital investment in facility maintenance, and hasten the rate of asset decay?

RESPONSE:

a. Yes.

b. If the Commission believes that such incentives would be appropriate and encourage improved cost performance by the Company, it may be reasonable to implement such a scheme, at least on a trial basis. For example, with respect to future capital expenditures on the hydros, NWE requests approval of its proposed purchase based on the assumption of an $8.5 million annual expenditure amount and MCC proposes a $10 million annual cap. Using these amounts, a range could be established around NWE's $8.5 million proposal from $7 million to $10 million, with NWE being allowed to retain cost savings below $7 million and with disallowance of amounts over $10 million.

PSC-223 continued

c. No. I have generally treated expenditures in the same way that NWE has treated them in it Application.

d. No. MCC's proposal is made on an aggregate basis.

e. This suggested limitation should not discourage NorthWestern from prudent capital investment in facility maintenance in a way that would reduce the rate of asset decay. NWE would not be permitted to engage in that perverse conduct as a regulated utility. Monitoring prudent capital investment in facility maintenance is a normal and ongoing regulatory responsibility, which would continue to be the case here. That is one reason why I suggest incentives on a trial basis in response to part "a" of this question.

PSC-224

Regarding: DCF analysis, terminal value
Witness: Wilson

a. At 13:8-12, you state that despite very low assumed expenditures for repair and renovation, the DCF analysis assumes the assets will have residual value of $1.073 billion in twenty years. Is there is a relationship between asset repair and renovation investments and the residual value of an asset at some point in the future? If so, please describe the nature of this relationship.

b. If NorthWestern's DCF analysis included estimates of future repair and renovation investments consistent with your expectations, would the $1.073 billion residual value seem more reasonable? If not, please explain.

c. Are you aware of a sound, industry-standard method for estimating the residual or terminal value of a generating facility at some point in the future? If so, please explain whether the method NorthWestern used is consistent with that method.

d. At 23:3-5 you state that NorthWestern assumes zero decommissioning costs. Should any estimate of decommissioning costs be reflected in any terminal value number used in a DCF analysis?

e. You testify that the $1.073 billion in terminal value accounts for $270 million of the company's $826 million valuation. (38:8-9). Please demonstrate this derivation.

RESPONSE:

a. Yes. Generally there is an inverse relationship, with less repair and renovation resulting in less terminal value. As further evidence that NWE's billion dollar plus terminal value assumptions (which are a deduction from assumed hydro cost levels in the Company's analyses) unreasonably understate the hydro's prospective costs, note that in its last depreciation study in the 1990s Montana Power assumed a negative terminal value for these hydro plants.

b. More reasonable repair and renovation cost assumptions would help, but very likely would not fully justify a billion dollar value, especially with current competitive market price expectations. Also, Montana Power assumed a negative terminal value for these plants even though it intended to repair and maintain them as needed.

c. I have never seen NorthWestern's method or anything resembling it used to estimate terminal value in any regulatory proceeding. The usual procedure that is used in

PSC-224 continued

depreciation studies is to estimate the remaining life of the facility and its decommissioning and retirement costs (if any) at that time and to offset those estimated costs with any estimated salvage value of the facility and/or its component parts.

d. Yes. Normally decommissioning costs would be a deduction from terminal value. However, in this case NWE's terminal value appears to be an assumed market value (albeit unsupported) in the terminal year. Were there actually such a market value that a willing buyer would pay for the facilities in the terminal year, that buyer would logically take future decommissioning cost into account in establishing that market value and no further deduction would be required.

e. See attachment PSC-224e

PSC-225

Regarding: Intergenerational equity
Witness: Wilson

a. At 20:1-10 you describe an intergenerational equity problem associated with NorthWestern's CO2 tax assumptions. In traditional utility regulation, is it practically possible to altogether avoid intergenerational equity issues? For example, given the nature of depreciation and return on equity, does an intergenerational equity problem arise whenever a utility brings new plant into its rate base for ratemaking purposes?

b. Please confirm that your intergenerational equity concern in this case is primarily the amount of burden imposed on current ratepayers, which you find to be extreme due to speculative and hypothetical CO2 tax cost assumptions (20:10-13). Otherwise please explain.

c. How does the discounting of future benefits and costs in the DCF analysis relate to the intergenerational equity issue? That is, doesn't discounting the value of all future costs and benefits weight the decision analysis toward the perspective of today's ratepayers over future ratepayers, or the utility's perspective today?

d. At 9:5-6 you indicate that there may be long-term benefits to ownership. What are some possible long-term benefits from ownership?

