

delivering the diversified minerals explorer over 16,000 additional square kilometers in South Australia and the Northern Territory.

Maximus said it had applied for 18 new exploration licenses covering 16,250 square kilometers of uranium prospective acreage around Kingoonya, Marla and Marree in northern SA, and near Kulgera and Illogwa in the NT. The interests will be held 100 percent by the company.

Once formally granted, the new blocks will add to Maximus' existing uranium tenements covering the Narndee project area east of Mount Magnet in WA and the Billa Kalina area northwest of Olympic Dam in SA.

"An exploration model similar to the geological setting of the Beverley and Honeymoon sedimentary uranium deposits is envisaged," Maximus' managing director, Kevin Wills, said....

UEX Corp. has launched the search for an engineering firm to take its **West Bear uranium deposit** in the eastern Athabasca Basin to final feasibility.

The property contains a flat-lying, shallow, near-surface deposit. The zones of mineralization have lithology, structure, alteration and chemical features that closely resemble those at Cameco's Cigar Lake deposit.

Cameco has just completed an interim resource estimate for UEX that puts the West Bear indicated resources at 46,500 tonnes grading 1.385 percent U₃O₈ or 1.39 million lbs.

The deposit is located within 80 km of two existing processing facilities (Rabbit Lake and McClean Lake) and could be mined using open pit methods.

A C\$700,000 winter drilling program overseen by Roscoe Postle Associates is underway at West Bear. It will test geophysical targets on the edge of the deposit in order to locate additional deposits. Sonic drilling will begin next month. The environmental baseline study is already underway, and is being done by Golder Associates. ●

Russian Revolution (Part II) **TPI President: U.S., Russian Disposition Programs Founder**

By Nancy E. Roth

In the second of two articles on a thorium fuel development project in Russia, the president of Thorium Power Inc., Seth Grae, explains why the Russians have made no substantive progress in their agreement with the U.S. to dispose of 34 tons of weapons-grade plutonium with

mixed-oxide fuel technology, and how the new thorium fuel could break the impasse. He suggests that creating mixed-oxide fuel suitable for civilian reactors out of weapons-grade plutonium is a complex, expensive project that should not be confused with the well-established European MOX. Grae also mentions a report issued in December by the Department of Energy Inspector General that finds that DOE has not exerted adequate project cost and management controls over the contract.

The views in this article represent those of Seth Grae and Thorium Power Inc. In Part III next week, FCW will describe the April 2005 NNSA critique of the thorium fuel development project in which it assesses the technology, projected schedule for implementation, cost estimates and environmental benefits.

The IG report says there have been a large number of mistakes in DOE's management and oversight of this contract. Current cost projections are so far above the original project cost estimate; do you think the original estimate was an honest mistake?

I can believe it is what Wall Street would call "puffing"—not lying but stretching the truth, but stretching it so we waste millions of dollars of taxpayers' money. The MOX program is always over budget and behind schedule and yet there's never been anything done that's gotten rid of one ounce of plutonium.

This is not just a bureaucratic waste of a billion dollars of the taxpayers' money; the U.S. MOX program is actually a danger to our national security. The reason we entered into the MOX program was to eliminate weapons-grade plutonium that can be used by terrorists to make weapons. They only need an amount [of plutonium] the size of a Coke can and 1940s technology to take out a large part of one of our cities. There are hundreds of tons of it in Russia, and not all of it is as secure as it should be. Now here we stand, more than 16 years since the fall of the Berlin wall on Nov. 9, 1989; we have gotten rid of over 12,000 warheads of highly enriched uranium equivalent [through the Megatons to Megawatts program], and zero warheads of plutonium. That's the contribution to our national security of the MOX program.

The Russians do not even have access to the MOX technology from France, because the French want to be paid for it. No one has figured out how to pay for it yet. The only way [Russia would even consider using it] is if the money for it has been committed from the beginning to the end of the project. As I understand it, the Americans and

other countries have given only about half the money needed and are asking the Russians to contribute, and the Russians are saying no. So the Russians don't want to start moving their plutonium into a program without enough money to finish.

The report says that with the U.S. program, the most basic management controls have not been exercised.

What I've heard at the Department of Energy is: we've built the tracks; we've built the train; the train is in motion; we shouldn't stop it. But if they've built a train, it is on a track that is going in a circle. Just because they've wasted billions of dollars on a program that hasn't even started in Russia—and that's the whole point of the program, getting rid of the plutonium in Russia—it does not mean we should go forward.

For the sake of our country, I think the program should be dropped. Especially after Katrina, I think a cost of billions of dollars of taxpayer money needs to be looked at carefully, particularly when we need it for important national security concerns.

I talked to Linton Brooks, head of the National Nuclear Security Administration, about the MOX program, and he said that at the time the agreement was made, the Russians were uncomfortable with the vitrification alternative. So he said we've committed to the MOX program at the behest of the Russians (see *FCW*, Nov. 22).

I can believe that that Russians were uncomfortable with vitrification, because they wanted to get some benefit out of the disposal of the plutonium. The benefit is the electricity they would get by burning the plutonium in reactors. I've heard that in Russia.

“Now here we stand, more than 16 years since the fall of the Berlin wall [and] we have gotten rid of over 12,000 warheads of highly enriched uranium equivalent [through the Megatons to Megawatts program], and zero warheads of plutonium.”

I do believe, though, that nobody in Russia ever wanted MOX. There is no MOX design for Russian VVER 1000 reactors; there is no real analysis of it. There's a big question mark as to how much it would actually cost to modify their reactors to use MOX fuel, and in the end MOX

would produce as much plutonium in those reactors as it consumes, albeit in spent-fuel form. It turns out to be an extraordinarily expensive and difficult way to handle the [plutonium disposition] program, and I think it will never happen in Russia.

