DPU Data Request 26.15

Questions 26.9 through 26.14 refer to DUTH/2007/C/806/B – Utah Mobile Radio Replacement Project:

The following documents relating to the Terminal Substation Replacement 345-138 kV Project were provided in response to DPU 2.29:

1. IAD #1 Term Sub Replace 345-138 kV XFMR's.pdf (4-20-2009)
2. ER #0 Terminal Sub - replace transformers.pdf (6-25-2009)
3. IAD #2 Term Sub Replace 2 345-138 kV XFMR's.pdf (4-29-2011)
4. PCN Terminal Transformers_APR 94000813 APPROVED.pdf (5-26-2011)
5. Terminal Substation GM.xls
   a. Please confirm that these are the only internal documentation available for this project.
   b. If other documentation exists, please provide copies of such.
   c. Were documents 1) and 2) above provided in 10-035-124?
   d. Were documents 3) and 4) above provided in 10-035-124? Have they been reviewed by the Commission? If so, please provide copies of relevant documentation.
   e. Please respond for each component of this project. Has construction begun, and if so, on what date did construction begin? Also if so, please indicate what percent of the planned component has been completed. Please provide a construction schedule for the full project.
   f. Regarding page 2 of 17 from document 1) above (the 2009 IAD), please provide workpapers showing how a 2008 load of 2,203 MVA for the Salt Lake Valley area growing at 3% per year equals a projected 2013 load of 2,717 MVA, since 2,203 x (1.03)^5 would seem to result in a 2013 load of 2,544 MVA?
   g. Regarding page 3 of 8 from document 3) above (the 2011 IAD), please provide workpapers showing how a 2009 load of 2,148 MVA for the Salt Lake Valley area growing at 3% per year equals a projected 2013 load of 2,627 MVA, since 2,148 x (1.03)^4 = 2,418 MVA, instead of 2,617 MVA?
   h. If expected area load in 2013 is 2,418, is it necessary to complete this project in 2012 to maintain reliable service? Please provide analysis supporting this answer.
   i. Regarding page 8 of 8 from document 3) above and the file named Terminal Substation GM.xls, please explain the cash flow analysis presented.
   j. Please provide actual loads for the Salt Lake Valley area for 2010 and 2011.
   k. What is the latest annual load forecast or projection of growth in the Salt Lake Valley area? Is the date of this forecast contemporary with the load forecast used in this rate case
   l. What level of load in MVA can the system support if this project is not built? Provide copies of relevant documentation.

m. The 2009 IAD has a cost of approximately $15.3 million. The 2011 IAD has a cost of approximately $48.6 million. Please explain in as much detail as possible the reasons for the large increase in cost, and provide any supporting documentation.
n. Please provide the date on which the Company changed the configuration represented in the 2009 IAD.
o. If the original project scope in the 2009 IAD were built, would it resolve the situation where transformer overload occurs under N-1 conditions? Which forecasted 2013 load is assumed in this answer?
p. According to the 2011 IRP, the Energy Gateway Project includes a new transmission line between Terminal and Oquirrh. Is any part of the proposed Terminal Substation Upgrade project dependent on or affected by the construction of this line? Please explain in as much detail as possible.
q. What is the status of the proposed Terminal to Oquirrh line?

Response to DPU Data Request 26.15

a. No. There is additional documentation.

b. Please refer to Attachment DPU 26.15a.

c. Yes. Please refer to the Company's response to DPU Data Request 24.5 in Docket No. 10-035-124.

d. No. PacifiCorp does not know whether the Commission has reviewed the documents but is not aware the documents have been introduced into the record in a PSC proceeding.

e. The major components of the project consist of: 1) Permitting; 2) Design Engineering; 3) Procurement; and 4) Construction. Please refer to Attachment 26.15e for the project timeline.
   1) Permitting – Only general construction permits were required and have been obtained.
   2) Design Engineering – Complete.
   3) Procurement – The major equipment procurement for this project consists of procuring two transformers which have been manufactured and delivered, and are currently being installed.
   4) Construction – Construction commenced on August 26, 2011 and is approximately 60% complete.

f. Please refer to Attachment "Salt Valley Area Loading Chart" in DPU 26.15h. The forecast used was based on a base year of 2006, not as shown in 2008 a low peak year. Years 2008 and 2009 would need to be weather adjusted, since these were more mild summer periods and low economic

conditions affecting load growth. The historical data can dramatically change from year to year since the Salt Lake Valley load is driven primarily by mild, normal, or high summer temperatures. The Salt Lake Valley load can change by 300+ MW in a couple of years. In this projection, actual load for 2007 was 2443 MVA, but in 2005 it was 2111 MVA. Another issue is that the 345-138 kV transformers loading in the Salt Lake Valley are offset by Generation at Gadsby and West Valley which are capable of about 550 MW. These transformers must carry the system load when any portion of the generation drops off for any reason. This study was done with the generation in service, which is a best case scenario.

g. Please refer to Attachment DPU 26.15g.

h. Due to the unknowns of local generation operating conditions, and weather conditions it would still be prudent to complete this project. In addition, because of additional 345 kV lines being connected into Terminal Substation, the fault duty on existing 138 kV circuit breakers exceed their current ratings and would require replacement. Please refer to the Company's response to part f above.

