IS IT WASTE

OR

IS IT FUEL

Dr. Temitope Taiwo
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Dr. Temitope Taiwo is the Deputy Director of Argonne's Nuclear Engineering Division. He has worked in the nuclear industry, research laboratory, and U.S. government in the areas of nuclear reactor design, methods development, and analysis. He has been at Argonne since 1990 and in that time developed computational tools and methods and performed analysis of nuclear energy systems, including fast and thermal reactors. Prior to employment at Argonne, he worked as a nuclear reactor analyst at the Northeast Utilities in Connecticut, where he was part of the code development and reactor analysis team. He developed nuclear analysis computer models and methods in support of Light-Water-Reactor core reloads, and designed and analyzed reload cycles. Dr. Taiwo is the Co-National Technical Director of the Fuel Cycle Options Campaign of the DOE Fuel Cycle Technologies program office. He directs system analysis of fuel cycle options and alternatives. He has a Ph.D. in Nuclear Engineering, from the Massachusetts Institute of Technology, Cambridge, U.S., and a B.Sc. in Engineering Physics (Nuclear Option) from the University of Ife, Nigeria.

Dr. Mark A. Williamson
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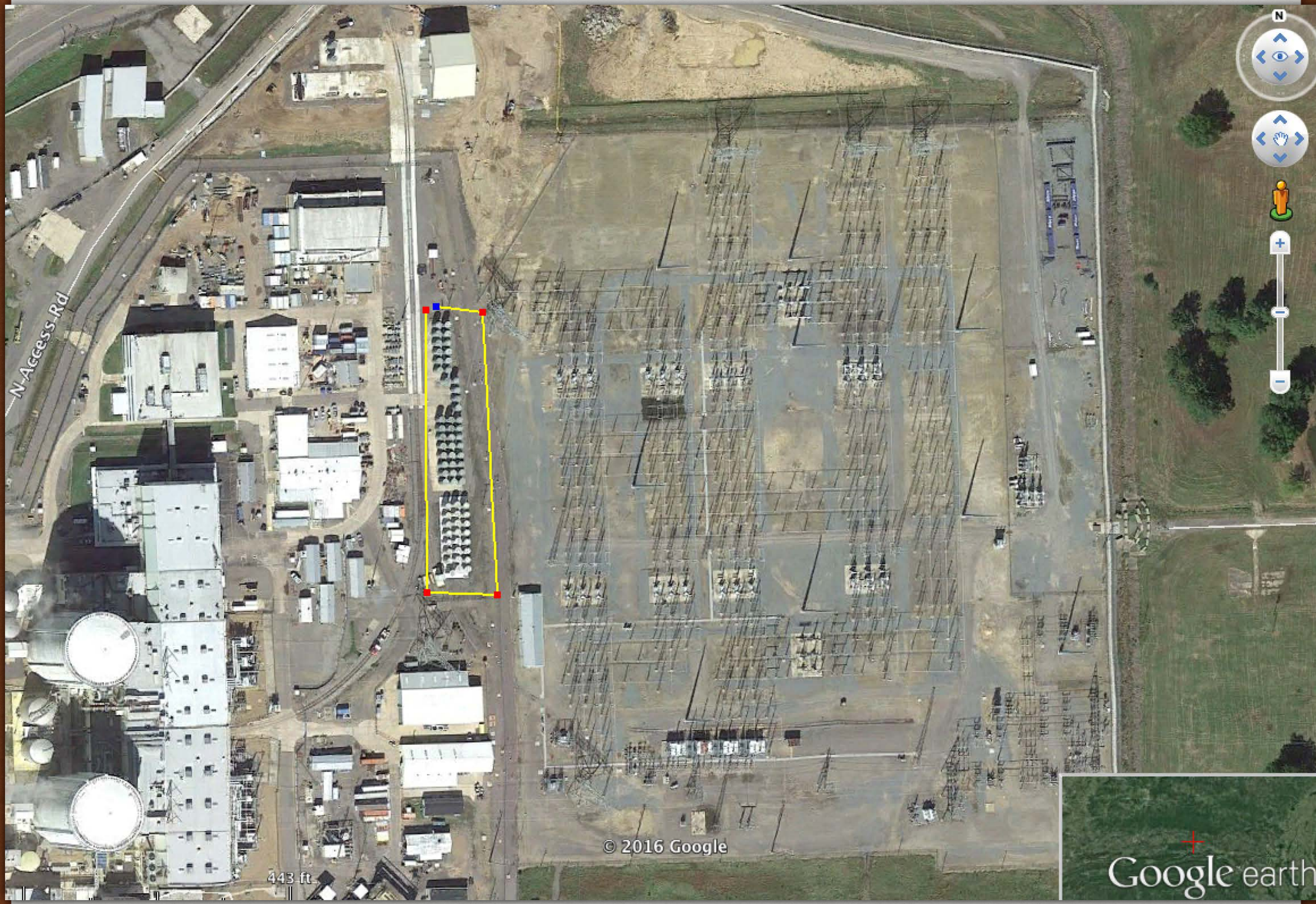
Dr. Mark A. Williamson leads a multidisciplinary research and development organization with programs in nuclear fuel reprocessing, radioactive waste management, safeguards and medical isotopes in the Nuclear Engineering Division at Argonne National Laboratory. Dr. Williamson's technical expertise is in developing pyrochemical processing technologies for nuclear energy systems. He has extensive experience in pyroprocess design, development and demonstration; equipment engineering; and facility design. His work includes the transformation of unit operations from concept to pilot-scale with a focus on technology commercialization. He is active in exploring safeguards technologies relevant to pyrochemical processing systems.

