

TABLE OF CONTENTS

Foreword	iii	II-5	Tritium Monitoring in the GCFR Sweep Gas Fuel Irradiation Capsule GB-10	54
Welcoming Remarks Harold F. Anderson, <i>General Chairman</i>	v		Uri Gat, M. E. Pruitt and A. W. Longest, <i>ORNL</i> ; B. D. Epstein, <i>GA</i>	
Keynote and Welcome Edward J. Hennelly, <i>President, American Nuclear Society</i>	vii	II-6	Transport of Tritium from GCFR Fuel Bundles Tested in the Helium Loop Mol	60
			R.-J. Campana, <i>GA</i> ; H. Euringer, <i>KFA</i> ; W. Krug, <i>KFA</i> and P. Vanderstraeten, <i>SCK</i>	
ENVIRONMENTAL CONCERNS PART I				
I-1 Estimation of Dose to Man From Environmental Tritium P. S. Rohwer and E. L. Etnier, <i>Oak Ridge National Laboratory</i>	1	II-7	Hydrogen Permeation Resistant Layers for Liquid Metal Reactors	64
			J. C. McGuire, <i>Hanford Engineering Development Laboratory</i>	
I-2 Tritium Dynamics in Vegetables: Experimental Results P. J. Dinner, D. J. Gorman, and F. S. Spencer, <i>Ontario Hydro</i>	9			
I-3 Updating the Tritium Quality Factor—The Argument for Conservatism J. E. Till, E. L. Etnier and H. R. Meyer, <i>Oak Ridge National Laboratory</i>	14	III-1	Hydrogen in Stainless Steels: Isotopic Effects on Mechanical Properties	69
			A. J. West, <i>Sandia National Laboratories, Livermore</i> and D. E. Rawl, <i>Savannah River Laboratory</i>	
I-4 Tritium Conversion and Its Influence on Personnel Protection at a Fusion Reactor C. E. Easterly and J. E. Phillips, <i>Oak Ridge National Laboratory</i>	19	III-2	Helium Embrittlement of Tritium Charged Metals	77
			J. A. Donovan, <i>University of Massachusetts</i>	
I-5 Implications of Uncertainties in Modeling of Tritium Releases From Fusion Reactors S. J. Piet and M. S. Kazimi, <i>Massachusetts Institute of Technology</i>	25	III-3	Atomistics of Tritium and Helium-3 in Metals	78
			C. L. Bisson and W. D. Wilson, <i>Sandia Laboratories, Livermore</i>	
		III-4	Tritium and Helium-3 Release Data from 304L and 21-6-9 Stainless Steels	85
			G. J. Thomas, <i>Sandia Laboratories, Livermore</i> and R. D. Sisson, <i>Virginia Polytechnic Institute</i>	
FISSION REACTORS				
II-1 Tritium Inventory and Release From Core Materials W. R. Yario, <i>S. M. Stoller Corp.</i>	32	III-5	Influence of Thin Silicon Films on Deuterium and Tritium Permeation in Steels	91
			W. A. Swansiger and R. Bastasz, <i>Sandia Laboratories, Livermore</i>	
II-2 Tritium in Fission Reactors Production and Management L. Dolle, B. Houdaille, D. Leger and E. Roth, <i>CEN/SACLAY</i>	39	III-6	Permeation of Tritium Through Aluminum with Oxide Films	98
			R. M. Alire, S. A. Steward, L. Bellamy and C. Griffith, <i>Lawrence Livermore Laboratory</i>	
II-3 A Study of Tritium Control in CANDU Nuclear Power Stations M. A. Maan, N. Anyas-Weiss and F. Loritz, <i>Ontario Hydro</i>	43	III-7	Investigations on Sorption and Diffusion of Tritium in HTGR-Graphite	102
			V. Malka, H. D. Rohrig and R. Hecker, <i>KFA Julich</i>	
II-4 Tritium Permeability of Structural Materials and Surface Effects on Permeation Rates J. T. Bell, J. D. Redman and H. F. Bittner, <i>Oak Ridge National Laboratory</i>	48	III-8	Effects of Time and Temperature on the Retention and Distribution of Helium in Metal Tritides	108
			A. Attalla and R. C. Bowman, Jr., <i>Monsanto Research Corp.</i>	