RESPONSE:

a. While I agree that intergenerational equity issues are not always avoidable altogether, utilities and regulators should attempt to avoid and minimize them as much as possible. The practice of capitalizing investment costs and recovering them over time through depreciation (rather than expensing them currently) is done specifically in an effort to spread costs over the useful life of investments so that all ratepayers who benefit from an investment over time pay their fair share of the cost, thereby minimizing intergenerational equity issues.

   The Company's proposal here to charge current ratepayers the costs of some hypothetical carbon taxes that may or may not be enacted at some time after 2020 is an intergenerational equity problem that can be avoided. At the very least, if the Commission elects to impose this hypothetical carbon tax burden on Montana consumers at this time, the hypothetical tax dollars that Montana consumers are forced to pay to NorthWestern should be properly recognized and treated as consumer contributed capital.

PSC-225 continued

b. Please see response to part "a".

c. I disagree with the argument made in this question. Discounting, as is done here, simply reflects the time value of money. In this case, in addition to the time value of money, there is enormous speculation about hypothetical future carbon taxes and about the remaining life and future value of facilities (with minimal repair and renovation costs over time) – which speculation is built into the prices that today's customers would have to pay if the Company's proposal is approved. This is all very contrary to the interests and welfare of today's ratepayers. There is also great risk of financial harm to future ratepayers if the Company's assumptions about carbon taxes (including their assumed escalation) and required capital expenditures prove to be wrong, and the currently perceived financial cost of that future harm is reduced by discounting.

d. In the long term ownership can be valuable if it results in lower costs and if the value of the owned asset increases more than expected over time. In this case, NWE's extremely high and unlikely assumed terminal value of the property and the much lower expected cost of alternative market purchases makes the ownership value of the hydros negative.

PSC-226

Regarding: Using Market to Meet Customer Needs
Witness: Wilson

a. Is it acceptable practice to continue to expose NorthWestern customers to the market for meeting half of their supply needs?

b. Is it possible to estimate the value of avoided market volatility? Is it appropriate to include volatility adders to the purchase prices of long term power purchase agreements (PPAs) and Company owned generation assets?

c. Please compare the volatility of long-term PPAs and mid-term PPAs (such as the current seven-year contract NWE has with PPL) to the volatility of a large cost-of-service-based purchase like the Hydros.

d. Do you agree with Ascend Analytics that price spikes are typically followed by a reversion to a mean in market prices for electricity and natural gas?

RESPONSE

a. It should first be noted that at present and in recent years NorthWestern's rate based assets and fixed price purchases have represented 75% to 85% of the Company's total delivered electricity supplies. See attachment. In addition, NorthWestern has also hedged significant portions of its on-system purchases at index prices with off-system fixed price swap transactions. Accordingly, at present and in recent years NorthWestern's customers have been subject to relatively little market price volatility. At the same time owned generation assets such as CU4 and DGGS, which NWE promoted much as they are promoting the proposed hydros purchase, have been far more costly to ratepayers than market purchases. That said, from an economic perspective, if it is expected that market purchases will, as here, be far less costly than rate based alternatives, consumers are better off with market purchases. To the extent there is value to avoiding market price changes, such value would vary both between and among buyers and sellers. Consumers would generally benefit from downward market price changes and their welfare would be impaired by high stable prices. I am not aware of any reliable studies that have estimated the value of market price volatility to Montana electricity ratepayers.

b. No such price/cost volatility study has been performed. It is not known what is meant by including volatility adders in the purchase prices of long term power purchase agreements (PPAs) and Company owned generation assets. If this means artificially increasing their actual costs, that would not be appropriate.

