MEMORANDUM

April 2, 2014

From: The Essex Partnership

To: Montana Public Service Commission

Re: Case document review/assessment of NorthWestern Energy's Due Diligence of the PPLM Hydroelectric Projects

The Essex Partnership (Essex) performed a case document review of NorthWestern Energy's (NWE's) due diligence of the PPL Montana's (PPLM's) hydroelectric projects. After examining NWE's application and pre-filed testimony, materials in the PPLM data room, and NWE's responses to data requests, Essex prepared a series of checklists that document information provided for specific project features and environmental and regulatory compliance, including instances where information was not available. The checklists were submitted to the Commission on March 31, 2014. This memorandum summarizes the major findings of our review.

In Essex's opinion, the information in the docket to date does not contain sufficient information to confirm NWE's projections of capital or operations and maintenance (O&M) expenditures through the 20-year study period of the discounted cash flow analysis. Major uncertainties include projected capital expenditures for the civil works, environmental liabilities, the timing and costs of equipment overhauls and upgrades, and regulatory compliance costs. Some of the major items are summarized below.

Civil – The case file indicates that the hydro system has aging structures that are generally in satisfactory condition. The aging structures include flashboard-stanchion systems on the spillway crests at eight developments to control water levels in the headpond. By today's standards these systems are slow, unreliable, and can compromise safety inspections of the downstream face of the spillway and toe of the spillway. As these flashboard-stanchion systems age, industry practice is to replace them with reliable, remotely operated gates or inflatable dams that have larger openings to pass debris.

A number of aging structures have post-tensioned rock anchors that were installed to meet FERC stability criteria. Over time the anchors can corrode and relax, resulting in safety factors not meeting FERC stability criteria. Current practice, as accepted by FERC, is for post-tensioned rock anchors to have double corrosion protection and to be installed per recommendations of the Post-Tensioning Institute (2004).

Rock slides have occurred at projects, damaging long sections of the flowline-penstock conveyance system. The case file indicates that uphill rock conditions are susceptible to rock falls. A long-term solution would involve reinforcing the rock slopes.

The case file contains no information that indicates NWE included costs over the 20-year study period for the above items.

Environmental Liabilities – A number of sites have documented environmental contamination issues that could entail significant remediation costs. For example, there is potential for inclusion of portions of the Black Eagle Project in a superfund site boundary. Similarly, Thompson Falls has contamination from Milltown superfund site debris, Rainbow has contamination associated with demolition of the old powerhouse , and Holter has PCB contamination of unknown origins. The case file does not provide adequate information to quantify the magnitude of the exposure for the above liabilities.

Equipment – Available information indicates that the equipment is aging and that there has been an ongoing program of upgrades and rehabilitation to maintain operational reliability and safety. The case file includes a schedule and budget for upgrades and rehabilitation, but little information on the condition, performance, or reliability of the turbine/generators, governors, and other equipment.

Some of the units have turbines nearly 100 years old and generators with windings over 50 years old. Although those units are scheduled for future overhauls and rewinds, there is a risk that a failure in advance of the scheduled date could not only accelerate the budgeted capital expenditures but, more importantly, cause collateral damage that could increase the cost. The risk of such an occurrence is unknown due to a lack of inspection and test data in the available docket information.

One area where test results were found was in the generator step up (GSU) transformer data. According to the data, the routine dissolved gas analyses (DGA) were generally favorable, but there were cases where the readings placed the transformers into an IEEE Category IV, which indicates an excessive level of insulation aging. Continued operation can result in premature transformer failure.

With regard to the interconnected transmission system, there is no information available as to the reliability of the transmission system or its capability to export the full output of the plant under normal or contingency system conditions.

Regulatory Compliance – The case file indicates that there are existing and potential Endangered Species Act (ESA) issues at three projects. At Hebgen and Madison there is a potential future ESA listing for Artic Grayling and at Kerr there is an existing Bull Trout listing. Each issue has potential to incur significant cost that is not addressed in the projected capital expenditures.

The FERC license for Thompson Falls expires in 2025. Relicensing proceedings typically begin at least 5 years prior to license expiration and can be expensive. There is insufficient information in the case file to determine if the projected budget is adequate to cover future relicensing costs.

NWE Projected Capital Expenditures – The case file indicates that NWE developed their projections of capital expenditures (CapEx) using PPLM historic cost data with some minor adjustments. As a check on this approach, Essex deducted the capital expenditures for major projects from the total historic expenditures for the years 2008 through 2011 to estimate historic base CapEx values. A similar exercise was performed for NWE's projected CapEx in the year 2021. To account for inflation, the historic base CapEx values were escalated to 2021 and then compared to NWE's projected values.

The average historic base CapEx in 2021 dollars is estimated to be $6.9 million. NWE's total projected capital budget for 2021 is $9.2 million. Of this amount, $5.0 million is for major capital projects, leaving $4.1 million for the base CapEx of the entire hydro system. The $4.1 million value represents 60% of the historic base CapEx. A summary of the budget analysis is attached.

Attachment

Item **Historic and Projected Capital Expenditures ($1,000s)**

Historic Expenditures	**2008**	**2009**	**2010**	**2011**	**Average**	**Source**
CapEx	35,784	35,418	103,958	78,585	63,436	WTR-2.1, p175
Adj. Historic Expenditures	**2008**	**2009**	**2010**	**2011**	**Average**	
Kerr CapEx	1,654	1,084	18	154		WTR-2.1, p173
Total CapEx, Less Kerr	34,130	34,334	103,940	78,431	62,709	
Major CapEx	(30,046)	(32,724)	(98,722)	(68,346)	(57,460)	WTR-2.1, p176 & 177
Base CapEx	4,084	1,610	5,218	10,085	5,249	
Escalation to 2021 @2.5%	1,546	555	1,628	2,825	1,639	
Base CapEx (2021$$)	5,630	2,165	6,846	12,910	6,888	
2021 CapEx	**Total**	**Base**	**Major**			JMS -1, Capital tab
Black Eagle	1,890	360	1,530			
Ryan	1,340	700	640			
Hauser	1,960	330	1,630			
Madison	1,480	250	1,230			
Total	6,670	1,640	5,030			
2021 Total CapEx Budget			9,150			JMS -1, Capital tab
2021 Major CapEx			5,030			see above
Available for Base CapEx			4,120			
Base CapEx (2021$$)			6,888			see above
Shortfall			2,768			