

THE NUCLEAR NEWS INTERVIEW

# Building a better supply chain

*Economic development expert Rick Prugh and engineering professor David Schmidt talk about their work to develop the nuclear supply chain in the state of Missouri.*

In October 2013, the Make It in America (MIIA) Challenge—an Obama administration initiative to accelerate job creation and encourage business investment in the United States—awarded 10 grants totaling more than \$20 million to projects supporting regional economic development, advanced skills training, greater supply chain access, and other enhancements. One of those grants was awarded to a University of Missouri (MU) project focused on developing the state’s nuclear power plant supply chain and workforce infrastructure.

To learn more about this grant

and the activities it funded, *NN* Associate Editor Michael McQueen spoke with the two leads on the project, David Schmidt, recently retired as an associate extension professor in the University of Missouri’s



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College of Engineering and the project’s principal investigator, and Rick Prugh, who managed the program for Missouri Enterprise, a nonprofit manufacturing consulting firm.

*Which federal agency was behind these MIIA grants?*

**Schmidt:** There were three agencies involved, with the Department of Commerce’s Economic Development Administration (EDA) as the lead. Joining EDA were the National Institute of Standards and Technology (NIST) and the Department of Labor. Since EDA was the lead agency, I did a lot of the coordination.

*You have worked with the EDA before?*

**Schmidt:** Prior to the MIIA grant, I managed an EDA university center grant for about three years.

*Could you describe the grant in a bit more detail?*

**Schmidt:** The whole thing was a little over \$2.1 million awarded over four years, ending in October 2016. Three main applicants received funding: the MU Extension Business Development Program and the MU College of Engineering; Missouri

Enterprise; and the Missouri Department of Economic Development’s Division of Workforce Development. MU received its funding from the EDA, a bit less than \$1 million. Missouri Enterprise received the NIST money, \$375,000. And the Division of Workforce Development received the rest from the Department of Labor.

*What was the purpose of the grant?*

**Schmidt:** Originally, the goal was to develop the supply chain, logistics, and

infrastructure necessary to manufacture small modular reactors (SMR) for the nuclear power industry. The project was positioned to build a nuclear supply chain and develop an additional workforce in collaboration with the State Technical College of Missouri (Missouri S&T) and the MU research reactor folks to produce more workers for the additional positions needed at local reactor sites and for the shortage of personnel at Midwest reactors in general. That was the original scope of work. The workforce part continued as initially conceived, but the technical assistance side had to be reconfigured when Westinghouse and Ameren decided to hit the pause button on their plan to build small modular reactors at Callaway. [Ameren joined with Westinghouse in 2012 to develop SMR technology, but the partnership was passed over for federal grants twice, and Ameren announced at the end of 2013 that it was “stepping back” from the project.] That occurred a few months after the grant began. So our team had to reconfigure our strategy to account

Extension Partnership Program (MEP) in Missouri. All of the funded MIIA projects were required to involve the MEP centers in their respective states. We also operate the only Missouri innovation center that focuses on improving manufacturing operations.

*And what is Missouri Enterprise’s role in the MEP program?*

**Prugh:** We concentrate on helping small to medium-sized manufacturers in the state of Missouri. It’s all hands-on assistance. It has nothing to do with policy or regulation. It’s all about trying to help manufacturers be more profitable. It’s the only federal program I know of that does that.

*From Missouri Enterprise’s perspective, what was done with the grant?*

**Prugh:** In the simplest form, it was our role to actually reach out to the manufacturers. We made manufacturers aware of existing opportunities in supplying components and subcomponents to nuclear

power plants. Our first step was to find manufacturers that were interested in pursuing the nuclear power plant supply chain. Then, for those that were interested, we provided guidance, contacts, and similar support to help them move forward in their pursuits. We also performed some initial evaluations to see if they would be able to do so, and if they were

not, we needed to see what we had to do to fill that capabilities gap so they could.

*Can you give me a little more detail on your activities?*

**Prugh:** We sent an e-mail blast to about 7,000 contacts in our database of manufacturers and other entities to find out who might be interested. Only 35 companies responded to it, and only 28 of those were manufacturers. At first that was disappointing, but it told us how far the supply chain for nuclear plants has deteriorated in this country over the past 30 years, during which time no nuclear power plants had been built. Also, you have people who hear “nuclear” and automatically think that it’s too sophisticated or complicated and that they can’t serve that market. I think the low response reflected those two realities.

*After you had the responses, what was your next step?*

**Prugh:** We started to narrow it down. A

student who worked in Dave’s office and I researched the NAICS codes that apply to components and subcomponents used in nuclear power plants. [The North American Industry Classification System is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.] I used those to look at the types of companies that could be involved in the nuclear supply chain, which, of course, consists of more than just reactor parts. You have to have office buildings and windows and cabinets as well as safety-related parts. So we looked at companies that could potentially supply parts used in the nuclear island, the turbine island, or balance of plant. I then used those NAICS codes to search the Hoovers.com database and found Missouri companies listed with those codes. [Hoovers is a subscription database compiled by Dun & Bradstreet.]

