

A Reversal of Trends in the LWR Fuel Fabrication Market

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Introduction

During my last presentation at the then “Uranium Institute Symposium” in September 1998, fuel fabrication prices in dollar terms had fallen more than 40% in two years. Nuclear fuel and services vendors were under significant pressure to adjust internal cost structures and consider co-operative means for reducing excess industrial capacity. Fuel business was declining due to low reactor utilization, reactor delays and cancellations. Nuclear plant decommissioning was the major “forecast” business.

In a remarkably short period of time, all of these adverse trends have been reversed. Utilization of existing nuclear plants is the highest ever and the “forecast” now is for new nuclear build – potentially substantial on a global basis. With respect to the fuel fabrication industry, this has produced stable prices and modest growth in demand from the existing fleet and the potential for significantly more demand associated with new reactor commitments.

In some ways, the fabrication industry was not preparing for this reversal of trends and some new problems may need to be addressed more fully in this context. I will discuss these at the end of this paper. But first let me briefly update some fabrication industry statistics as background for this discussion.

LWR Fabrication Market Update

The first observation is that the average total demand has increased slightly (~100 MT/year) over the past few years. Primarily this is the result of increased power ratings and capacity factors within the existing fleet. But the addition of three new first cores to the backlog (partially offset by some closures in Europe) has contributed as well.

The major point is that this is no longer strictly a “zero sum” business wherein one supplier’s growth can only be realized at the expense of another.

That is good news for the suppliers because, in fact, not much vendor changing has occurred. Since the industry consolidation (circa 2000) and today (July 2005), nearly 35 000 MTU of new fabrication contract commitments were made. But within all of this commerce, only ~ 5% of the total fuel demand and less than 2% (net) reactors have switched vendors.

Basically, throughout all the recent contracting, the “dual monopoly” situation (or “full monopoly” in several segments) has been somewhat “institutionalized”, or at least prolonged for many years. By any reasonable macro-economic definition, the fuel fabrication market is “underserved” in most segments and regions. And, in some cases, no practical alternative exists.

In theory, this is a fuel buyer’s nightmare and should result in higher prices. But, surprisingly, the overall effect has been modest so far. The results of 2004 activity indicate that there has been a 3% price increase in the US since the 2003 report. This follows the ~2% price increase in the US between 2002 and 2003. Such increases are sustainable in the current US energy market. But the fact that the rate of change is increasing causes some concern for the future. And importantly, this relative price stability does not pertain to buyers in monopoly segments.

In Europe, prices in Euro terms appear to be level, perhaps even declining slightly. This opposite trending in the US and Europe is the result of the production dynamics of the major global suppliers and, in particular, the wide disparity in the Euro-Dollar exchange rate. If this exchange disparity should close, we would expect prices to rise in both regions because of the segmentation dynamics mentioned previously.

Asian price activity has been stable over the last year. But incoming competition (in various forms) could again affect this regional stability.

In addition to upward price pressure, another major issue in underserved markets is vendor viability (or reliability). What does a buyer do if his preferred (or only) vendor does not show up for work?

The good news is that, according to our analyses, fuel operations at all major vendors are in reasonably good shape and financially rewarding – although not necessarily getting better in all cases. Revitalized competition by Westinghouse in US and Asian BWR segments, delivery delays in Japan and phase-out politics in Europe present market challenges for some suppliers. Another event to monitor in this regard is the imminent ownership change of Westinghouse, including the “seamlessness” of any transition that may effect current operations.

Finally, we note that, as a result of consolidations made in response to the conditions that existed in the late 1990s, global fuel assembly manufacturing now has been concentrated mostly into a few large facilities. What happens if a large facility goes down, in whole or in part, for any of a number of plausible reasons? As an operator in an underserved segment, will you be ready?

Future Trends

In effect, most of the US and European market demand through 2010 has been (or soon will be) settled. With a few minor exceptions, the commercial focus is shifting to accommodation of new first cores (e.g. new reactors) and post 2010 refuelling requirements.

Today, most major fabricators are operating in excess of 90% facility utilization – a very good business situation for suppliers, but well above the operational comfort level of the buyers. At this level of utilization there is very little operational flexibility, very little reserve capacity and (importantly) very little ability to assume new business. In effect, very little margin for error.

There are several announced expansion plans that may put global production capacity in a more comfortable range around 2010. These include:

- FANP expansion of Romans;
- FANP’s “two facilities” approach in the US;
- Westinghouse BWR assembly expansion;
- KNFC expansion of Taejon; and
- Growing use of Russian production capacity in the West.

But even with these announced plans, there are still some regional concerns (most notably in Japan). And new reactor sales, if realized anywhere near the extent desired, will strain even this expanded fuel fabrication capacity. [Note: First cores put an unusual demand on a fuel fabrication facility. The manufacturing requirement is approximately three times the routine reload requirement and it occurs only once in a relatively short time frame. They are difficult to outsource, because of the impact on reactor performance guarantees.]

Moreover, the current excess capacity is not generally available for new supply. In fact, it exists mostly with a few suppliers. The others will need (at the very least) a new supply strategy with all that that entails. So, if you are a customer of one of these highly utilized suppliers (or if you wish to be), you should take interest in their new reactor successes.

Another new dimension of the market is the rapid run-up in UF₆ and SWU prices and the possibility that this may be the new reality. While it is not directly a fuel fabricator’s problem, high commodity prices create some new commercial requirements that are in the normal domain of the fabrication industry.

Time does not permit elaboration but let me say that these include:

- Re-optimization of fuel assembly designs.
- Even higher energy cycle designs, including:
 - Higher burnups;
 - Higher enrichments;
 - Advanced burnable poisons.
- Processing and fabrication of alternative fuels
 - RepU;
 - RecU and off spec materials;
 - MOX.

In simple terms, any design or manufacturing idea that can reduce the demand for virgin uranium has doubled in value over the past year. And if adequacy of uranium supply becomes a deterrent to industrial growth or profitability, these concepts may be “priceless”.

Finally, we believe that there is renewed incentive for comprehensive fuel packages in the new market for the following reasons:

- Facilitates application of alternative fuels;
- Enables/facilitates new market supplier entry (Russia);
- Introduces fabrication supply “discipline” to the commodities market.

This, in turn, portends a growing possibility for horizontal integration and cross-consolidation in the nuclear fuel industry.

Summary

The current fabrication industry was created by the nuclear dynamic of the late 1990s. While there is lingering concern over “ritualized” market segmentation and the associated risk of supply interruption, the industry re-configuration since then has stabilized this business segment more or less favourably on both sides of the table. Fabrication is a viable business with good prospects into the future.

But the industry is at another inflection point. The advent of new reactor sales will create a (first core) demand for which we are unprepared. And higher priced (potentially scarce) enriched uranium will create some new requirements for new manufacturing capabilities and product re-optimization.

The change in Westinghouse ownership, the emergence of potential new global suppliers and the political developments in major nuclear markets are other important factors in this regard.