

Review of ERI Study 2142.12 – 1201, April 2012

Quantification of the Potential Impact on Commercial Markets of Introduction of DOE Excess Uranium Inventory in Various Forms and Quantities During Calendar Years 2012 through 2033.

This paper is limited to an analysis of the impact on the conversion market & industry. The U.S. conversion industry consists of only 1 company: ConverDyn, with its conversion plant located in Metropolis, Illinois.

1. General comments on methodology

As stated in the Executive Summary of ERI's report, Department of Energy policy since March 2008 requires "the Department to manage its uranium inventories in a manner that is consistent with and supportive of the maintenance of a strong domestic nuclear industry". ERI has chosen to limit its analysis of the potential impact of DOE uranium disposition solely on the market price as a measure of market damage. However, particularly for the domestic conversion industry the loss of production volume to DOE sales has the potential to have other adverse material impacts which have not been addressed in the report.

Conversion plants operate with a high ratio of fixed to variable costs, hence their profitability is particularly sensitive to volume reductions. A reduction of 2,000tU as UF₆ (approximate average from Table 3.6 of ERI study) results in an increased cost per kgU of 20% rather than the approximate 4% price decrease predicted in the report. Unlike a uranium mine where in-ground resources are available to be exploited another day, a kg of conversion not produced this year cannot be "recovered" in a future year. This is similar to a plane that takes off with an empty seat: the airline cannot sell that seat again for that flight.

2. Market Clearing Price

ERI claims to have conducted an economic market clearing price analysis to conclude that impact on term market prices is between 1.8% and 5.8%. This cumulative impact over 9 to 21 years is extremely significant for a marginal business and most certainly represents a significant adverse material impact to the domestic conversion industry. The price impact figures presented in table 4.6 simply do not support the conclusion provided in Section 4.3.2 where ERI state that the impact is estimated to be very small.

The market clearing model that ERI claims to have used is fundamental to the entire report. However, as with previous reports, ERI has failed to provide the detail of this model which make it impossible to conduct an independent review of the finding. Hence, there can be little confidence in the results and conclusions.

3. Flaws in the ERI Report

Even with the limited information provided there are serious flaws in the approach adopted by ERI.

3.1 Since DOE materials are sold in the spot market the analysis must concentrate on this market rather than the term market. The report states *“it is very difficult if not impossible, to accurately predict the specific change in spot market price that might result from a particular future event”*. It may be difficult but this is the whole purpose of the report.

Other approaches widely used in the financial markets are available such as that presented by Dr A. Anselmo at the World Nuclear Fuel Market Conference in 2009 where he concluded that volume criticality in the uranium market occurs at a level of 200,000 lbs (or 76.5 mtU of conversion) after which the market begins to break down.

If ERI do not have the necessary competence (by their own admission) to determine the impact on the spot market then DOE has a fiduciary duty to commission an alternative report.

3.2 ERI attempted to reconcile their approach of using the long term uranium market as a proxy for the spot market and presenting a correlation between the two. However, such a correlation is not presented for the conversion market. Furthermore, since by their very nature spot transactions occur in advance of term transaction the spot market is a leading indicator for the term market. Hence, if there is a correlation then it cannot be assumed to be bidirectional. Using the long term market as a proxy for the spot market presents a fundamentally flawed assumption that prevails throughout the whole report. In other words if X causes Y, then cannot argue that Y causes X.

3.3 In Section 2.1.1 ERI states that *“The transition from much higher prices for uranium that characterized the market in 2007 and 2008 – and which could not be justified on the basis of economic production cost-based market clearing price analysis -”*. If a market clearing model was unable to account for the increase in price then there is no basis to assume that it would predict the extent of a decrease in price.

Furthermore, a market clearing model for the uranium mining industry would disproportionately affect the U.S. producers since they would have the highest cost and therefore be the first ones to stop production. This further deviates from the clear directive to DOE that there should be no adverse material impact on the domestic U.S. nuclear fuel cycle industry.

Since ConverDyn is the only US producer then clearly ConverDyn is the marginal producer in the US and will bear the majority of the market impact in its domestic market. Therefore it is completely inappropriate to adopt a clearing model that relies upon the stacking of individual increments of supply when there is only one domestic source of supply. Furthermore, ConverDyn is the only stand-alone converter, hence it does not have the luxury of other nuclear businesses to absorb losses in conversion.