Westinghouse graciously granted us access to its proprietary list of parts and suppliers for its nuclear reactors. While we could not and did not share that list with anyone not covered by the access agreement, we were able to determine which parts had the most potential for Missouri manufacturers by referencing the affiliated NAICS codes.

*What did you find?*

**Prugh:** We found that there were about 136 components that had the most potential for Missouri manufacturers. There were about 424 subcomponents that would be necessary to build those components. And we weren’t just looking at Tier 1 components. We were also considering subcomponents in Tiers 2 and 3—and so on—that Missouri companies could supply.

Since our original e-mail blast netted only 28 interested parties, I realized that I needed to do a more targeted awareness campaign. By searching the Hoovers.com database, I found 444 manufacturers in Missouri that had the potential to serve the nuclear market. I personally contacted 228 companies, making 85 site visits and contacting 132 companies by telephone or e-mail. And I notified 11 companies about nuclear supplier conferences that might be beneficial for them to attend. Out of the 228 companies I contacted, only 19 had some nuclear experience.

I gave an initial supplier evaluation form to each of the companies I visited on-site to determine their level of interest and basic capabilities. Sixty-three manufacturers expressed an interest in pursuing the nuclear power plant market, and 37 actually completed and returned the forms.

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for that, and we ended up with a little bit of a different scope of work, instead focusing on any and all things nuclear in the commercial power generation world. So, it was the whole nuclear supply chain, from the existing fleet to what was going on with SMRs.

I spent quite a bit of time building a network with the nuclear supply chain and key players in the nuclear supply chain industry outside of Missouri. Rick’s firm, Missouri Enterprise, built relationships with manufacturers inside the state of Missouri to help them evaluate and understand what it might mean for them to pivot and meet some of the people in the industry.

*Rick, what is Missouri Enterprise and how did it come to be involved in the MU grant?*

**Prugh:** We are a not-for-profit manufacturing consulting firm that contracts with the federal government to operate the National Institute of Standards and Technology’s Hollings Manufacturing

Can you define “tiers”?

**Prugh:** “Tiers” is a key supply chain term. A Tier 1 supplier is a company from which a utility or nuclear reactor supplier would buy directly—i.e., the containment vessel or certain kinds of pumps. Tiers 2 and 3 would be companies that would supply the parts necessary to fabricate a Tier 1 component, such as gaskets for the Tier 1 pumps. In other words, the utilities or nuclear reactor builders have their approved supply chains for primary components, but component suppliers also need lower tier subcomponents. Each company supplying a subcomponent for another component is a lower tier supplier.

*I understand that some of the Missouri firms you dealt with attended NuScale Power’s NuEx SMR exposition in 2015.*

**Prugh:** Yes. Dave and I helped five companies attend the event. NuScale was one of two U.S. companies to receive a \$200-million-plus grant from the federal government in 2013 for SMR development. Over 200 people attended NuEx. NuScale talked about where its SMR efforts were at the time and the timelines regarding when it would be recruiting its SMR supply chains.

And we have maintained our contact with NuScale. Near the end of the MIIA-funded program, we received word that the firm was looking for locations for an SMR fabrication facility. We contacted Missouri’s Department of Economic Development and informed them of the opportunity. If it happens, and we are able to get a major company like NuScale to build a plant here, it will be a major economic boon for our state.

An organization at Missouri S&T called the Small Modular Reactor Research and Education Consortium has determined, through an economic study, that this project, or a similar project to make major modules for the SMR, would have anywhere from a \$34-billion to \$250-billion impact on the state over 30 years. That is the reason I want to make sure the state of Missouri is still interested. Since the election, we have a new governor, and we needed to get him up to speed. There may not be anything there, but if there is, we would like to pursue it. If Missouri got involved, the project level would be similar to the commitment made by New Jersey in 2014 to bring a Holtec design and SMR manufacturing facility to Camden.

*The funded part of this project came to a close with the Advanced Manufacturing and Nuclear Supply Chain Development Conference held in St. Louis in September of last year. How did that go?*

**Prugh:** We partnered with MU and the U.S. Nuclear Infrastructure Council in that event. Considering the facility

and the agenda, it turned out to be about the perfect number of participants. There were about 41 people from 30 companies. When you include our presenters—we had presenters from Ameren, Westinghouse, and NuScale—we had about 66 people total. Among other things, we conducted a “speed-matching” event in which each company representative had a three-minute segment to give a quick elevator speech about the company. With the potential buyers and potential suppliers, there were a couple of matches made on the spot.

*Dave, you mentioned earlier the State Technical College of Missouri. What role did that institution play in project activities?*

**Schmidt:** State Technical subcontracted with the Division of Workforce Development and some of the education that the Department of Labor funding paid for.

The college has a two-year nuclear safety program and was able to add more courses and more students due to the grant money. At the undergraduate level, the MU research reactor and its education side, as opposed to the research side—through the classes taught there in connection with the reactor—were able to do things similar to the four-year engineering program level. They added courses on topics such as nuclear culture and safety culture.

