

Madia team assesses ITER management

(As published in *The Oak Ridger's Historically Speaking* column on April 28, 2014)

Carolyn Krause provides insight into the International Thermonuclear Experimental Reactor and Bill Madia's team assessment. She also enlightens her readers about the technologically advanced experiment being constructed in France under the leadership of the Oak Ridge National Laboratory.

Enjoy a glimpse of the future as Carolyn explains what is going on with ITER.

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Every two years the world's largest fusion energy project must undergo an audit. In 2013 Bill Madia, former director of Oak Ridge National Laboratory, and his consulting company Madia & Associates were awarded the job.

Charles V. Shank and T. J. Glauthier assisted Madia; together the three men had more than 100 years total leadership experience with large scientific organizations.

Some of the management problems faced by ITER (Latin for "the way") are mentioned in "A Star in a Bottle," an article by [Raffi Khatchadourian](#) in the March 3, 2014, issue of *The New Yorker*. The author also noted that "In October, a confidential management assessment determined that the project was 'in a malaise and could drift out of control.' It made 11 stark recommendations, among them that [Osamu] Motojima [a Japanese plasma physicist] be replaced [as ITER's director-general] as quickly as possible."

It turns out that the Madia management assessment team (MAT) made the 11 recommendations. The executive summary of the MAT report was recently released to the Internet.

Once called the International Thermonuclear Experimental Reactor, ITER was first proposed in 1985 at a Reagan-Gorbachev summit. The U.S. is a partner nation ("domestic agency," or DA) in ITER with the Russian Federation, European Union, China, Japan, South Korea and India. U.S. ITER is a Department of Energy Office of Science project hosted by ORNL.

ITER is an unprecedented international collaboration of scientists and engineers working to design, construct, and assemble a burning plasma experiment (think of a giant fluorescent lamp) that can demonstrate the scientific and technological feasibility of fusion power for the commercial power grid. This type of power plant may be humankind's best hope for reining in global warming.

ITER's goal is to show by 2033 near Cadarache, France, that heavy hydrogen ions (a plasma of deuterium and tritium bred in a lithium blanket) can be heated to record-high temperatures and contained by superconducting magnets enough to produce and sustain energy-producing fusion reactions.

ORNL technologies that will be used to heat the ITER plasma include neutral beams, radio waves, and microwaves. ORNL's pellet injection technology will be used to refuel the plasma with deuterium-tritium pellets. Currently, ORNL is involved in blanket design and windings for the central solenoid, a cylindrical coil of current-carrying wire that acts as a magnet.

The MAT report had five positive findings: the parties' commitment to success, capable and motivated project staff, use of best practices, positive interactions and collaborations among DAs and a good start for improving communication, collaboration and interactions between the international organization (IO) and the DAs.

The MAT reported 18 findings and observations that the team "believes impede ITER progress." Listed are inadequate original design, distributed manufacturing of common components and "lack of sense of urgency, passion for success, commitment to finding solutions to problems rapidly and agile and nimble project organization."

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The ITER culture was found to lack a “constructive confrontation” component between staff and management. “As a result, many of the best ideas were never heard nor expressed and key decisions lacked ownership,” the team wrote.

The international organization (headed by Japanese executives) was criticized for its lack of strong project management culture, inadequate leadership of systems engineering and design integration, lack of motivation to reduce costs or risks to DAs, poor communications within the project and with contractors and subcontractors, an excess of senior managers who supervise an insufficient number of employees and lack of critical management tools and ineffective use of tools it has.

Here are the 11 recommendations of the Madia team:

1. Create a project culture so everyone on the team feels empowered, even compelled, to speak up and identify new and better solutions through constructive confrontation that is openly encouraged by management
2. Begin a search for a new director general as soon as practical
3. Hold the DG accountable for resolving conflicts
4. Reduce the number of senior managers in the IO and give more authority to act to people at the lowest technically competent level
5. Strengthen systems engineering and design integration capability and leadership
6. Instill a nuclear safety culture (so that ITER can be licensed in France)
7. Develop a realistic and achievable ITER project schedule to maintain credibility
8. Align the interests of the IO staff with those of the DAs
9. Simplify and reduce the IO bureaucracy by empowering people with wide-ranging freedom to act and communicate openly
10. Use human resources systems and tools as a strategic asset (to attract, motivate and retain the world's top talent and efficiently remove underperforming staff)
11. Improve the ITER Council's responsiveness to advisory assessments. The Council should act like a board of directors and take action without complete consensus of all board members

To achieve significant improvement over the next two years, the MAT advised ITER to follow all 11 recommendations, which are related. Bill Madia will be watching, and so will ITER folks at ORNL.

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Thank you Carolyn for yet another excellent *Historically Speaking* column. Next she will bring you insights into the leadership of Jeff Wadsworth while he was the director of ORNL.

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ITER which will begin operating as an experiment in 2023, will consist of 39 buildings on 103 acres