October 2008
Volume 8, Issue 3

NED Newsletter

Nuclear Engineering Division Newsletter
Joe Miller – Editor 703-356-4149

Special Interest Articles and Info:

- Advanced Nuclear Power Reactors
- New Reactor References
- Advance Reactors Around the World
- Salary and Career Articles
- Nuclear Power Plants Under Construction by Type
- Nuclear Power Plant s Under Construction
- World Availability Factors for Nuclear Power Plants

Highlights of NED:

Message from the NED Chairman

Robert W. Tsai, PhD
Chairman NED
robert.tsai@exeloncorp.com

Dear members and friends of the Nuclear Engineering Division,

Greetings! Over the last months, the ICONE17 organizers of the ASME Nuclear Engineering Division Executive Committee, ASME staff along with the volunteers have worked very hard to plan the upcoming ICONE to be held July 12-16, 2009 in Brussels, Belgium. Our colleagues from JSME, Chinese Nuclear Society (CNS) and Europe are actively supporting this historic campaign as well.

Under the excellent leadership and organization skill of Mr. Joe Miller, Chairman of Technical Program Committee, we have made significant progress. Your input and support will be the key to our success and your participation, as author, presenter, exhibitor or attendee of the conference will contribute greatly to this campaign.

ICONE17 represents a long overdue return to Europe. We are delighted to collaborate with our European partners. We hope that ICONE17 will serve as a catalyst and help to envigorate the European Nuclear Renaissance. On September 12, 2008, an ASME/EU Partner Orientation Meeting was held in Brussels, Belgium. The main purpose of the meeting was to establish a firm collaboration with and to seek input from our European partners and colleagues. It was a great success. The leaders and key representatives from European Nuclear Society, FORATOM, Electrabel, Tractabel, Westinghouse-Brussels, ASME-Brussels and other organizations attended the meeting. Significant input was provided and our European partners made firm commitments to support ICONE17.

A joint ICONE17 Organizer meeting is being planned for December 2008 with the key organizers from JSME, CNS and EU to finalize the conference program.

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Editor's Message

The purpose of this newsletter is to keep the NED membership informed on new developments and important activities in the nuclear industry. This newsletter places an emphasis on current and new reactors and advanced reactor designs. The category of different reactor designs are presented on page 12. The number of operational reactors in the world is currently at 439 plants, and the signs of significant expansion are apparent world wide. The current fleet of nuclear reactors have a remarkable energy availability of 77% (See page 10), which leads the world to believe in nuclear power as an efficient energy producer. Current construction activities of nuclear power plants are shown on Page 4. Table 1 on page 9 shows the current list of new reactor designs. Although nuclear power expansion is under way with remarkable momentum, the amount of time it takes to actually see noteworthy construction for the advanced reactors will be in 5-10 years depending on our progress on licensing issues, overcoming our material issues and our adaptation to standardization. It is important for all of us to stay in touch with the world organizations that are mobilizing this new nuclear renaissance.

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Advanced Nuclear Power Reactors

World Nuclear Association (August 2008)

- The next two generations of nuclear reactors are currently being developed in several countries. (Category descriptions are presented on page 12)
- The first (3rd generation) advanced reactors have been operating in Japan since 1996. Late 3rd generation designs are now being built.
- Newer advanced reactors have simpler designs which reduce capital cost. They are more fuel efficient and are inherently safer.

Kashiwazaki-Kariwa Nuclear Power Station Unit NO.6 of The Tokyo Electric Power Co., Inc.

Onagawa Nuclear Power Station of Tohoku Electric Power Co., Inc., Unit No3. is under construction

The nuclear power industry has been developing and improving reactor technology for more than five decades and is starting to build the next generations of reactors to fill orders now materializing. Several generations of reactors are commonly distinguished. Generation I reactors were developed in 1950-60s, and outside the UK none are still running today. Generation II reactors are typified by the present US fleet and most in operation elsewhere. Generation III (and 3+) are the Advanced Reactors discussed in this paper. The first are in operation in Japan and others are under construction or ready to be ordered. Generation IV designs are still on the drawing board and will not be operational before 2020 at the earliest.

