Enterprise Risk Management

Risk, Reserves, and TPP

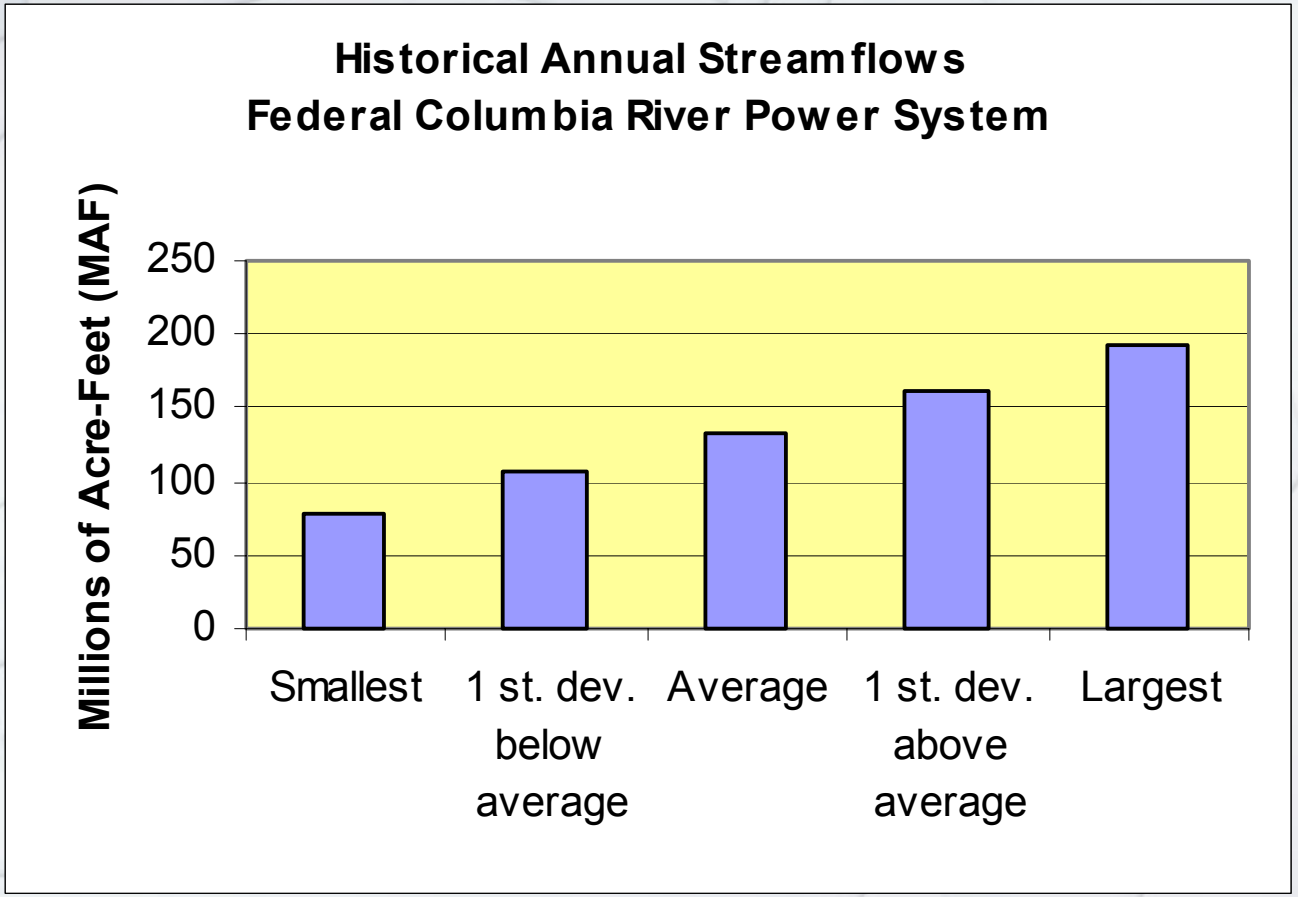
Background and discussion

June 10, 2004

BPA's Fundamental Financial Variability

- Roughly 80% of BPA's power is hydro
- Hydro "fuel" is highly unpredictable; approximately in the shape of the "normal distribution".
- 2/3 of the time, a "normal" variable is within one standard deviation of the mean (average) value.
- The annual streamflow standard deviation is over 27 maf.
- In the 1929 to 2002 history:
  - smallest streamflow = 79 maf
  - largest streamflow = 194 maf – over 2 ½ times the smallest!

