Oak Ridge Centers for Manufacturing Technology — Partnership and Impact on the Semiconductor Industry

The many testimonials coming in result from Jack Cook making contacts with some of the people who experienced the Oak Ridge Centers for Manufacturing Technology firsthand. Here is his introduction followed by the first of three letters pertaining to one partnership arrangement created by the Oak Ridge Centers for Manufacturing Technology (ORCMT). This first letter is from Dr. Dan Hoffman, a former Oak Ridge National Laboratory (ORNL) employee who went to work in industry as a result of the experience he had with ORCMT.

Jack said, "During one of our early call for proposals, several ORNL Divisions made inputs that related to the Semiconductor industry and the Industry-lead consortium called SEMATECH. [This acronym stands for Semiconductor Manufacturing TECHnology – a consortium formed in 1987 when 14 U.S.-based semiconductor manufacturers and the U.S. government came together to solve common manufacturing problems by leveraging resources and sharing risks – according to the SEMATECH web site: http://sematech.org/corporate/history.htm - Ray]

"Opportunities to place our engineers and scientists at SEMATECH in Austin, Texas provided ORCMT and the Divisions of Y-12 and ORNL with a means to learn the semiconductor processes, the trends of the products, the processing equipment issues, and most of all we made valuable contacts. [This interaction would prove valuable for a number of reasons, and I think it is interesting to note how soon after the consortium was formed that ORCMT connected with it – Ray]

"The SEMATECH consortium issued national calls for proposals on their critical needs. ORCMT saw these needs as just 'tough manufacturing problems.' ORCMT teams, with the advice of the assignees and support of the newly made contacts at SEMATECH, were very successful in winning Work For Others programs that protected jobs back in Oak Ridge.

"We worked on projects that exercised the cutting edge of our nuclear weapons-based technologies and the best science that ORNL had to offer. Programs included surface cleaning, coating and plating processes, radio frequency-generated plasmas, equipment designs, machining, materials development, quality assessments and in-process inspections techniques to mention a few."

Jack also commented on the ORCMT and SEMATECH interaction by saying, "If there is a lesson learned from this that can be replicated in current efforts to grow jobs and Work For Others, it would be to seek partnerships that address critical and sustaining needs where US-based companies have formed collaborative associations.

"Work with them, learn from them and build programs around technologies that ORNL and Y-12 have some technical or scientific advantage. All of the projects do not have to be 'rocket science,' but they need to have that element of creativity or innovation that Oak Ridge has exhibited over the years and is best known for. That 'Can Do' attitude was our secret and distinct advantage in the past, and it can be in our future."

Below is a note from Dr. Dan Hoffman to Jack that tells the story from the perspective of one of those researchers that helped ORCMT get into work for the semiconductor industry. Jack says, "Dan left ORNL and joined one of the equipment makers, Applied Materials Corporation of California, and is now a Fellow and Vice President of Advance Energy in Ft. Collins, Colorado."

Hoffman said, "Jack, It was great to see some of the ORCMT history being reevaluated after some time has passed.

"The report card has to come back as having been outstanding. At the time of ORCMT, the DOE budget difficulties required that people find uses of Y-12/ORNL's great technologies beyond Oak Ridge and with the rest of the nation. At the inception of ORCMT, some seed money was used to connect us to United States industries to assist and promote advancing their capabilities with our technology.

"We connected with many industries across the USA and helped our nation become more competitive. In the early phase, we had hoped to make the nation's industries more competitive and preserve some crucial technology skills in Oak Ridge.

"An example of that was the winning of SEMATECH business to help plasma technology create semi-conductors that are so important for the information age. The immediate financial impact was to save jobs locally in ORNL and Y-12. In the work that I was doing in the Fusion Energy Division and other associated Divisions of ORNL, over 100 man-years of effort was protected by the funding resulting from the ORCMT program.

"Fusion Division was located in the Y-12 valley at that time and the job of many great Y-12 technical and skilled crafts were at risk and were saved due to these programs. (We use the Y-12 Crafts to help us build our devices and conduct our experiments).

"Impact extends far beyond savings jobs and exposing incredible technologists within the Oak Ridge Complex and touched the 'real world' of American industries. I applaud the incredible success of Rasmussen and Tobin in transforming ORCMT successes into local success. Beyond that, one must consider that DOE money is derived from our nation's taxpayers, and that the ultimate goal is to give back to our nation.

"My own path, along with that of Bob Mikkola (who was crucial to the copper interconnect for the whole industry), was to be an Oak Ridge export to industry. ORCMT connecting us to industry made us ultimately become ambassadors from ORCMT. And, personally for me, it advanced my career in the semiconductor industry, and currently I am a VP and Fellow with Advanced Energy.

"Again, helping careers is a nice result of ORCMT, but truly giving back to our nation is the most important accomplishment. I know that Bob Mikkola's work became a foundation of metal interconnect for the whole semiconducting industry.

"For myself, my own products led to over $1B of products that generated jobs in our industry. Beyond that, more than 100 patents worldwide were awarded to the ORCMT-trained ambassadors in the years that followed the close of the ORCMT.

"Just for these few semiconductor products that I was associated with, the business taxes (~22% of GDP end up as taxes) more than paid for the entire initial funding of ORCMT (~$50M). In simple terms, ORCMT saved many local jobs, entirely paid back its DOE funding, created and established new careers, opened eyes around the nation and, most importantly, created jobs directly and indirectly inside and outside the Complex.

"In retrospect, the people who formed ORCMT [Dave Beck, Jack Cook, Bill Thompson, Jeff Bostock et al] really accomplished well beyond any reasonable expectation or vision to connect our Oak Ridge facilities with industry and other parts of our nation's infrastructure. They gave back n-fold."

Wow! What a powerful testimonial. ORCMT was obviously helpful in Dr Hoffman's career. Next we will see two other testimonials where individuals credit their ORCMT experience as being instrumental to their successful careers.

We will continue these testimonial letters to Jack Cook in the next installment. Send your ORCMT stories to me at smithdr@y12.doe.gov or call me at 865-851-6423.