Continued on Page 7

New Reactor References

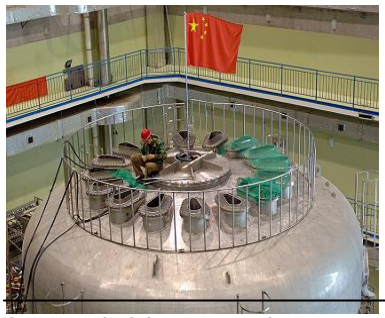
Nuclear Regulatory Commission

- New Reactor Licensing - http://www.nrc.gov/reactors/new-reactors.html
- Design Certification – Licensing Reviews – http://www.nrc.gov/reactors/new-reactors/design-cert.html
- Early Site Permits – Licensing Reviews – http://www.nrc.gov/reactors/new-reactors/esp.html
- Licensing Process – http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/licensing-process-bg.html
- Rulemaking - http://www.nrc.gov/reactors/new-reactors/regs-guides-comm.html
- Construction Inspection Program and NRC Oversight - http://www.nrc.gov/reactors/new-reactors/oversight.html
- Public Involvement – http://www.nrc.gov/reactors/new-licensing/public-involvement.html
- Related Documents – SECY Papers, Fact Sheets, History - http://www.nrc.gov/reactors/new-reactors/regs-guides-comm/related-documents.html
- Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (NUREG-0800) – http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0800/

Zaporizhia Nuclear Power Plant in Ukraine

International Atomic Energy Agency

- Achievements and Prospects for Advanced Reactor Design and Fuel Cycles - Roberto O. Cirimello Argentina IAEA – Scientific Forum 2004 – Nuclear Fuel Cycles Issues and Challenges – http://www-pub.iaea.org/MTCD/Meetings/PDFplus/2004/gcsfSess1-Cirimello.pdf
- Advanced Reactors – Fact Sheet – http://www.iaea.org/Publications/Factsheets/English/advrea.html



A technician works at a superconductive nuclear reaction device in Hefei, central China. The energy project aims to generate infinite and clean nuclear-fusion-based energy.

Advanced Reactors Around the World

(Ref. *Nuclear Plant Journal* Editorial Archive, by Debu Majumdar)

At the end of 2002, 441 nuclear power plants were operating around the globe and providing 17% of the world's electricity. Although the rate of population growth has slowed, recent United Nations data suggest that two billion more people will be added to the world by 2050. A special report commissioned by the Intergovernmental Panel on Climate Change estimated that electricity demand would grow almost eight-fold from 2000 to 2050 in a high economic growth scenario and more than double in a low-growth scenario.

There is also a global aspiration to keep the environment pristine. Because of these reasons it is expected that a large number of new nuclear reactors (hundreds to thousands) may be operating by 2050. Realization of this has created an impetus for the development of a new generation of reactors in several countries. The goal is to make nuclear power cost-competitive with other resources and to enhance safety to a level that no evacuation outside a plant site would be necessary. It should also generate less waste, prevent materials diversion for weapons production and be sustainable.

The nuclear industry has accumulated over 10,000 reactor years of operation in 30 countries, but most of that comes from developed nations. Two countries, China and India, which are now constructing several nuclear plants, currently obtain only 1.2% and 3.7% of their electricity from nuclear power. Population increase, demand for an increased standard of living (and hence for additional electricity) will occur primarily in developing and smaller countries in Asia, South America and eventually Africa. These countries have low grid capacity and less economic capital. They cannot add a GWe-sized plant, hence the designs for these countries would have to be smaller and more cost-effective (and hence more innovative) than existing large plants.

Prominent among those countries that have initiated the development of new reactor designs in the last few years are the United States, Russia, South Africa, Canada, France, Argentina, Japan, South Korea, India and China. There has also been renewed interest in liquid metal-cooled fast reactors for smaller-sized designs and from a sustainable development point of view because they can generate new fissile material and extend the potential of nuclear energy. This article discusses the status of next-generation reactors under development around the world.

Progress in Generation IV International Forum (GIF) Member Countries:
Nuclear power is an important cornerstone in the current energy policy of the U.S. for both energy diversity and independence as well as for the environment where nuclear-produced hydrogen is envisioned as the fuel of the future for transportation. A two-prong approach has been initiated by the U.S. Department of Energy (DOE):
Continued on Page 9

Salary and Career Articles

From http://www.payscale.com/resources_archives

Recession Topics

Recession Proof Jobs - http://blogs.payscale.com/content/2007/12/recession-proof.html

Is the Real Estate Market Affecting Your Job? How to Stay Afloat - http://blogs.payscale.com/content/2007/1 affected-b.html