Hydro Variability



Power Variability

- Hydro variability translated into power variability: standard deviation of power output of hydro system is more than 16,000,000 megawatt-hours.
- This is more than twice the average annual output of a nuclear plant like Columbia Generating Station.
- This means that each year, there is about a 1-in-6 chance the Federal system will have at least two more nukes' worth of power than average, but also
- A 1-in-6 chance of being at least two nukes' worth below average in power production.

Net Revenue Variability (Power)

- Combined with variability of market prices, BPA faces huge power net revenue uncertainty:
  - 2005 and 2006 PBL net revenue std. dev. >= $200 million
  - 2007 through 2009 PBL net rev. std. dev. >= $300 million

- Notes:
  - Risk level varies with market price assumptions;
  - This work used these average market prices:
    - $30 - $50 per MWh 2005-6
    - $35 - $60 per MWh 2007-9

BPA's Financial Reserves

- How does BPA pay its bills in dry, low-revenue years?
- Reserves are main buffer against adverse conditions.
- Builds up during good conditions, can be drawn down in bad conditions to pay bills.
- "Reserves" are cash in the Bonneville Fund at Treasury plus any deferred borrowing.

TPP: Treasury Payment Probability

- As a non-profit, Federal enterprise, BPA does not seek to maximize net revenue; BPA must use other financial performance measures.
- Key performance – making all scheduled payments to Treasury on time.
- High probability of making payments to Treasury has become a key financial metric.
- BPA must pay other vendors before paying Treasury; TPP measures overall financial health.

BPA's TPP Standard

- BPA's 10-Year Fin. Plan (1993) established the two-year TPP standard of 95%.
- 95% probability of making BOTH year-end Treasury payments in a two-year rate period.
- The standard applies to whole rate periods, not individual years within a rate period.
- Since 1996, standard has been applied separately to each business line (except in 2003 SN CRAC).

Rate Periods of Different Lengths

- In 1995, began looking at a five-year rate period – what TPP standard to use?
- Answer: consider a 10-year period with 5 two-year periods, or 2 five-year periods.
- If probability of making 10 payments in a row is same, TPP standards are equivalent – will provide same long-term assurance of paying Treasury on time.

Rate Period TPPs

- 5 two-year periods:
  - 95% * 95% * 95% * 95% * 95% = 77%.
- 2 five-year periods:
  - X% * X% = 77%;
  - X has to be 88;
  - Therefore, the five-year TPP standard = 88%.

BPA's TPP Standard	Length of Rate Period (years)				
	1 *	2	3	4	5
	97.5%	95%	92.6%	90.3%	88%