PSC-226 continued

c. Forward market price curves indicate volatility from month to month and between peak and off-peak periods generally ranging from $25 to $50 per Mwh and averaging about $35 per Mwh. Rational consumers who compare this market volatility with the Company's projected more stable hydros costs in the range of $60 to $65 per Mwh would be unlikely to place great positive value on such price stability. Nevertheless, it is generally the case that mid-term or long-term PPAs with fixed prices or base prices with annual escalations have somewhat higher prices and less price volatility than PPAs with prices tied to daily or monthly index prices. The extent to which PPAs would have more or less price volatility than the cost volatility of rate based assets would depend not only on the nature of the PPAs but also on uncertainties and risks associated with rate based assets. In the case of the hydros, NWE's very low repair and renovation cost assumptions for the hydros could very well result in considerably more upward cost volatility for these rate base assets than one would expect.

d. During the past decade or so, significant upward spikes in short term electricity or natural gas market prices have been followed within relatively short periods of time by significant reductions in short term market prices. To the extent that "mean market prices" suggests reversion to a price trend, rather than to a fixed average, I would be inclined to generally agree with this view of price moderation.

PSC-227

Regarding: Best Practices for Resource Planning
Witness: Wilson

a. Should the Commission be concerned that the typical purpose of a resource plan—to surface the best resources to acquire, before their acquisition—is seemingly not the purpose of the 2013 Resource Procurement Plan?

b. If the answer to sub-part (a) is yes, how should the Commission therefore regard the reliability of the evidence presented in the 2013 RPP?

RESPONSE:

a. Yes.

b. The evidence in the 2013 RPP should be regarded as an element of the Company's advocacy in this case. For example, as I stated in my direct testimony NWE's filing is remiss in not more candidly advising the Commission on the sensitivity of its analysis to the assumptions about carbon taxes. As MCC stated in its comments on NWE's procurement plan: "MCC notes with particular concern issues involving how the Procurement Plan evaluates the possible imposition of a CO2 tax, both because this has been a subject of much contentious debate and because it may have a significant impact on the outcome of the Procurement Plan. NWE has recognized in the past that a robust plan is one in which significant choices are relatively insensitive to changes in input assumptions and modeling methods. If the decision to purchase the PPL hydro assets is sensitive to the assumed level and imposition date of a CO2 tax, e.g., it is incumbent on NWE to explicitly evaluate that sensitivity and to explicitly evaluate the consequence of an unfortunate outcome or of a wrong choice. The 2013 Procurement Plan is deficient on this important issue."

PSC-228

Regarding: Market structure
Witness: Wilson

a. Is the wholesale electricity market in the Northwest sufficiently competitive such that, absent any involvement by electric utilities, their regulators, and publicly-owned utilities (*e.g.*, ratepayer-backed construction of new resources or commitments to long-term PPAs with non-utility generators), unregulated entrepreneurs would construct the capital-intensive resources needed to satisfy demand in the timeframe needed to maintain current standards of system reliability? If so, what evidence supports that conclusion?

b. If the wholesale electricity market in the Northwest is not competitive to the degree described in part (a), is it reasonable to assume that the region could not sustain current standards of system reliability if all the publicly-owned and regulated investor-owned utilities undertook a strategy of relying solely on purchases from wholesale spot markets to provide all future resource needs?

c. If the wholesale electricity market in the Northwest is not competitive to the degree described in part (a), so that maintaining current standards of system reliability requires ratepayer-backed capital investments either directly by publicly-owned and regulated investor-owned utilities or through ratepayer-backed long-term PPA commitments, to the extent NWE were to undertake a strategy of relying solely on purchases from wholesale spot markets to provide all future resource needs, would it and its customers be free-riding on other utilities' ratepayer-backed capital investments?

d. Are you aware of other utilities that use the projected cost of wholesale spot market purchases as the only or primary measure of the cost-effectiveness of a potential capital investment in a new resource? If so, please identify those utilities and provide citations for the documentation of this practice.

RESPONSE:

a. No. Certainly at the present time and for the foreseeable future the involvement by electric utilities, their regulators, and publicly-owned utilities, including ratepayer-backed construction of new resources and commitments to long-term PPAs with non-utility generators are important elements in the Northwest wholesale electricity market.