Linton Brooks is a highly competent person, and I think he is respected on both sides of the aisle in Washington, which is rare. He is also a very busy person and is listening to people under him who are giving him bad advice.

So there is no active constituency advocating an alternative to MOX, like thorium fuel?

MOX certainly does have a constituency. [That program] spreads around billions of taxpayer dollars and employs a lot of people. So it has a constituency that is paid for by the government. But that's not a real constituency, that's a waste.

I think the constituency for this is all of those members of Congress and people in the administration and the private sector who support Thorium Power, which I think frankly is anyone who gives us a fair look, and has real scientists and engineers look at it.

For example, the company in the world that has the highest level of expertise in analyzing this sort of technology is Westinghouse. Westinghouse designed 80 percent of the reactors in the U.S., half of the reactors in the world, and makes over a third of the nuclear fuel in the world. It has handled plutonium through its current corporate parent BNFL. They have made MOX fuel—commercial MOX fuel, not what the U.S. government is talking about—using reactor-grade plutonium in Britain. And Westinghouse has designed, built and deployed fuel for Russian VVER reactors, which are exactly the reactors that are supposed to burn the plutonium in Russia.

So Westinghouse was hired by NNSA, paid with taxpayer dollars, partly because of pressure from Congress, to conduct a thorough review...that recommended in writing to go forward to deployment in lead test assemblies in full-sized reactors powering a city. Now that's real. We have this fuel being irradiated in a research reactor in Kurchatov Institute in Moscow. It's been running there for over two and a half years and many members of Congress on both sides of the aisle have been visiting it, and Westinghouse has now independently reported to the government on it.

So this is not like MOX. This is something that has been designed and developed in Russia based on Thorium Power technology by and with the people who designed

and developed the Russian VVER reactor, and they are the ones who are running it in a test reactor. They say it works. Westinghouse, which makes fuel for the reactors, says it works. But NNSA has people who disagree. I will just say the results speak for themselves.

You once told me that Thorium Power is not in this venture to compete with MOX. What has changed?

President Bush and Sen. Kerry in their first presidential debate agreed on one point: The greatest threat to the United States is a nuclear weapon in the hands of terrorists. The MOX program has the greatest responsibility of preventing that from happening of any program in the U.S. government. It is probably the most important mission that the government is carrying out today. And it has totally fumbled it.

If I believed that the MOX program could, in the end, happen, and that the thorium fuel program were given an honest look...I'd be the first to say, let's just do whatever it takes, whatever is best, for protecting our nation. Use the technology that's best. But the [people in the] MOX program have not been willing to [let qualified experts] make an honest judgment on the program. And anyone looking at the program on the Russian side there will understand that it won't end up getting rid of Russian plutonium.

What has happened since the last time we talked is that Paul Longworth [former NNSA Deputy Administrator for Defense Nuclear Nonproliferation] who was responsible for this effort, sent a letter to Congressman Curt Weldon [an advocate of the thorium fuel project] that said, the Westinghouse report is not our report—even though [NNSA] hired Westinghouse, and paid Westinghouse government money for its review.

Now, I don't believe that is giving anything a fair look. We've spent about \$3 million of government money in these last few years on our program. We'll show you what we've done with it. Let's see what MOX has produced for their billions. Ours works, theirs is a disaster.

MOX and reprocessing are becoming very popular on Capitol Hill all of a sudden.

This is a different thing. Let's not confuse these. There are legitimate issues about whether reprocessing is a good or bad idea. There are policy reasons and economic and national security reasons. Technologically we know reprocessing works [although] there are some new ideas on reprocessing that would have to be proved out.

But MOX fuel, as applied to reprocessing weapons-grade plutonium, is totally different. MOX fuel made of reactor-grade plutonium has been produced since the 1960s in Western Europe and Japan. Technically it works using plutonium extracted from spent-fuel rods from commercial reactors. It's expensive, up to three times the cost of making new uranium fuel for reactors, when you include the reprocessing cost, but technologically it works.

With the MOX program for weapons-grade plutonium disposition, we're talking about plutonium that is isotopically different from plutonium taken out of spent fuel from commercial reactors. We're talking about Russian VVER 1000 reactors, not western pressurized-water reactors, with a different fuel and different electronics in the reactor.

Reprocessing in Europe involves very expensive plants that have been built to make the MOX fuel. But no plant in the United States or Russia can make MOX fuel with weapons-grade plutonium. So the taxpayers would have to spend billions of dollars to create this plant to make MOX fuel using weapons-grade plutonium for commercial reactors.

Technologically we can reprocess plutonium from spent fuel, we can run MOX in commercial reactors. That might make policy and commercial sense. It might rationalize the way we deal with the Yucca Mountain Project—or it might not, it has to be honestly evaluated.

But that has nothing to do with the MOX program for disposing of weapons-grade plutonium. We are talking about something very different—don't be fooled.

In fact, when we talk about reprocessing plutonium, rather than go back to the old 1960s technology, which would work in a pressurized water reactor, maybe looking at newer and better fuels for commercial reactors might make sense. And assuming it meets all government safety regulations, I think that in the end thorium fuel should be judged in the commercial nuclear power industry—not by government. I think we would beat MOX in every category. But that would be in the commercial nuclear power sector.

Out in the government program, no one is making this determination. People are just spending money. ●

Reactor Design Shows India Still Chasing Thorium Cycle

By Nancy E. Roth

Indian physicists V. Jagannathan and Uma Pal have published a paper describing the design of a new reactor that will run on thorium fuel, in the Jan. 10 issue of the