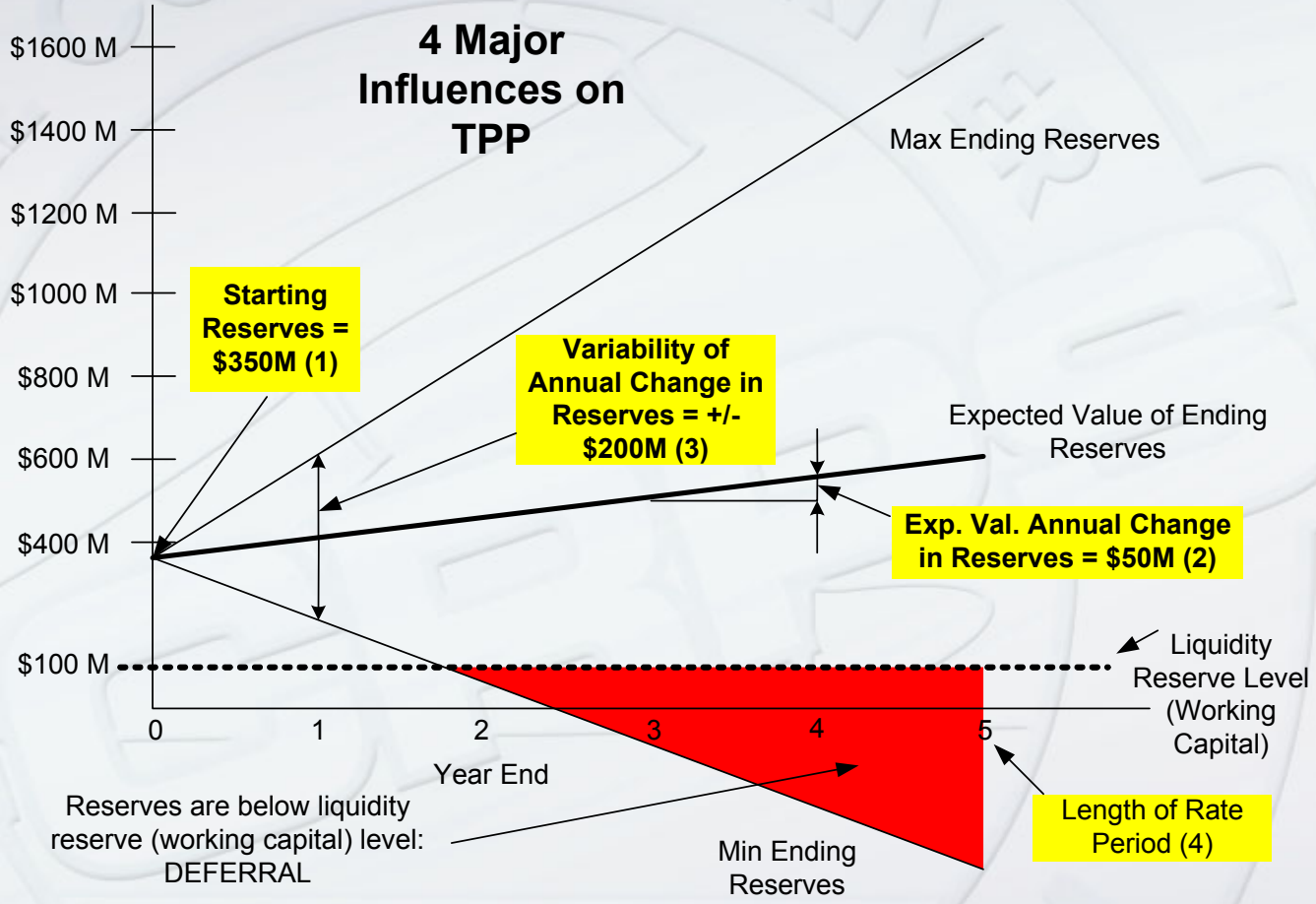
* This is the standard for a one-year *rate period*, not for any particular year within a rate period.

Factors Affecting TPP

Assuming reserves are the main protection against net revenue variability, 4 main factors affect TPP in a rate case:

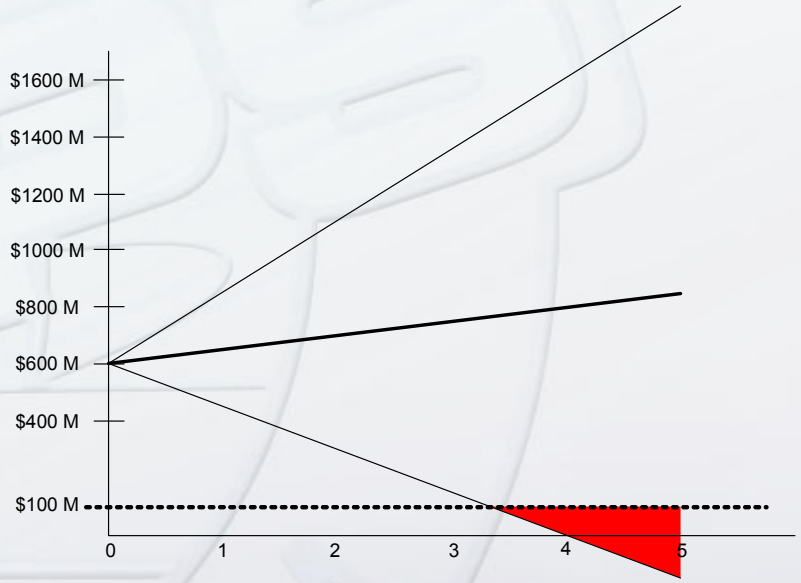
1) The starting reserve level;
2) The expected value of the change in reserves from one year to the next (i.e., the E.V. of BPA's cash flow);
3) The annual variability (risk) in BPA's cash flow;
4) The length of the rate period.

TPP Graph


4 Major Influences on TPP
$1600 M
$1400 M
$1200 M
$1000 M
$800 M
$600 M
$400 M
$100 M
Max Ending Reserves
Starting Reserves = $350M (1)
Variability of Annual Change in Reserves = +/- $200M (3)
Expected Value of Ending Reserves
Exp. Val. Annual Change in Reserves = $50M (2)
Liquidity Reserve Level (Working Capital)
0
1
2
3
4
5
Year End
Reserves are below liquidity reserve (working capital) level: DEFERRAL
Min Ending Reserves
Length of Rate Period (4)

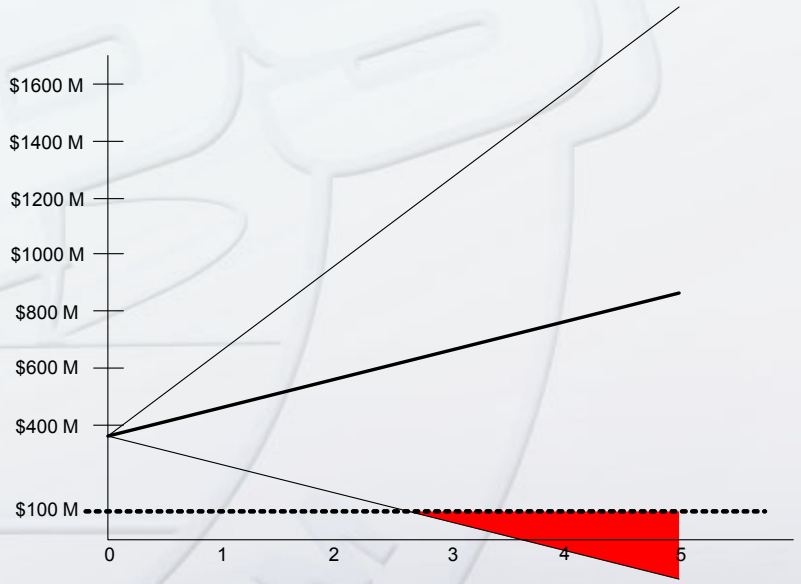
1. Starting Reserves

- Initial size of BPA's chief buffer against risk
- If the starting reserves are very high, area below the liquidity reserves level is small (i.e., TPP is high).
- If starting reserves are low, a bad year can exhaust BPA's reserves and trigger a Treasury deferral, so TPP is low.
- Main rate case tool to increase reserves: PNRR



