

Board Staff Interrogatory #065

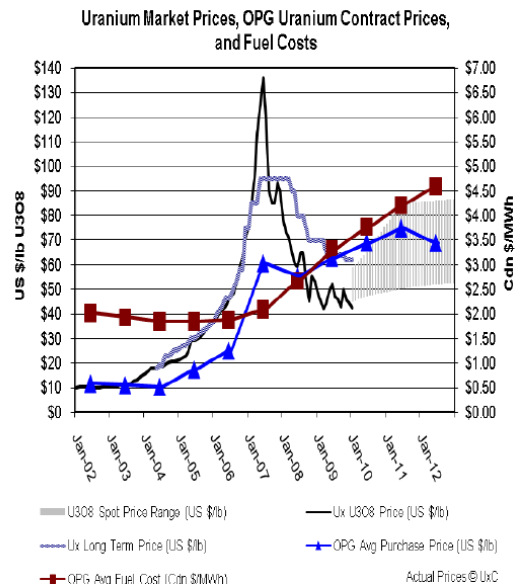
Ref: Ex. F2-T5-S1, pages 7-8

Issue Number: 6.6

Issue: Is the forecast of nuclear fuel costs appropriate?

Interrogatory

The chart on page 7 shows that both the spot and long term price for uranium have been steadily declining over the past two years from over US\$90 per pound to about \$40 and \$60, respectively. Over the same period – 2008 to 2010 – OPG’s costs associated with uranium have increased by about 35% (or \$45.2M) and are forecast to increase a further 32% (or \$55.7M) by 2012. It notes on page 8 this “disconnect” between declining market prices and rising OPG costs is primarily due to the timing of OPG’s negotiation of uranium concentrate contract prices. This disconnect is reflected in the chart to the right which can be found on page 12 (as Attachment 1).



- Given this material “disconnect”, does OPG believe the current negotiation / purchasing strategy remains appropriate or should it be reviewed?
- Given the variance account, 100% of the cost increase flowing from OPG’s negotiation / purchasing strategy discussed above will be borne by ratepayers. What plans does OPG have to address this “disconnect”?
- What incentive does OPG have to minimize the fuel costs with the variance account in place?
- Should consumers pay for contracts that are significantly more expensive than market?

Response

The interrogatory incorrectly characterizes OPG’s evidence at lines 24-27 on page 8 of Ex. F2-T5-S1. OPG’s evidence is that “this disconnect between the trend in uranium market prices and the trend in nuclear fuel costs is primarily a reflection of the timing of OPG’s negotiation of uranium concentrate contract prices, **the expiry of previously negotiated supply contracts, fuel inventory management, and inventory accounting.**” [Emphasis added] All of the listed factors are relevant to the observed divergence between market prices for uranium and OPG’s nuclear fuel costs.

Witness Panel: Nuclear Base OM&A & Revenues
Deferral and Variance Accounts, Payment Amounts and Regulatory Treatments

- 1
2 a) OPG believes its purchasing strategy of procuring a portfolio of indexed and market
3 priced contracts continues to be appropriate.
4

5 The use of a portfolio approach allows OPG, which must regularly enter the uranium
6 market for a portion of its supply needs, to mitigate the variations in extremes in market
7 prices. The resulting average portfolio price will be more stable than relying on market
8 prices alone and this provides a benefit to ratepayers. Any strategy for hedging risk
9 through the use of long-term contracts will show poorly when viewed in hindsight solely
10 through the lens of falling market prices, but market prices rise as well as fall.
11

12 Indexed-priced contracts have base prices set at the time of contract negotiation which
13 escalate to the time of delivery by formula or by published, inflation-related indexes.
14 Hence, prices at time of delivery under such contracts do not reflect market prices at time
15 of delivery, but rather market prices at the time the contract was entered into, plus
16 escalation. These indexed prices at the time of delivery may be higher, or lower, than the
17 current market prices. The portfolio also includes market-related contracts, i.e., market
18 contracts or market-related term contracts where price is established by the market price
19 at or near the time of delivery.
20

21 OPG's procurement strategy also addresses security of supply. Since the physical
22 markets for uranium are relatively thin, multi-year contracts are a way of ensuring OPG's
23 security of supply. Compared to a strategy that relies more heavily on spot market
24 purchases, OPG's approach helps protect consumers from the cost and risk of needing
25 to procure uranium during periods of supply shortages.
26