5 Ways to Recession-Proof Your Income - http://blogs.payscale.com/content/2008/04/5-ways-to-reces.html
Overcome Your Recession Fears - http://www.payscale.com/current-recession
Check Your Vital Signs, Be Prepared - http://www.payscale.com/preparing-for-a-recession
Create Your Career Backup Plan - http://www.payscale.com/career-plan-recession
Ask for a Raise During a Recession - http://www.payscale.com/ask-for-a-raise-during-recession

News & Views

Best Future Career Choices By Industry: What's Your Next Move? - http://blogs.payscale.com/content/2008/09/best-future-car.html
How to Get U.S. Government Jobs - http://blogs.payscale.com/content/2008/09/how-to-get-us-g.html
6 Top-Paying Green Jobs - http://blogs.payscale.com/content/2008/02/6-top-paying-gr.html

Nuclear Power Plants Under Construction by Type

Data below is from PRIS database. Last updated on 2008/09/26

Under Construction

Type	No. of Units	Total MW(e)
BWR	3	3925
FBR	2	1220
LWGR	1	925
PHWR	4	1298
PWR	26	23235
Total:	**36**	**30603**

ASME News

This month's issue of ASME News Online is now available for you to read, exclusively at http://www.asmenews.org. The issue includes news stories on such topics as:

Engineering Headlines
October 04, 2008 - Saturday

1. **Nanoscale Polymers Don't Play by the Rules**
   United Press International Oct 02, 03:49 PM EST
2. **NASA Selects Science Teams for Astrobiology Institute**
   U.S. Newswire Oct 02, 04:27 PM EST
3. **Green Country Alternative Energy Expo Set in Muskogee**
   Journal Record - Oklahoma City Oct 03, 12:08 AM EST
4. **NASA Assigns Crew for Space Shuttle Discovery's STS-129 Mission**
   U.S. Newswire Sep 30, 03:55 PM EST
5. **Resin Plant in Rural South Carolina May Be Rescued**
   The Post and Courier Sep 30, 03:44 PM EST
6. **Institutes Form Alliance to Learn More About Brain Diseases**
   U.S. Newswire Sep 30, 02:35 PM EST
7. **Xcel Plant Will Burn Wood Chips**
   Milwaukee Journal Sentinel Sep 30, 02:05 PM EST

ASME PeerLink: Your Virtual Collaboration Tool

ASME's PeerLink is an online interaction tool designed with engineers' needs in mind with links to helpful resources, solutions and ideas from peers. It's much more than discussion boards, because there are many tools integrated into this site to help ASME PeerLink members connect with each other.

Access to the ASME PeerLink site is open to both members and non-members of ASME. To access ASME PeerLink, go to http://peerlink.asme.org. The comprehensive user guide is available at http://peerlink.asme.org/COP/Shared/Home/UsersGuide.pdf. For more information you can contact Mel Torre, Director of Communications at torrem@asme.org.

Important Links

For information on ICONE17 go to http://www.asmeconferences.org/icone17/
Go to NED Web Site - http://www.divisions.asme.org/ned/
To pick up the latest ASME News - http://www.asmenews.org/latebrk/latebrk.html
New Nuclear Plants - http://www.nrc.gov/reactors/new-reactor-licensing.html
Other Important Links at http://divisions.asme.org/ned/links/index.html

Message from the NED Chairman (cont.)

Continued from Page 1

ICONE17 programs again are designed to promote excellence in nuclear plant performance as well as technology advances for future generation reactors

It provides an excellent forum for interactions among nuclear professionals to discuss issues and challenges related to nuclear safety, licensing, engineering, operation, maintenance and training for nuclear power plants. Representatives from all major nuclear power-related companies in the world will be present at ICONE17.

Further information regarding ICONE17 may be obtained at the official web site: http://www.asmeconferences.org/icone17/. I am looking forward to hearing from you.