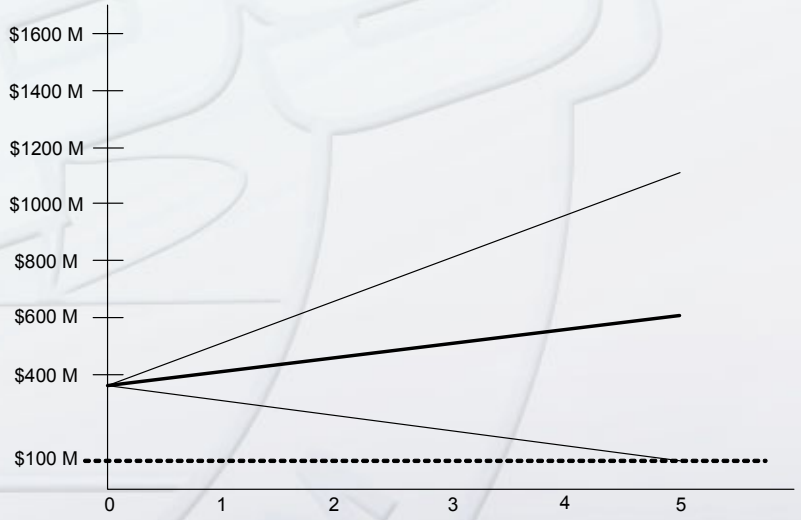
2. Expected Cash Flow (~ net rev.)

- Expected cash flow: how fast reserves are expected to increase or decrease.
- The faster they increase, the more the distribution tilts upwards as time progresses from left to right and, again, the higher TPP will be.
- If BPA's starting reserves are low, BPA will have to plan on a high expected cash flow to have a high TPP – increase PNRR (Planned Net Revenue for Risk).
- The high cash flow works to build up reserves.



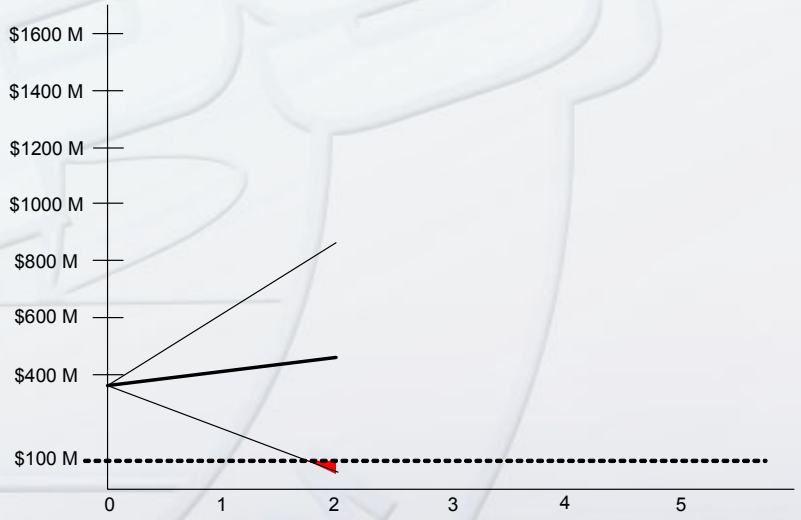
3. Cash Flow Variability (risk)

- How fast the maximum and minimum ending reserve lines diverge.
- A measure of the total financial risk BPA faces.
- The more risk BPA has, the larger its reserves need to be, other things equal, to have the same assurance of making all of its Treasury payments.
- This diagram shows the effect of cutting the variability of cash flow in half.

