High Temperature Gas-cooled Reactor Technology Training Curriculum

Presented by Idaho National Laboratory

July 16-17, 2019

Day 1 – Tuesday July 16, 2019		
Time	**Topic**	**Presenter**
8:30	High Temperature Gas-cooled Reactor: Introduction • Motivation and Applications for HTGRs • High Level HTGR Design and Safety Approach	Hans Gougar
8:50	High Temperature Gas-cooled Reactor: History • Overview: U.S., World Experience (Experimental, Demo, or Commercial) • Evolution of HTGRs • Lessons Learned	Hans Gougar
9:30	*Break*	

9:45	High Temperature Gas-cooled Reactor: Core Design
	• General Attributes of Modular Prismatic and Pebble Bed HTGRs
	  ○ Physics
	  ○ Neutronics
	  ○ Prismatic and Pebble Fuel
	  ○ Thermal-Fluidics
	  ○ Inherent Safety
	• Plant Systems and Power Conversion
	  ○ Reactivity Control
	  ○ Instrumentation and Control
	  ○ Helium Conditioning
	  ○ Power Conversion
	• Normal Operation and Power Maneuvers
		Hans Gougar

11:30	*Lunch*	
12:30	TRISO Fuel: Design, Manufacturing, and Performance • Background and History • Fabrication and Quality Control • Irradiation Performance • Accident Performance • Fuel Performance Modeling	Paul Demkowicz
1:45	Modular High Temperature Gas-cooled Reactor: Safety Design Approach • HTGR Design Criteria • Inherent and Passive Safety • Prevention vs. Mitigation • Radionuclide Sources/Barriers • Residual Heat Removal • Reactivity Control • Reactor Building	Jim Kinsey

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Time	**Topic**	**Presenter**
2:45	*Break*	
3:00	Modular High Temperature Gas-cooled Reactor: Accident Analysis • Types of Potential Accidents • Reactor Response • Safety Analysis Approach • Codes and Tools • Experimental Validation	Hans Gougar
4:00	Modular High Temperature Gas-cooled Reactor: Accident Analysis (continued) • Licensing Modernization Project • Use of PRA in LMP, ASME/ANS Non-LWR PRA Standard • Methods for Incorporating Passive System Reliability into a PRA	Jim Kinsey
5:00	*Adjourn*	

Day 2 – Wednesday July 17, 2019		
Time	**Topic**	**Presenter**
8:30	TRISO Fuel: Mechanistic Source Term • Radionuclide Barriers • Radionuclide Design Criteria • Computational Tools • Source Term Estimation	Paul Demkowicz
9:30	Modular High Temperature Gas-cooled Reactor: Licensing Experience • Past US HTGRs Licensing Approach • Summary of NGNP Experience	Jim Kinsey
10:00	*Break*	
10:15	Modular High Temperature Gas-cooled Reactor: Licensing Experience (cont.) • NRC Regulatory Approach Assessment (Next Generation Nuclear Plant)	Jim Kinsey
11:00	High Temperature Gas-cooled Reactor: Materials • Nuclear Graphite Components • Structural Alloys for HTGR and VHTR Systems • Component Design (Materials and Applications)	Richard Wright
12:00	*Lunch*	
1:00	Group Discussion and Review	Hans Gougar
2:15	Overview and Concluding Remarks	Hans Gougar