Sincerely,

Robert W. Tsai, Chairman, ASME/NED
Exelon Generation Company
630.657.2162
robert.tsai@exeloncorp.com

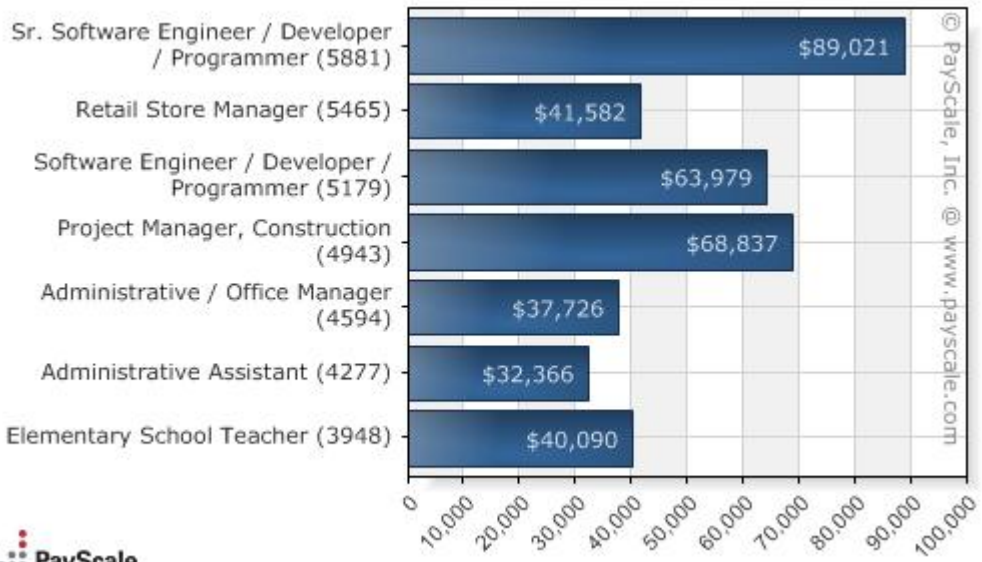
Median Salary of Different Jobs in the USA

http://www.payscale.com/research/US/ Compare this to the nuclear engineering salaries presented in the June Newsletter.

(See more countries)

More reports for this country: Hourly Rate, Bonus, Commission, Profit Sharing, more...

Median Salary by Job – Country



USA PayScale

International Conference on Nuclear Engineering ICONE 17

About the Conference
The American Society of Mechanical Engineers (ASME), Japan Society of Mechanical Engineers (JSME) and Chinese Nuclear Society (CNS) are jointly organizing the **17th International Conference on Nuclear Engineering (ICONE17)**. The **International Conference on Nuclear Engineering (ICONE)** is the premier global conference for addressing the needs of the nuclear industry. The conference will take place July 12-16, 2009 and will be held at the Sheraton Brussels Hotel. Go to http://www.asmeconferences.org/ICONE17/ for more information.

Previous Conference
The ICONE-16 was held on May 11-15, 2008, at the Disney's Contemporary Resort in Orlando, Florida. Over 620 presentations were made and 733 worldwide nuclear professionals attended the Conference.

Technical Tracks
ICONE17 will be accepting abstracts for submission to the following technical tracks:
We invite you to join us at ICONE17. Topics will include:

TRK-1: Plant Operations, Maintenance, Engineering, Modifications and Life Cycle
TRK-2: Component Reliability And Materials Issues
TRK-3: Structural Integrity
TRK-4: Advanced Applications Of Nuclear Technology
TRK-5: Next Generation Systems
TRK-6: Safety And Security
TRK-7: Codes, Standards, Licensing And Regulatory Issues
TRK-8: Fuel Cycle and High & Low Level Waste Management and Decommissioning
TRK-9: Balance of Plant for Nuclear Applications
TRK-10: Thermal Hydraulics
TRK-11: Computational Fluid Dynamics (CFD), Neutronics Methods And Coupled Codes
TRK-12: Current Advanced Reactors – Plant Designs, Construction, Workforce And Public Acceptance
TRK-13: Instrumentation & Controls (I&C)
TRK-14: Student Paper Competition
TRK-15: Nuclear Industry Forum - Keynote, Plenary and Panel Sessions
For more information, view the technical track descriptions.

Abstract Submission
Authors should submit a 400 word text only abstract on the ICONE17 website. For assistance with submitting your abstract online, please view the author help manual.

Publication Schedule
If you are planning to submit an abstract for consideration, please do so in accordance with the ICONE17 publication schedule. When your abstract is submitted, you will receive a confirmation and an assigned paper number. Late submissions may not be accepted.

Links to ASME Codes and Standards

Links for Students

- An Introduction to Codes & Standards for Students
  http://files.asme.org/ASMEORG/Codes/About/Links/1028.pdf
- ASME C&S - Examples of Use for Mechanical Engineering Students
  http://files.asme.org/ASMEORG/Codes/About/Links/3116.pdf

ANSI Links

- ANSI Standards Action
  http://www.ansi.org/news_publications/periodicals/standards_action/standards_action.aspx?menuid=7
- The National Standard Systems Network (NSSN) http://www.nssn.org/

Advanced Nuclear Power Reactors (cont.)