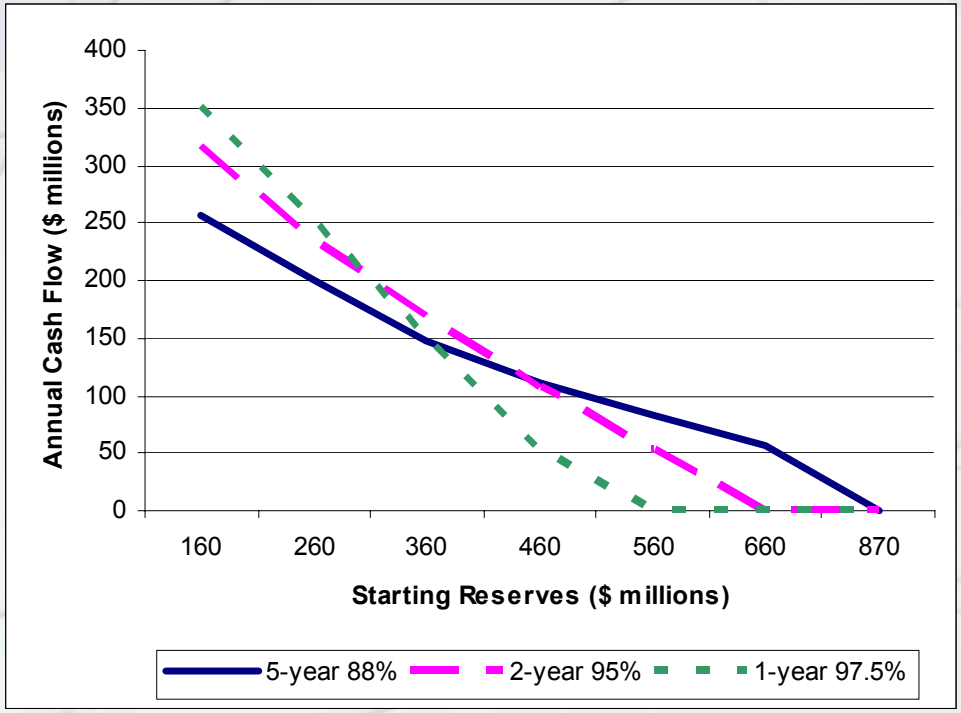


4. Rate Period Length

- In long rate periods, few opportunities to change rates – larger reserves are needed.
- This diagram shows increase in TPP made by reducing the rate period from five years to two.



Reserves, Cash Flow & Rate Period



- Assumes the level of risk corresponding to 2004 market prices;
- Assumes fixed-price, flat rates (no Cost Recovery Adjustment Clauses);
- Assumes $70 million needed for liquidity reserves (a.k.a. working capital)

Implications for Post-06 Power Rates

- Ending 2006 reserves will have a large influence on BPA's financial risk in the subsequent rate period.
  - For example, if BPA begins 2007 with $560 million in reserves and sets rates for only a single year, it would not have to plan to have a positive cash flow,
  - but it would have to plan on generating about $50 million per year in a two-year rate period,
  - or about $80 million per year in a five-year rate period, to meet its TPP standard for the various lengths of rate period.
  - Reserves above $870 million would be high enough that BPA could meet its TPP standards for one-, two-, or five-year rate periods without planning to generate positive cash flow
  - If 2006 is a bad financial year and PBL starts 2007 with low reserves, PBL's rates for the next period would have to include a positive expected cash flow to build reserves.

Implications cont'd

- The graph above shows an apparent anomaly. If ending 2006 reserves are $160 million, the positive cash flow required is higher for a one-year rate period than for a two-year period, which in turn is higher than for a five-year period. How can this be if risk mitigation for longer rate periods is more expensive?
- The answer lies in the fact that the incremental cash flow required is an annual number. The cash flow required for a one-year rate period is $350 million for one year; the expected value of ending reserves after that year is $510 million, and, at that level, no additional cash flow would need to be generated for the next year. The annual cash flow required for a five-year rate period is only about $250 million – but it is for five years. The expected value of ending reserves five years later, is $1.4 billion. While the five-year rate would be lower than the one-year rate, PBL has set flat rates for a rate period and that five-year rate would be much higher than the average of five one-year rates.

Conclusions

- BPA's situation continues to become riskier; e.g.:
  - The Fish Cost Contingency Fund is gone; once provided up to $325M of low-water protection;
  - DSI load and revenue uncertainty unresolved;
  - More aspects of BPA's structural environment are uncertain – RTO, Regional Dialog, FERC, etc.
- $500 million in reserves, given this riskiness, is not excessive – it's not even adequate.