Further, while the Division of Workforce Development estimated that a total of 160 students would enroll in the classes being designed at State Technical and the MU research reactor, they ended up enrolling 270 students. Out of that number, 141 have graduated as of last fall, and 100 of those are employed in the field in unsubsidized employment—which means that they are no longer in any kind of internship or apprenticeship or similar program.

*What about the technical assistance side of the grant?*

**Schmidt:** In the process of working with the companies that expressed an interest in being part of, or expanding their footprint in, the nuclear supply chain, our technical assistance—which consisted of business, strategic, human resource, finance, growth, and other types of consulting services—helped produce 418 jobs, over \$22 million in additional revenue, and over \$12 million in additional investments for those companies. For example, in some cases, we would work with chief executive

officers to determine whether it would be a good strategic move and whether their companies had the necessary resources to enter the nuclear supply chain. Those efforts helped the companies grow, which resulted in added jobs, increased revenues, and increased capitalization. Most small and medium-sized companies cannot access the level of expertise that our team was able to bring to the table.

*Rick, what were your biggest challenges in working on the project?*

**Prugh:** Probably some of the biggest challenges were related to the fact that the nuclear industry moves at a slow pace due to safety factors. This isn’t an industry in which a Missouri company will get involved and within two months be hiring workers. This is a long-term investment in time and, in some cases, money, for a Missouri company to succeed in getting work

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out of this power supply chain.

I think that initially, the expectation for the MIIA program and everyone who was going into it was that by the end of three years we would have a bunch of companies involved and hiring a bunch of people. That didn’t happen—and not for lack of trying. It’s just that it takes that long to develop relationships, get into the supply chain, and prepare even to be able to pursue the supply chain. It’s been a few months since I checked, but the last time I looked at ASME’s nuclear component certification list, there was only one N Stamp company in the state of Missouri. As noted earlier, I found only 19 companies with nuclear experience, but there might be more; I didn’t talk to every company. To make companies aware of opportunities and to get them to the point where they could start pursuing those opportunities took the whole three-year period of the grant. The next step is to get them involved.

*Do you think that the state of the industry—its flatness—is affecting companies’ interest in becoming involved in the nuclear supply chain?*

**Schmidt:** I think that the interest and pace are picking up the closer we get to new reactor designs coming out, and as there is more activity around bidding supply chain requests for proposals [RFP].

*Dave, what were your biggest challenges?*

**Schmidt:** The biggest single challenge was when Westinghouse decided to hit the pause button, and Ameren was not able to change course to work with another vendor. That was really a major challenge. If Westinghouse had built five of its first-of-a-kind reactors in Missouri, the supply chain would have been easy to round up. But since that didn't happen, the conversations were a lot harder to have. The second biggest challenge, I would say, was talking to key people in the nuclear power generation world and convincing them that Missouri was a viable place for a supply chain when the state doesn't have a history of providing a supply chain for the nuclear industry. But I think we've made that sale, and now it's a matter of following through and finishing the delivery on that.

*To either of you, what were the major accomplishments of the project?*

**Schmidt:** We worked really hard to get some momentum going during the grant period. It came to a head at the event in St. Louis, where there was a lot of interest and

movement from Missouri companies to try to get involved in the nuclear supply chain. What we've been able to do since then is to bring more opportunities for companies in the Midwest to participate in the nuclear supply chain. We actually have coalitions now set up where we are beginning to bid on supply-chain RFPs. We have four to six companies in Missouri doing that and another 15 or so from other parts of the Midwest that are beginning to come together to bid on some of these RFPs. All of them are in some stage of getting NQA-1 quality certifications or whatever certifications they need. Some of them have an N Stamp or some part of that.

In addition, I'm working with NuScale to build a supply chain for them here in the Midwest. That is something that is unfolding this spring. I would say, accomplishment-wise, that the grant gave us a really good start, and now we're trying to move to the next level, where we're getting companies into the bid process, the quality certification process, and actually participating in the supply chain. We're kind of on the front end of that.

**Prugh:** I believe that there were several major accomplishments. Missouri manufacturers are better positioned to sell components and subcomponents to the global supply chains to construct and maintain nuclear power plants, and Missouri's rep-

utation as a supporter of nuclear power and a good place to find partners and suppliers has been enhanced. Missouri manufacturing companies' awareness of nuclear power plant supply chain opportunities has been greatly improved, and its manufacturing capability to supply the nuclear power plant supply chain has been defined and documented. This program provided a great foundation for follow-up activities to further develop opportunities and partnerships between Missouri manufacturers and buyers in the nuclear power plant supply chain.

*Do you have any final comments?*

**Schmidt:** I would say that given the fact that the supply chain has really been decimated over the past 30-plus years in the United States, what we're really talking about here is starting up a new industry. It's really important to this area, because we're facing severe cutbacks in defense contracts. There are other places in the country that are competing right now. Depending on how you evaluate us, I believe that we're ahead of the other areas, but we need to continue to push on this. If we don't, the supply chain could develop in other parts of the country instead of here. We don't pretend to think that we can have it all, but we would like to have as much as we can get for our economy and our companies. **■**