Continued from Page 2

About 85% of the world's nuclear electricity is generated by reactors derived from designs originally developed for naval use. These and other second-generation nuclear power units have been found to be safe and reliable, but they are being superseded by better designs. Reactor suppliers in North America, Japan, Europe, Russia and South Africa have a dozen new nuclear reactor designs at advanced stages of planning, while others are at a research and development stage. Fourth-generation reactors are at concept stage.

Third-generation reactors have:

- a standardized design for each type to expedite licensing, reduce capital cost and reduce construction time,
- a simpler and more rugged design, making them easier to operate and less vulnerable to operational upsets,
- higher availability and longer operating life - typically 60 years,
- reduced possibility of core melt accidents,
- resistance to serious damage that would allow radiological release from an aircraft impact,
- higher burn-up to reduce fuel use and the amount of waste,
- burnable absorbers ("poisons") to extend fuel life.

The greatest departure from second-generation designs is that many incorporate passive or inherent safety features* which require no active controls or operational intervention to avoid accidents in the event of malfunction, and may rely on gravity, natural convection or resistance to high temperatures.

* Traditional reactor safety systems are 'active' in the sense that they involve electrical or mechanical operation on command. Some engineered systems operate passively, eg pressure relief valves. They function without operator control and despite any loss of auxiliary power. Both require parallel redundant systems. Inherent or full passive safety depends only on physical phenomena such as convection, gravity or resistance to high temperatures, not on functioning of engineered components.

Another departure is that some will be designed for load-following. While most French reactors today are operated in that mode to some extent, the EPR design has better capabilities. It will be able to maintain its output at 25% and then ramp up to full output at a rate of 2.5% of rated power per minute up to 60% output and at 5% of rated output per minute up to full rated power. This means that potentially the unit can change its output from 25% to 100% in less than 30 minutes, though this may be at some expense of wear and tear.

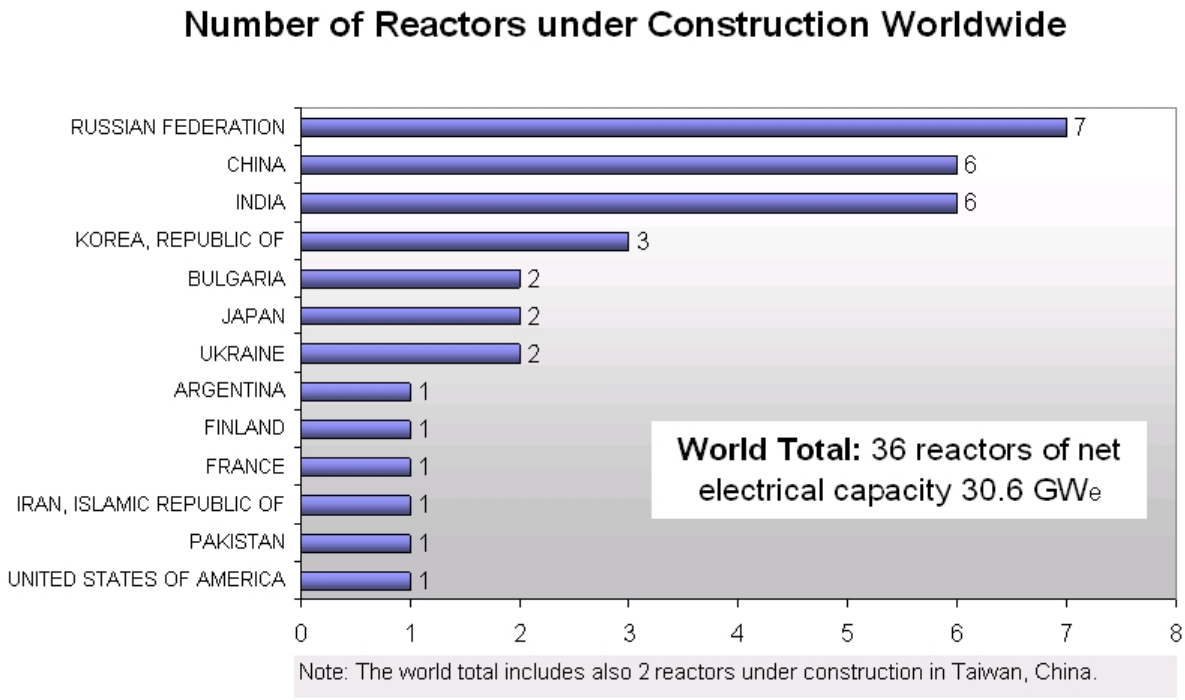
Many are larger than predecessors. Increasingly they involve international collaboration. Certification of designs is on a national basis, and is safety-based. In Europe there are moves towards harmonized requirements for licensing.