- 27 b) The underlying premise of this question is incorrect. The existence of the Nuclear Fuel
28 Variance Account does not mean that 100 per cent of the cost increase will necessarily
29 be borne by ratepayers. If any of the costs in the variance account are found to be
30 imprudent by the OEB, then OPG will not be able to recover these costs from ratepayers.
31 It should also be noted that any cost decreases would be passed on to ratepayers
32

33 OPG notes that the current nuclear fuel procurement strategy was in effect long before
34 the variance account. While OPG reviews the portfolio mix from time to time (i.e., indexed
35 vs. market-related price contracts, term vs. spot market) OPG believes its strategy to be
36 appropriate and has no plans to make fundamental changes.
37

- 38 c) Within the context of the Nuclear Fuel Variance Account, OPG continues to have a strong
39 incentive to minimize its fuel costs given that, as indicated in part b), it will be unable to
40 recover any costs determined by the OEB to be imprudent.
41

- 42 d) As indicated in part a), OPG's use of a portfolio approach can result in periods where its
43 average portfolio price is above the prevailing market price and periods where its average
44 portfolio price is below the prevailing market price. To the extent that the contracts in the

1 portfolio were entered into competitively and prudently, then consumers should pay the
2 cost of these contracts during periods when the market price is less than the contract
3 price at the time of delivery since they will reap the benefit from contracts whose price is
4 lower than the market price at the time of delivery. This is in accord with the OEB's
5 consistent approach to reviewing prudence, which explicitly rejects disallowances based
6 on viewing outcomes in hindsight in favour of an assessment based on the information
7 that was known or reasonably should have been known at the time decisions were taken.

Board Staff Interrogatory #066

Ref: Ex. F2-T5-S1, page 8

Issue Number: 6.6

Issue: Is the forecast of nuclear fuel costs appropriate?

Interrogatory

On page 8, it notes *“OPG is proposing to continue the Nuclear Fuel Cost Variance Account. Over 2008 and 2009, uranium market prices were lower than those forecast by OPG in EB-2007-0905, resulting in a credit in the Nuclear Fuel Cost Variance Account... OPG is forecasting a debit amount for 2010, such that overall there will be a net debit balance in this account owing to OPG from ratepayers for the period 2008 - 2010.”* Why is OPG forecasting a debit balance given the declining prices noted above and the current credit balance?

Response

The Nuclear Fuel Variance Account calculation is based on OPG's actual fuel costs and nuclear production for 2008 – 2009 (and as forecast for 2010) as shown in Ex. H1-T1-S1, Table 9 and described in Ex. H1-T1-S1, section 6.6. The observed divergence between market prices for uranium and OPG's nuclear fuel costs is discussed in Ex. F2-T5-S1, section 4.0 and response to the interrogatory in EX. L-1-065.

Ex. H1-T1-S1, Table 9, line 6 shows that actual fuel rates (actual fuel costs/actual production) were \$2.75/MWh and \$3.25/MWh in 2008 and 2009 respectively, and are forecast to be \$3.76/ MWh in 2010. The credit balance in the Nuclear Fuel Variance Account as at December 31, 2009 arose because the actual fuel rates were below the reference plan rates reflected in the current payment amounts in 2008 and 2009, shown in line 3 of Table 9.

The reference plan rate for 2010 is \$3.27/MWh. This is lower than the forecast rate of \$3.76/MWh. This will create a forecast debit entry of \$22.4M into the account during 2010, which will more than offset the actual credit balance at the end of December 31, 2009.

SEC Interrogatory #033

Ref: Ex. F2-T5-S2

Issue Number: 6.6

Issue: Is the forecast of nuclear fuel costs appropriate?

Interrogatory

OPG has over forecast its nuclear fuel costs by between 7% to 15% for the period 2007 to 2009. Please provide a description of the forecast methodology used for fuel cost and what changes were made to that methodology in the current application to address the systemic forecast bias.

Response

OPG does not agree that there is a systemic bias in the forecasting of fuel costs. Indeed, as noted in Ex. F2-T5-S2 there are instances where actual nuclear fuel unit price is both higher and lower than forecast over the three years in question.

Generation variances are the main factor causing actual fuel cost to diverge from forecast amounts. Actual fuel costs have been lower than forecast in most cases due to a lower volume of fuel used, as a result of generation being below forecast. Ex. F2-T5-S2 describes all variances between actual and forecast fuel costs for the 2007, 2008 and 2009 historical years.

A second component of fuel costs reflects the price estimate for fuel used in generation. Ex. F2-T5-S1 describes the process used by OPG to manage the fuel process including steps taken to manage the risks of a volatile uranium supply market. Please also refer to Ex. L-1-065. The process OPG follows includes diversification of supply contracts and balances the security of uranium supply with pricing. OPG believes this approach to be a balanced and prudent method to manage uranium purchases.