i. The Net Present Value is the present value of the future cash flows from an investment less the current cost of the investment. From a formula point of view we get:
Net Present Value = Present Value of Benefits - PV of Costs
The net present value method uses a predetermined discount rate, 7.15% in this case, to compare the present value of the cash inflows and the present value of the cash outflows associated with an investment. A positive net present value means that the project is earning more than the required rate of return and indicates that the project represents an acceptable investment
Two results are presented:
   1) Cash Flows without Regulatory Recovery is the after-tax cash flows associated with the proposed investment including the cost of the investment, operating and maintenance costs, administrative and general costs, income taxes and property taxes. This calculation does not include the revenue impact of recovering the revenue requirement of the investment through general rates.
   2) Cash Flows with Regulatory Recovery is the after-tax cash flows associated with the proposed investment including the revenue impact of recovering the revenue requirement of the investment through general rates.

   The Internal Rate of Return is defined as a discount rate which gives a net present value equal to zero. This is also the rate where the present value of the cash inflows equals the present value of the cash outflows.

j. The Salt Lake Valley 345-138 kV transformer total load for 2010 load equals 2121 MVA and year 2011 equals 2329 MVA.

k. Please refer to Attachment DPU 26.15k. This chart uses a 3% load growth from 2011.

l. One of the two existing 345-138 kV transformer has already been moved to a new location and a loss of the remaining transformer during this N-2 condition, would cause overloads on some remaining 345-138 kV transformers in the Salt Lake Valley by the summer of 2012 with a projected load of 2470 MVA or higher during conditions of high temperatures and some generation reductions. Please refer to Attachment DPU 26.15l for the contingency document showing the conditions with the loss of either one of the 345-138 kV transformers at Terminal, N-1 condition.

m. The 2009 IAD and project estimate was limited to replacing two existing 345-138 kV transformers and included the following scope:
- Replace Terminal XFMR #9 (421 MVA) to 700 MVA – quantity 1
- Replace Terminal XFMR #10 (448 MVA) to 700 MVA – quantity 1
- Replace breaker L180 to a continuous rating of 3000A (40 kA Fault Rating) – quantity 1
- Replace 138 kV breaker CB101, CB115, and CB116 to a fault rating of 63 kA (2000 A Continuous) – quantity 2

As detailed project scoping evolved in 2010, it became apparent that other related infrastructure within the substation could not support installation of two 700 MVA transformers. The Terminal Substation 138 kV load and transfer bus was an antiquated design dating back to the World War I era when Grace Hydro was connected to the Terminal Substation to serve load along the Wasatch Front. The bus design was inappropriate for the size of the station and installation of the higher MVA transformers. The existing 138 kV bus could not handle projected load and fault duty. Footings for many of the substation apparatus did not meet seismic requirements and had to be replaced as well.

The 2011 IAD and scope included the following upgrades:
- Replace the antiquated 138 kilovolt operate and transfer bus design with a breaker and a half scheme
- Install higher fault rating breakers to mitigate the problem of higher fault ratings due to the new transformers
- Address numerous major substation apparatus that do not conform to current seismic specifications

n. The date on which the Company changed the configuration is the approval date of the Project Change Notice (PCN) for Terminal Transformers _ APR 94000813 approved July 7, 2011.

o.

a. No, the original scope would not have resolved all the problems. Several factors influenced the decision to expand the project beyond the original scope. During the detailed scoping for the project, it was determined that the continuous rating of the existing 138 kV major bus work ranged from approximately 1000 amps to 2200 amps (240 – 526 MVA), and the 138 kV switches were 2000 amp units. 700 MVA at 138 kV produces 2930 amps. As such, the improvement would have been limited to 526 MVA or less depending on the distribution of flow in the station. In addition, 6 - 138 kV circuit breakers were found to have inadequate short circuit interrupting capability when the transformers were replaced. Since much of the bus work associated with these circuit breakers were originally designed for 115 kV, it was determined that it would not be prudent to replace the circuit breakers in their original positions. Since the capacity improvement with the original scope would be limited to 526 MVA or less per transformer, and significant improvements would have been required to replace the inadequate circuit breakers, and bus. This was determined to be ineffective and would not resolve the requirements identified in the original scope.
b. The studies were conducted with the Salt Lake Valley 345-138 kV transformers at approximately 2500 MVA total load for 2013.

p. The Terminal to Oquirrh transmission project will be a 345 kV double circuit line approximately 14 miles in length and will connect to an existing bay at Terminal Substation. The Terminal Substation 345-138 kV transformer replacement project is designed to support Wasatch Front 138 kV voltages and mitigate loss of load due to a loss of one of the 345-138 kV transformers. The Terminal Substation Upgrade project is not dependent or affected by construction of the Terminal to Oquirrh transmission line. Both projects have unique purpose and necessity.

q. Right-of-way acquisition for the project is underway and is scheduled to continue through 2013. The request for proposal process for obtaining a construction contractor is scheduled to begin late 2012. Construction is scheduled to begin spring 2014. Testing and commissioning will occur spring 2015, with the project scheduled to be placed in service approximately June 2015.