However, in Europe reactors may also be certified according to compliance with European Utilities Requirements (EUR). These are basically a utilities' wish list of some 5000 items needed for new nuclear plants. Plants certified as complying with EUR include Westinghouse AP1000, Gidropress' AES-92, Areva's EPR, GE's ABWR, Areva's SWR-1000, and Westinghouse BWR 90.

In the USA a number of reactor types have received Design Certification (see Table 1) and others are in process: ESBWR from GE-Hitachi, US EPR from Areva and US-APWR from Mitsubishi. Early in 2008 the NRC said that beyond these three, six pre-application reviews would get underway by about 2010. These include: ACR from Atomic Energy of Canada Ltd (AECL), IRIS from Westinghouse, PBMR from Eskom and 4S from Toshiba as well as General Atomics' GT-MHR apparently.

Nuclear Power Plant Constution Information

Under Construction Reactors by Country *Data from PRIS database. Last updated on 2008/09/26*



Upcoming ASME Conferences

ASME District F Early Career Technical Conference (ECTC)
Oct 03 2008 - Oct 04 2008

Society of Automotive Engineers in Japan (JSAE)
Oct 06 2008 - Oct 09 2008

International Manufacturing and Engineering Conference (MSEC)
Oct 07 2008 - Oct 10 2008

IDMME -Virtual Concept 2008
Oct 08 2008 - Oct 10 2008, Beijing, China

4th Annual ASME-IPTI Sporting Clays Tournament
Oct 10 2008

2008 4th IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications(MESA08)
Oct 12 2008 - Oct 15 2008

2008 International Joint Tribology Conference (IJTC)
Oct 20 2008 - Oct 22 2008

Dynamic Systems and Control (DSC) Conference
Oct 20 2008 - Oct 22 2008

Gas Turbine Users Symposium (GTUS) 2008
Sep 08 2008 - Sep 11 2008, Houston, Texas, United States

Table 1 New Reactor Designs

Reactor Design	Vendor	Approximate Capacity (MWe)	Reactor Type	Certification Status	Target Certification in USA
AP600	Westinghouse	650	PWR	Certified	Certified
AP1000*	Westinghouse	1117	PWR	Certified	Certified
ABWR*	GE et al	1371	BWR	Certified	Certified
System 80+	Westinghouse	1300	PWR	Certified	Certified
ESBWR*	GE	1550	BWR	Undergoing certification	2007
EPR*	AREVA NP	1600	PWR	Pre-certification	2009
PBMR	Westinghouse, Eskom	180	HTGR	Pre-certification	Not Available
IRIS	Westinghouse et al	360	PWR	Pre-certification	2010
US APWR	Mitsubishi	1600	PWR	Undergoing certification	2011
ACR Series	AECL	700-1200	Modified PHWR	Pre-certification	Not Available
GT-MHR	General Atomics	325	HTGR	Research prototype planned	Not Available
4S*	Toshiba	10-50	Sodium-cooled	Potential construction	Not Available

Note: Data are approximate targets which may change. Reactor types are defined below. Designs marked with an asterisk (*) are also supported by electricity generating firms or organizations publicly investigating possible construction in the U.S. AECL is Atomic Energy of Canada Limited. Taken from http://www.eia.doe.gov/.

Advanced Reactors Around the World (cont.)

(Ref. *Nuclear Plant Journal* Editorial Archive, by Debu Majumdar) **Continued from Page 3**

1. To pave the path for construction of new nuclear plants.
2. To initiate research and development for the next generation of nuclear plants known as Generation IV reactors.