The last component of fuel cost variances as seen in Ex. F2-T5-S2 is fuel efficiency and represents the reactor efficiency and fuel burn-up rate actually achieved in the nuclear generation process.

SEC Interrogatory #034

Ref: Ex. F2-T1-S1

Issue Number: 6.6

Issue: Is the forecast of nuclear fuel costs appropriate?

Interrogatory

Has OPG studied the cost advantage related to fuel for those technologies that use enriched uranium and the non-enriched fuel used by the CANDU reactor? If so, please provide these studies.

Response

OPG has not specifically studied the extent to which non-enriched uranium used in its CANDU reactors confers a cost advantage relative to technologies which use enriched fuel. The ScottMadden benchmarking study (Ex. F5-T1-S1) included benchmarking of fuel costs. OPG ranked in the best quartile for the three-year period ending in 2008 (three-year rolling average fuel costs per MWh). The report identifies the following factors associated with achieving best quartile performance (Ex. F5-T1-S1, page 135):

- Uranium fuel costs: Raw uranium is processed directly into uranium dioxide to make fuel pellets, without the cost and process complexity of enriching the fuel as required in light water reactors. The advantage due to fuel costs also includes transportation, handling and shipping costs.
- Reactor core efficiency: CANDU is the most efficient of all reactors in using uranium, requiring about 15 per cent less uranium than a pressurized water reactor for each megawatt of electricity produced.
- Fuel assembly manufacturing costs: Manufacturing costs for light water reactor fuel assemblies are significantly higher than CANDU fuel bundles, due to physical design complexity and increased amount of materials.

VECC Interrogatory #020
(NON-CONFIDENTIAL VERSION)

Ref: Ex. F2-T5-S1, page 7, Figure 1.0, and page 9, Chart 3

Issue Number: 6.6

Issue: Is the forecast of nuclear fuel costs appropriate?

Interrogatory

- a) Are the market-related prices for uranium concentrate simply the spot prices at the time of delivery? If not, please indicate exactly how market-related prices are determined.
- b) For contracts B, C, and D, please provide a breakdown of the quantities subject to market related pricing and the quantities subject to indexation.
- c) Please provide details as to how the prices are indexed, i.e., by a general index of inflation, by an index of commodity prices, etc.
- d) Please provide details as to how OPG has hedged the price risk which is fully borne by ratepayers.

Response

- a) The market-related price for uranium concentrate is not simply the spot price at the time of delivery. Market-related price is the price to be paid at the time of delivery, based on the average of published market price indicators for a specified period prior to delivery.

The two most common price indicators used to establish the price paid at the time of delivery for OPG market-related contracts are the following:

- The month-end U3O8 Long-Term Price Indicator (in United States dollars) per pound of uranium as U3O8, listed in The U_x Weekly published by The U_x Consulting Company LLC.
- The month-end U3O8 Long-Term Price Indicator (in United States dollar) per pound of uranium as U3O8 listed in the Nuclear Market Review published by Trade Tech LLC.

A combination of these indicators over different periods may also be utilized.

- b) The breakdown of quantities subject to market pricing versus indexation for contracts B, C, and D is provided in the confidential version.

1 c) Contracts utilizing indexed pricing (base price escalation) will have a fixed price component
2 which is subject to price escalation over the term of the contract based on changes in either
3 (Consumer Price Index ["CPI"] for Canada – all items) or US Gross Domestic Product
4 implicit price deflator for the base period specified in the contract.
5

6 d) The underlying premise of this question is incorrect. The existence of the Nuclear Fuel
7 Variance Account does not mean that the price risk is fully borne by ratepayers. If any of the
8 costs in the variance account are found to be imprudent by the OEB, then OPG will not be
9 able to recover these costs from ratepayers. It should also be noted that any cost decreases
10 would be passed on to ratepayers.
11

12 OPG's uranium concentrate procurement strategy, as stated in Ex. F2-T5-S1, page 5, is to
13 maintain a combination of uranium concentrate supply contracts and inventory which
14 provide a minimum of 100 per cent of delivery requirements for two years and a declining
15 proportion of delivery requirements for ten years. OPG maintains a portfolio of uranium
16 concentrates supply contract arrangements, diversified by source, contract term, and pricing
17 mechanism. This portfolio diversity aids in the hedging of price risk, reduces cost volatility,
18 and enhances supply security.