4. Comments on applicable sections

4.1 Section 2.2.1

The report chronicles the price reductions experienced over the past 12 months but fails to acknowledge that DOE inventory sales over this period could have been a direct causative factor. An

analysis of this actual data would provide real and compelling evidence of adverse material impact which ERI has chosen to conveniently ignore.

4.2 Section 2.2.2

ERI makes reference to an increase in conversion demand but fails to recognize that this growth will be concentrated in China and Russia, 2 countries which are not accessible to the U.S. converter. Both Russia and China have publicly stated their intention to use domestic capacity to meet internal demand. By concentrating on the global demand and not the markets accessible to the US converter, the report again fails in its primary objective to determine the impact to the domestic conversion industry.

Furthermore, there is no assessment of the reduction in demand post-Fukushima, in the major Japanese & German markets that are accessible to the U.S. converter. This is a serious omission impacting ERI demand assumptions.

4.3 Section 2.2.3

ERI anticipates a drop in supply of conversion equivalent to 9,000 mtU/year when the HEU program ends in 2013. Although Russia has stated that they do not intend to continue the current HEU down blending this supply has been superseded by a combination of direct EUP sales to US utilities and commercial LEU sales to USEC, both sales contain conversion services that completely replace the volume in HEU.

This anticipated reduction in demand underpins ERI's conclusions and as such any sales by DOE should be conditional upon this supply actually being removed from the market. This means there should be no Russian origin EUP allowed into the U.S. market.

4.4 Section 2.2.4

ERI's report clearly shows that the market is in over supply during the majority of DOE's proposed disposition period. Hence any additional conversion brought to market during this period will inevitably displace primary production. This further illustrates the point that an assessment of the impact to the domestic conversion industry must address the volume of lost sales and not just the theoretical price impact derived from a suspect market clearing model. This clearing model has not been subject to customary peer review.

4.5 Section 2.2.5

ERI states "the industry recognizes the need for expansion". However, outside of China and Russia this is simply not the case. Areva, Cameco, ConverDyn & Rosatom have all publically stated that expansion cannot be justified.

ERI states that 85% of the conversion services are purchased under term contracts. Hence just 15% is traded in the spot market. Based on ERI's estimation and considering a U.S. demand of 20,000 mtU the

volume traded in the spot market is 3,000 mtU. DOE sales would swamp the spot demand accounting for 67% of the spot demand. ERI attempts to connect the impact of DOE supplies on term conversion market prices, but ignores the reality of the material being forced onto the spot market to meet cash objectives for their agent. As such, ERI's methods places further doubt on the validity of attempting to use the term market as a proxy for the spot market. This is further evidence that the report fails to address DOE's primary objective to maintain a strong domestic nuclear industry.

4.6 Section 4.3.2

ERI attempts to connect the fact that most transactions in the conversion market are base-escalated, so the impact from any decline in market price results in no adverse impact. ERI conveniently ignores the market reality experienced by converters, whose customers exercise downward volume flexibility in contracts or even pursue a "buy & hold" strategy when spot prices drop, thus causing production costs to increase as mentioned before. In addition, ERI fails to adequately look forward to future contracting at those lower price levels or pushing the domestic industry into uneconomic market conditions.

ERI also indicates that if deteriorated market conditions do prevail, that cheap spot material will be available to fill existing contracts. This statement has no merit whatsoever and demonstrates a fundamental misunderstanding of the conversion business. As stated above Conversion operations have a high fixed cost with the potential to generate profits being dependent upon the ability to produce at above a critical volume. It would never make sense for a converter to reduce production and purchase from the spot market. To suggest that prices depressed by DOE actions can be a benefit to converters is grossly naive and again places serious doubts on the competence of the authors of the report. And further illustrates the point that an assessment of damage must consider the impact of volume lost to DOE sales. ERI also attempts to rationalize that despite all of the secondary supplies in the marketplace, the conversion price has increased, focusing on the term index (whose movement was due to supplier discipline, not market fundamentals), and not on the spot price which continues to fall as a direct result of current DOE actions in the market.