Generation IV systems are intended to be responsive to the needs of all nations and users and would be available for deployment by 2030. An international organization known as the Generation IV International Forum (GIF) was created for this purpose—to expedite and collaborate on mutually interesting design concepts. Currently there are eleven members of GIF: Argentina, Brazil, Canada, the European Union, France, Japan, South Africa, South Korea, Switzerland, the United Kingdom and the U.S. They have selected six reactor concepts for research and development, namely:

· Very High Temperature Reactor (VHTR)
· Gas-Cooled Fast Reactor (GFR)
· Supercritical Water-Cooled Reactor (SCWR)
· Sodium-Cooled Fast Reactor (SFR)
· Lead-Cooled Fast Reactor (LFR)
· Molten Salt Reactor (MSR)

The list indicates that interest has shifted toward fast reactors, which the visionaries of nuclear power had originally conceived for better fissile fuel management, but now there is renewed interest for various additional reasons such as waste minimization and non-proliferation. These are reactors for the future, and they have not yet been built.

The primary aim of a VHTR is high-temperature process heat applications such as coal gasification and thermo-chemical hydrogen production. It could also provide electricity with superior efficiency. It is a graphite-moderated, helium-cooled reactor with a thermal neutron spectrum and a once-through life cycle. The concept has evolved from the High-Temperature Gas Reactor (HTGR) designs—notably the Arbeitsgemeinschaft Versuchsreaktor GmbH (AVR) and Thorium High-Temperature Reactor (THTR) plants in Germany and Peach Bottom and Fort St. Vrain in the U.S. The latest HTGR designs are:

Continued on Page 11

WORLD AVAILABILITY FACTORS FOR NUCLEAR POWER PLANTS

Data from PRIS database. Last updated on 2008/09/26

Lifetime Energy Availability Factor

(Includes all operational & shutdown reactors from beginning of commercial operation up to 2007)

Country	No. of Reactors	EAF (%)
ARGENTINA	2	80.2
ARMENIA	1	64.1
BELGIUM	8	85.2
BRAZIL	2	63.4
BULGARIA	6	69.4
CANADA	25	75.2
CHINA	11	82.7
CZECH REPUBLIC	6	80.1
FINLAND	4	90.9
FRANCE	68	76.9
GERMANY	30	82.8
HUNGARY	4	84.4
INDIA	17	60.6
ITALY	4	53.9
JAPAN	57	72.8
KOREA, REPUBLIC OF	20	86.5
LITHUANIA, REPUBLIC OF	2	61.2
MEXICO	2	82.6
NETHERLANDS	2	84.4
PAKISTAN	2	42.5
ROMANIA	2	87.6
RUSSIAN FEDERATION	31	69.7
SLOVAK REPUBLIC	7	76.4
SLOVENIA	1	82.8
SOUTH AFRICA	2	70.1
SPAIN	10	83.9
SWEDEN	13	79.9
SWITZERLAND	5	86.3
UKRAINE	17	69.4
UNITED KINGDOM	29	72.9
UNITED STATES OF AMERICA	121	78.3
World Wide	**517**	**77**

The following data from Taiwan, China is included in the totals

No. of Reactors	EAF (%)
6	82.2

Editor's Message (cont.)

Continued from Page 1

That is why is so important to attend ICONE17 where the world is meeting to discuss nuclear power. ICONE17 (International Conference on Nuclear Energy -17) is the largest and most revered nuclear conference in the world. ICONE17 is being held in Brussels in 2009 to accentuate the worldwide growth of nuclear power. So put July 12-16, 2009 on your calendar and join us in Brussels, Belgium for four days of papers, panels and networking. Go to http://www.asmeconferences.org/ICONE17/ for more information on ICONE17. If you have any questions or comments, email me at jsmeda@cox.net. Joe Miller

Advanced Reactors Around the World (cont.)

Continued from Page 9

1. The U.S., France, Japan and Russia joint design Gas Turbine–Modular Helium Reactor (GT-MHR) currently being developed for plutonium-disposition in Russia and also as a smaller power-producing reactor.
2. The Pebble Bed Modular Reactor (PBMR) originally developed in Germany and currently being commercialized in South Africa.

The PBMR has made some progress recently, as it has received approval from the Department of Environmental Affairs to build a 110-MW-class PBMR and an associated fuel plant in South Africa. However, the South African Cabinet must approve the project, and the National Nuclear Regulator must issue a construction license before a PBMR can become a reality.

A 30 MWt prismatic HTGR research reactor, a High Temperature Test Reactor, is operating in Japan to demonstrate the feasibility of reaching outlet temperatures of up to 950°C and perform tests for hydrogen production. They have reached 800°C, and they are currently working on steam reforming of methane. The U.S. has shown some interest in a developmental reactor for hydrogen production.