PSC-228 continued

b. At the present time and for the foreseeable future the region could not sustain current standards of system reliability without the generation resources of publicly-owned and regulated investor-owned utilities. Moreover, without an orderly divestiture of utility owned generation resources (which I do not advocate) there would not be sufficient resources in Northwest wholesale markets to support a strategy of sole reliance on purchases from wholesale markets (spot or otherwise) to provide all future resource needs.

c. I do not advocate that NWE should undertake a strategy of relying solely on purchases from wholesale spot markets to provide all future resource needs. However, strategic economic choices to avoid the imposition of excessive electricity rates that would result from the acquisition of unreasonably costly rate base assets by, instead, making economical market purchases under long term PPAs and on a spot basis would not be free-riding on other utilities' ratepayer-backed capital investments. Rather, it would be the good common sense use of the competitive market options that have generally been recognized to be the backbone of our free market economy.

d. No. Well managed utilities generally look at multiple supply options. Generally, PPAs as well as other purchase options and spot market transactions are among the alternatives that are considered in assembling a reliable least cost supply plan.

PSC-229

Regarding: Alternative cost estimates
Witness: Wilson

a. At 27:7-10 you state that NorthWestern's cost comparisons will result in higher costs for ratepayers than would projected competitive market purchases for at least the next decade. Why is a projection of market purchases a reasonable benchmark against which to compare the cost of purchasing the hydro facilities?

b. NorthWestern's stochastic cost comparison compares estimates of total portfolio costs with the hydro facilities to total portfolio costs with a combined cycle gas turbine generator; NorthWestern's recent preferred resource plans acquire a combined cycle gas turbine in the 2018 timeframe. Aside from any issues with the stochastic modeling process itself, are avoidable supply portfolio costs for a preferred resource plan a reasonable benchmark against which to evaluate the cost of purchasing the hydro facilities? If not, please explain why.

c. In each of the last two NorthWestern PURPA avoided cost dockets (D2010.7.77 and D2012.1.3) the Commission used a combination of market price projections and the cost of owning and operating a combined cycle gas turbine generator to estimate NorthWestern's avoided costs. Would applying that method to determine an avoided cost benchmark against which to evaluate the cost of purchasing the hydro facilities be reasonable? If not, please explain.

d. To what extent should there be consistency between the cost benchmark the Commission uses to evaluate the purchase of the hydro facilities and the avoided cost estimates the Commission uses to set standard rates for PURPA qualifying facilities?

e. To what extent can NorthWestern's evaluation of the PPLM thermal facilities, which NorthWestern also had an opportunity to purchase, establish a cost benchmark against which to compare the purchase of the hydro facilities?

RESPONSE:

a. Alternative market purchases are a benchmark that NWE chose to use and rely upon in both its comparative cost and valuation analyses. Market purchases are also an actual source of supply that NWE has utilized extensively and successfully at relatively low cost in recent years. Also, there is an established futures market that one can look to for unambiguous cost comparisons, and these comparisons have been used by the Company and the Commission in their evaluations in other recent cases.

PSC-229 continued

b. Yes. Setting aside the major problems that invalidate the stochastic modelling that has been done by the Company in this case, avoidable supply portfolio costs for a preferred resource plan would be another reasonable benchmark. As in the case of comparisons with market purchases, it would, of course, continue to be important to avoid the comparative distortions caused by the Company's carbon tax, terminal value and capital expenditure assumptions.

c. Yes. That would be another reasonable benchmark.

d. Other things being equal, consistency would be desirable. However, other things are far from equal. In setting avoided cost rates for QFs the Commission faces issues of wanting to promote renewable development, wanting to provide needed certainty and fairness to small power developers, wanting to balance the needs of small power producers against NorthWestern's greater knowledge, experience and market power. Also, having to withstand the scrutiny of FERC in its oversight over PURPA. NorthWestern's interests in QF dockets may not differ greatly from those of ratepayers. A simplified approach such as that used in D2010.7.77 and D2012.1.3 may be satisfactory. The resulting balance may favor the interests of QFs over those of NorthWestern at the expense of ratepayers, although with relatively minor impact on both.

   By contrast, in consideration of proposed preapproval for a major acquisition of already existing facilities by NorthWestern, a different set of issues dominate: NorthWestern's incentives are driven as much or more by the interest of shareholders and corporate growth than by any desire to minimize long term costs and risks for ratepayers; the agent/principle and moral hazard issues are at the forefront of the decision; and the magnitude of the impact of the decision on ratepayers dwarfs that of a QF decision. The virtues of consistency may correspondingly be outweighed by the need for careful consideration of costs and risks of decisions that rely on contentious and highly uncertain long term forecasts and assumptions about future carbon policy.

e. I do not advocate using NorthWestern's evaluation of the PPLM thermal facilities as a cost benchmark against which to compare the purchase of the hydro facilities.