Dr. Donald R. Bobbitt, President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Arkansas Nuclear One - #1) 864 MW(e) #2) 930 MW(e)

The total fuel discharged from the two reactors through the end of 2016 is approximately 1,500 metric tonnes of heavy metal.

Fuel Comparison: for 1 kg of material - Heat Energy

Coal	8 kWh	12,400 btu/lb
Oil	12 kWh	125,000 btu/gal
U 235	24,000,000 kWh	note (Generation IV can burn U 238 + An>89)

If the two existing Generation II reactors were converted to Generation IV, (using a thermal efficiency of 40%) how many years of fuel is there piled up in the Russellville Arkansas parking lot?

1,500 x 10 (3) x 24 x 10 (6) / ((864+930) x 10(3) x 24 x 360) x .4=929 years

929 years + (100,000 year vs. 300 years) environmental isolation.

Arkansas Alternative Energy Commission
December 8, 2016

Pursuant to the duties set forth in the enabling legislation, more specifically §15-19-802 (1) (F) “Other energy sources identified by the commission”; and (2) The effects of the use of alternative energy sources on the economic development of the state;

Preamble:

TO have a safe, continuous, reliable, sustainable, efficient, economically competitive and hydro-carbon free electric power source, and;

TO rectify the existing nuclear spent fuel waste inventory that has accumulated at Arkansas Nuclear One reactor site, and;

TO develop the Arkansas economy by having the modular reactor and reprocessing manufacturing facilities located in Arkansas, and by having a world class nuclear training center with all the associative development located in Arkansas;

The Arkansas Alternative Energy Commission hereby approves the following resolution:

a) The Commission finds that a Generation IV liquid sodium fast reactor using reprocessed metal fuel has been identified and is declared an alternative energy source.

b) The Arkansas Alternative Energy Commission recommends to the Governor’s office, the Arkansas Legislature, and the Arkansas Attorney General’s office that the appropriate resolutions be passed, resources allocated, and support given to the University of Arkansas System to investigate and document recommendations for a plan to development the nuclear spent fuel opportunity.

Arkansas Alternative Energy Commission
December 8, 2016

Dr. Roy Glauber - Manhattan Project Texas A & M (Texarkana) April 4, 2016

Questions for Clearance issues - The project is complex and the details needed for consensual contract are beyond the resources of the AAEC. The path forward is for the AAEC to clear the basic issues, pass the proposed resolution, and support the University of Arkansas System's investigation. The University of Arkansas will be empowered (funded) to solicit input from all interested parties, i.e. environmentalist, nuclear power plant operators, think tanks, National Laboratories, other Universities, anyone that can make a contribution. The work product will be a BRAC (Defense Base Closure and Realignment Commission) type report, in a consensual contract format, that will be submitted to the Arkansas Legislature and the United States Congress for an up or down vote. The University of Arkansas will be charged with the responsibility to educate the public on these issues.

1) Has this ever been done before?
2) Is this safe?
3) What is the estimated cost of Generation IV electricity compared to todays market price?
4) How large is a nuclear reactor?
5) What happened to the Yucca Mountain Project? Is there any money in the spent fuel trust fund?
6) Has Entergy collected damage awards from the US Court of Claims for breech of contract?
7) Why is the nuclear reactor in Nebraska being closed? Same for Diablo Canyon Power Plant?
8) If this demonstration project works in Arkansas, how many new reactors are needed in the United States?

	$bln	Quads	
	Subsidies	Produced	$/MMBtu
Coal	$1.08	20	$0.05
Petroleum/NG	$2.35	44.1	$0.05
Nuclear	$1.66	8.2	$0.20
Renewable electricity	$13.20	9.3	$1.42
Solar	$5.30	0.305	$17.38
Wind	$5.90	1.6	$3.69

	Relative
	Subsidies
Coal	1
Petroleum/NG	1
Nuclear	4
Renewable electricity	27
Solar	326
Wind	69

IN SITU PROCESS MONITORING FOR PYROCHEMICAL SYSTEMS

A powerful process monitoring and safeguards technology for the electrorefining systems used in actinide recovery is being developed by Argonne's research team, which includes experts in process research and nuclear safeguards. Reliable process monitoring and control technologies are essential for operating a commercial fuel treatment facility.

A variety of electroanalytical methods including cyclic and square-wave voltammetry, and spectroscopic techniques are being developed and evaluated to determine the quantity of actinide in molten salt. This research includes developing:

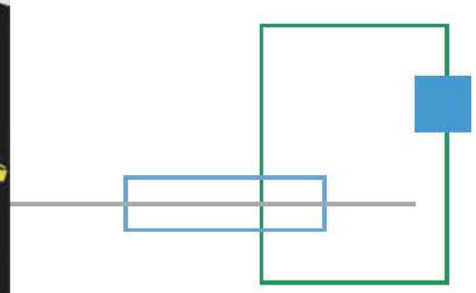
- Methods that achieve representative and reproducible conditions at the sensing electrode/molten salt solution interface
- Methods to determine the sensing electrode's effective area, which is vital to accurate concentration measurements

Scientists review data from in situ process monitoring for pyrochemical systems.

PYROCHEMICAL PROCESSING FACILITY CONCEPT

To further advance Argonne's pyroprocessing work and the potential for recycling used nuclear fuel, researchers developed a conceptual 100 metric tonne per year pyroprocessing facility. This work includes the development of processes, equipment concepts, an operations model, and the identification of materials handling issues.

Conceptual pyroprocessing facility



Credit: Lawrence Livermore National Laboratory