Conclusion

As briefly described here, there is a worldwide resurgence in developing a new generation of power reactors. This is expected to result in safer, more cost-competitive and less- proliferating nuclear electricity.

See the whole article at
http://www.npjonline.com/NPJMain.nsf/504ca249c786e20f85256284006da7ab/9d01c4645e3e35a186256dcf00647d01?OpenDocument

Nuclear Related Conference

ICEM'09 Announces it's ...

12th International Conference on ...

Environmental Remediation and Radioactive Waste Management

Conference Date: October 11-15, 2009
Location: Liverpool, UK
Arena and Convention Centre (ACC), UK
http://www.icemconf.com/ *We look forward to your participation*

Abstract Deadline – December 31, 2008
Author Notification – March 06, 2009

About Our Organization…

The ASME Nuclear Engineering Division focuses on the design, analysis, development, testing, operation and maintenance of reactor systems and components, nuclear fusion, heat transport, nuclear fuels technology and radioactive waste.

AP1000 Passive Reactor Containment Design

The safety systems in the AP1000 are passive, relying on things like gravity and natural recirculation rather than active systems such as pumps. The Passive Core Cooling System (PCCS) is the AP1000's passive analogue to the Emergency Core Cooling System used in currently operating reactors. The PCCS is passive because none of the systems are reliant on AC power and the actuation for the safety systems is automatic. The valves required for alignment are usually fail-safe and are always powered by energy stored in batteries, springs, or compressed gas. Figure 3 presents the passive containment cooling system for the AP1000.
For simulations click on http://www.ap1000.westinghousenuclear.com/ap1000_psrs_pccs.html and http://www.ap1000.westinghousenuclear.com/ap1000_psrs_pcs.html

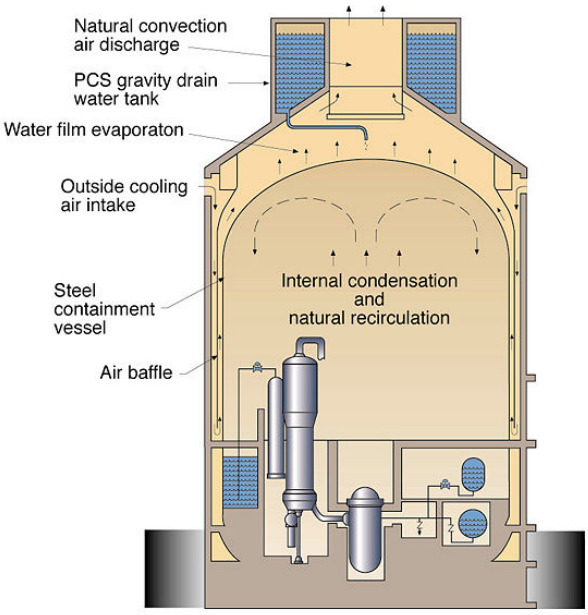


Figure 3. AP600 Passive Containment Cooling System

Category of Reactor Designs

Generation I
These were the prototype commercial reactors of the 1950s and 1960s.

Generation II
These are the reactors deployed in the 1970s and 1980s and currently in commercial use today. In the United States, they include such light-water reactors as the boiling water reactor (BWR) and the pressurized water reactor (PWR), and, in Canada, the CANDU heavy-water reactor.

Generation III
Referred to as advanced-design nuclear power plants, these reactors include the advanced boiling water reactor (ABWR), the System 80+ advanced pressurized water reactor (APWR), and the AP600 passive-design reactor. These designs were developed in the United States and certified by the U.S. Nuclear Regulatory Commission in the 1990s. ABWRs and APWRs have been built and are in operation in other countries around the world.

Generation III+
These are reactors that can be deployed by 2010. They have been under development during the 1990s and are in various stages of design and implementation now. They include the pebble-bed modular reactor (PBMR) and the AP1000. Both have passive safety designs and the PBMR is gas-cooled, two technological features that may foreshadow Generation IV reactors. These designs have not been certified by the U.S. Nuclear Regulatory Commission yet.

Generation IV
Generation IV nuclear reactors are those identified by the Generation IV International Forum, which was initiated by the U.S. Department of Energy and has 10 international member countries. Most Gen IV reactors are in the conceptual or experimental stage and are considered deployable around 2030, provided that appropriate development begin now. The Department of Energy document "Overview of Generation IV Technology Roadmap" from September 2002 contains diagrams of six Gen IV reactors.