PSC-230

Regarding: Comparison of Hydros to Gas Generators
Witness: Wilson

a. You seem to rely, for purposes of comparing the Hydros with alternatives, only on a market alternative. Have you analyzed the portfolio that includes CCCT and SCCT, and what are your general observations about these portfolios as a viable alternative to the Hydros?

b. Have you reviewed how the 2013 and 2011 RPPs differ in regard to their inputs for CCCT capital costs? Do you believe one set of data is more reliable than the other?

c. Montana-Dakota Utilities, in its integrated resource plan, assumes co-ownership of a CCCT to achieve greater economies of scale. NorthWestern does not. Do you believe that NorthWestern's expectation that it would bear the sole burden of building a 238 MW CCCT in 2018 is a proper one?

RESPONSE:

a. A least cost portfolio that includes CCCT and SCCT as well as market purchases could be a viable alternative to the hydros. I have considered the Company preferred portfolio including CCCT and have found that, like alternative market purchases, it is a lower cost and less risky resource option than the Company's ratemaking proposal for the hydros.

b. Yes. The Company's estimated CCCT capital costs were somewhat higher in the 2013 RPP ($1,425 per kW vs $1,239 per kW). These estimates were in current dollars in each year and reflected the cost for a site-specific air cooled condenser in 2013. I considered the difference to be moderate. The fact that the 2013 cost was site-specific and more recent may make it more reliable.

c. MDU has a history of generation co-ownership as does NWE in South Dakota, where there are multiple utilities within a proximate area. Montana Power also engaged extensively in co-ownership in the development of all of the Colstrip generating resources. If co-ownership of generation to achieve greater economies of scale is feasible for NWE in Montana it would not be proper for NWE to simply assume away that option.

PSC-231

Regarding: Analysis of PPLM's Thermal Assets
Witness: Wilson

a. In response to data request PSC-066, NorthWestern provided a spreadsheet that estimates the net present value of Colstrip 1 and 2 to be minus $127 million, and the net present value of Colstrip 3 to be plus $100 million. In your opinion, do these figures represent reasonable estimates of the value of these resources?

b. Have you reviewed the Long Term Rev Req analysis of the thermal assets presented in response to PSC-003? If so, do you believe that this model represents an appropriate judgment about the future revenue requirements of the thermal assets?

c. In your opinion, is a detailed valuation of the proffered coal-fired resources relevant to this proceeding? Please explain your reasoning.

d. How would you recommend the Commission perform its duty in relation to statute and administrative rules in order to find that NorthWestern did (or did not) reasonably evaluate these resources compared with the Hydros?

RESPONSE:

a. Dr. Wilson has not evaluated this matter.

b. No.

c. NWE has an obligation to consider all economic alternatives in selecting a preferred supply portfolio. I agree that there are likely to be numerous supply alternatives that are more economic than the Company's hydros proposal.

d. I do not have a recommendation in this regard.

PSC-232

Regarding: Carbon Hedging, Thermal Assets
Witness: Wilson

In your opinion, would a combined purchase of the hydro and coal-fired facilities provide a hedge against the uncertainty in carbon prices, if the same carbon price forecast was baked into the initial purchase price of the coal assets?

RESPONSE:

Such a combined purchase would likely result in lower unit costs for future electricity supplies than the present hydros-only proposal if corresponding hypothetical carbon costs are incorporated as an offset to the price of coal-fired facilities.

PSC-233

Regarding: Consumer Counsel Conditions
Witness: Wilson

Can you provide other examples of where regulated, cost-of-service based utilities were subject to provisions of the type that you suggest (i.e., which cap recovery of certain expenditures beyond what had first been forecasted by the utility, or where a utility is only allowed to recover part of its capitalization on a deferred basis)?

RESPONSE:

Recovery of capitalization (both investment and its carrying cost) on a deferred basis has been done as a standard ratemaking procedure during construction periods for new plant development prior to its recognition as used and useful rate base. This corresponds with the suggestion to defer recovery of the assumed hypothetical carbon tax portion of the proposed purchase cost until actual carbon taxes are enacted.

Also, rate base disallowances for excessive construction costs (e.g., as in the case of some nuclear plant construction cost overruns) parallels the proposal here to disallow rate base additions for future capital expenditures that exceed a reasonable margin above the capital expenditure cost level that has here been represented by the Company as a basis for approval of its proposed acquisition.

PSC-234

Regarding: Market-Crossover-Point Test
Witness: Wilson

In a case concerning the rate-basing of natural gas supply fields, the Consumer Counsel and NorthWestern reached a settlement that subjects the purchases to a market-crossover-point test. Would such an approach have validity here and, if so, how would one apply it?

RESPONSE:

Yes. The three to five-year time period for expected unit costs of a rate based production asset to be at or below the expected market prices of purchased supplies that is set forth in the September 18, 2012 Stipulation in Docket No. D2012.3.25, entered into by NorthWestern and the MCC, could have applicability here. In that case, NorthWestern agreed to a "Unit Cost/Market Price Crossover Point" that would pertain to future natural gas acquisitions by NorthWestern. The September 18, 2012 Stipulation in that case ties the period of time for expected unit costs of natural gas acquisitions to fall below expected market prices to the estimated "20-Year Levelized Unit Revenue Requirement ($ per Mcf), " as follows:

- $5.00 to $6.00 Levelized Revenue Requirement - 3 Years or Less
- $4.00 to $5.00 Levelized Revenue Requirement - 4 Years or Less
- Below a $4.00 Levelized Revenue Requirement - 5 Years or Less

Essentially the lower the levelized revenue requirement, the more distant the permitted crossover point. NorthWestern has applied that market-crossover-point test to its two subsequent acquisitions of natural gas producing properties - Bear Paw I (NFR) and Bear Paw II (Devon). The MCC has reviewed NorthWestern's market-crossover-point tests for the Bear Paw I and Bear Paw II acquisitions, determined that they were consistent with the provisions of the September 18, 2012 Stipulation, and has not opposed NorthWestern's Bear Paw I and Bear Paw II acquisitions.

In this case, NorthWestern has presented an estimated unit cost/market-crossover-point of 8 years, based on the assumption of significant hypothetical carbon tax adders to future electricity market prices, beginning in 2021, and very low future hydros capital expenditure costs, but very high terminal values. A unit cost/market-crossover-point of 8 years for the hydros far exceeds the above market cost period in the September 18, 2012, Stipulation between NorthWestern and the MCC, and underscores the difficulty of applying the September 18, 2012 Stipulation methodology when market costs are, as

PSC-234 continued

There, so substantially below proposed rate base costs. This also suggests that the potential for positive ratepayer benefits over time from the Company's Bear Paw I and Bear Paw II acquisitions is greater than the potential for positive ratepayer benefits over time from the hydros.

If the hypothetical carbon tax adders do not occur or occur at significantly lower levels by 2021 or occur later, or if future hydros costs are greater than assumed by NorthWestern, the estimated unit cost/market-crossover-point of the hydros in 8 years will not be achieved, and applying the intent of the September 18, 2012 Stipulation, the hydros cost of service would need to be reduced to produce an 8-year crossover of costs and market prices.

PSC-235

Regarding: Relevance of Public Sentiment to this Transaction
Witness: Wilson

NorthWestern has represented that public support for acquiring the Hydros runs high, as compared to, say, thermal assets. (See Exhibit_(APP-3), where NorthWestern includes various editorials from around the state as well as a statement of support from Sen. Jon Tester.) How, if at all, should such public attitudes and political opinions influence the Commission's thinking on this matter?

RESPONSE:

See p. 10 of my prefiled testimony. As discussed there, it is not at all surprising that there is strong sentiment in favor of reacquiring these hydro facilities. There is an understandable frustration at the loss of benefits that once flowed from them. Public opinion is largely formed on the basis of this desire and NWE's representation of benefits to be obtained. NWE is understandably self-interested in this proposal. That is why Montana, like all other states, has charged a regulatory commission to conduct a careful evidentiary process to consider the public interest. The process which is now occurring will allow all aspects of the application to be considered. The Commission should of course consider public opinion, and understand the basis on which it is formed, keeping in mind that the expression of public opinion (including its expression through editorials, the views of individual political leaders or otherwise) depends to a large extent on things like the phrasing of the questions posed. Most importantly, the Commission should incorporate the specialized knowledge and information it receives through the regulatory process to inform decisions that are in the public interest– even if fulfilling this duty may run contrary to short-term public attitudes and opinions. The public relies on the Commission for this function, as recognized even in the editorials cited by NWE, urging the Commission to take a "hard look," and to be "diligent in making sure there are no hidden downsides."

Support that has been most frequently expressed seems to be tied to the notion that if NWE does not acquire the dams (at virtually any cost) the hydroelectric output of the dams will likely go to some other market. That is a mistaken impression. It is not the case that the ownership of the dams will determine where the power generated there will go. Ownership will control only the flow of money – not the flow of hydro power. Ownership of the dams will direct where the money goes, who pays it, and how much is paid for the power. The actual power flows from these plants will remain very much the same as now whether they are owned by PPL, NWE, or by another corporation.

PSC-235 continued

Ownership change will have a big impact on the size and recipient of the money flows, but little or no impact on the power flows.

Even if the dams were sold to a third party who in turn decided to "sell the output" to, let's say, the West Coast, the power from the dams would not physically flow there. What would happen is that the power would, as now, flow into the NorthWestern system to which the dams are connected, and displacement power would be purchased in the West (and paid for by NorthWestern at market prices), and it would be delivered to the new Western power buyer who would pay the owner of the dams whatever price was agreed to. If the dams are valued at $900 million for this transaction the Western buyer would be paying the dam's owner about double the cost of the displacement power actually delivered to the Western buyer, and NorthWestern would be getting the actual output of the dams at the much lower cost of displacement power.

Power markets work this way because it is operationally efficient and, in this case, because there are no available transmission paths for the actual shipment of the hydro generation to the West Coast in any event. In short, dam ownership will control how much money is paid for the hydros output and who gets the money, but it will not control the actual power flow. The question is whether Montana consumers should pay twice as much for the same output of these dams so that NWE's stockholders in New York can acquire ownership of the dams from PPL's stockholders in New York and make more money.

PSC-236

Regarding: Alternate Proposals
Witness: Wilson

a. Could you support an alternate proposal where the Commission would not place prior restrictions on the recovery of future decommissioning or negative net salvage costs, apply expected terminal value appreciation adjustments to depreciated capital, limit future capital expenditure recovery, or defer admission into rate base of the capital equivalent of the expected net present value of carbon taxes; but instead would approve immediate entry into rate base of some value less than $900 million, along with specified values for return on equity and capital structure?

b. If you could support such a proposal, do you have a set of recommended values for the approved capital increase to rate base, return on equity, and capital structure?

c. If you could support such a proposal, and given that the increase to rate base would be treated now and in the future on a consolidated basis with the rest of the rate base regarding Commission authorized returns, do you have a recommended value for increase to rate base?

d. If you could support such a proposal, and given that the increase to rate base would be treated now and in the future subject to a 10% return on equity and a 52/48 capital structure, do you have a recommended value for increase to rate base?

RESPONSE:

a. Yes. But in order to be reasonable that rate base value would have to be substantially below $900 million. Because I assumed that such a traditional rate base value substantially below the proposed $900 million purchase price would not be accepted by NWE because it would not enable full cost recovery, I did not propose that approach, but instead proposed an alternative that would enable the Company to recover its full projected cost if the assumptions underlying its approval request were accurate. An alternative would be for NWE to renegotiate a more reasonable arrangement with PPL.

   Note that in response PSC-202a above I have, in the interest of compromise, also suggested an additional ratemaking approach ("deferral paralleling deferred income taxes") that would permit full rate base recognition of the $900 million purchase price immediately.

PSC-236 continued

b. Please see responses to part “a” of this question and to PSC-202a above. This would be consistent with an ROE allowance in the 8.0 to 10.0 percent range and a common equity ratio in the 45 to 48 percent range.

c. Please see response to part “b” of this question.

d. Please see responses to the prior parts of this question.