FUSION REACTORS

IV-1	Fuel Cleanup System for the Tritium Systems Test Assembly: Design and Experiments	115	V-4	Differential Monitoring of Tritium and Carbon-14 Compounds	182
	E. C. Kerr, J. R. Bartlit and R. H. Sherman, <i>Los Alamos Scientific Laboratory</i>			R. W. Goles and F. P. Brauer, <i>Pacific Northwest Laboratory</i>	
IV-2	Feasibility Studies on Exhaust Plasma Processes	119	V-5	Determining Total Tritium Content of Rocky Flats Stack Emissions	186
	B. Pierini; H. Dworschak; B. Spelta, <i>J.R.C., Ispra</i> and C. Rizzello; S. Sansolini and A. Tata, <i>SNIA Techint</i>			J. D. Hurley, <i>Rockwell International</i>	
IV-3	Tritium in the Compact Ignition Experiment (ZEPHYR)	125	V-6	Correlation Between Predicted and Observed Levels of Airborne Tritium at the Lawrence Livermore Laboratory Site Boundary	190
	H. Weichselgartner, <i>Max-Planck-Institut fur Plasmaphysik</i> and W. A. Swansiger, <i>Sandia National Laboratories, Livermore</i>			C. L. Lindeken, W. J. Silver, A. J. Toy and J. H. White, <i>Lawrence Livermore Laboratory</i>	
IV-4	Implications of Tritium in Neutral Beam Injectors	132	V-7	Tritium in the Environment Around the Maxey Flats Radioactive Waste Burial Facility	194
	J. Kim, <i>Oak Ridge National Laboratory</i> and L. D. Stewart, <i>Exxon Nuclear Company</i>			D. G. Draper; R. M. Fry, <i>Commonwealth of Kentucky</i> ; and J. E. Razor, <i>National Waste Management Services</i>	
IV-5	Characteristics of Unburned Tritium Exhaust, Recovery, and Reprocessing Systems in Magnetic and Inertial Confinement Reactors	137	V-8	Reduction of Tritium Concentration in an Aquifer	201
	M. S. Ortman, E. M. Larsen and S. I. Abdel-Khalik, <i>University of Wisconsin</i>			C. E. Styron and H. E. Meyer, <i>Monsanto Research Corp.</i>	
IV-6	A Review of Fusion-Related Experimentation on Blanket/Tritium Processing and Hydrogen Isotope Migration at the Argonne National Laboratory	144	POSTER SESSION		
	E. H. Van Deventer, J. R. Weston, R. W. Peterman, R. G. Clemmer, E. Veleckis and V. A. Maroni, <i>Argonne National Laboratory</i>		VI-1	1, 4-Diphenylbutadiyne as a Potential Tritium Getter	208
IV-7	Design of Tritium Breeding Experiments for the Tokamak Fusion Test Reactor (TFTR)	150		H. H. Miller, E. R. Bissell, R. T. Tsugawa and P. C. Souers, <i>Lawrence Livermore Laboratory</i>	
	D. L. Jassby, <i>Princeton Plasma Physics Laboratory</i> ; C. S. Caldwell; R. H. Lewis; W. G. Pettus; J. K. Schmotzer; T. A. Thornton; F. G. Welfare and R. E. Womack, <i>Babcock & Wilcox Co.</i>		VI-2	Kinetics of Catalyzed Tritium Oxidation in Air at Ambient Temperature	213
IV-8	Tritium Implications of Advanced-Fuel Fusion Cycles	156		A. E. Sherwood, <i>Lawrence Livermore Laboratory</i>	
	G. H. Miley, <i>University of Illinois</i>		VI-3	Effects of Tritium on Electron Multiplier Performance	219

ENVIRONMENTAL CONCERN PART 2

V-1	Estimated Radiation Dose from Timepieces Containing Tritium	163	VI-6	Design Study of Fuel Circulating System Using Pd-Alloy Membrane Isotope Separation Method	233
	L. M. McDowell-Boyer, <i>Oak Ridge National Laboratory</i>			T. Naito, T. Yamada, T. Yamanaka, T. Aizawa, M. Nishikawa, T. Kasahara and N. Asami, <i>Mitsubishi Atomic Power Ind., Inc., and Mitsubishi Heavy Ind. Ltd.</i>	
V-2	Developments in Tritium Monitoring	169	VI-7	Isotopic Analysis of Hydrogen-Helium Mixtures	240
	R. G. C. McElroy and R. V. Osborne, <i>Chalk River, Atomic Energy of Canada Limited</i>			R. E. Ellefson, <i>Monsanto Research Corp.</i>	
V-3	Mound Operational Experience with Tritium Differentiating Ethylene Glycol Air Samplers	175	VI-8	HT/HTO MPC Detector Response Under Field Conditions	245
	W. E. Sheehan and D. C. Carter, <i>Monsanto Research Corp.</i>			S. Hoots and P. Barry, <i>Lawrence Livermore Laboratory</i>	

VI-9	An Ionization Chamber for Measurements of High-Level Tritium Gas D. H. W. Carstens and W. R. David, <i>Los Alamos Scientific Laboratory</i>	251	VI-23	Design Options for Improving Tritium Control at CANDU Nuclear Generating Stations R. Isles, C. Cringan and F. H. Wu, <i>Ontario Hydro</i>	323
VI-10	Pressure Surge Limiting Valve for Vacuum Pump Inlet Piping R. P. Wurstner, <i>Monsanto Research Corp.</i>	254	VI-24	Tritium Surface Contamination—The Special Problem G. D. Whitlock, <i>Hughes Whitlock, Ltd.</i>	330
VI-11	A Conceptual Design of Tritium Handling Facility Y. Naruse, K. Tanaka, L. Tachikawa, Y. Matsuda, M. Kinoshita and Y. Obata, <i>Japan Atomic Energy Research Institute</i>	257	INVENTORY CONTROL		
VI-12	Magnetic Drive Vane Pump F. C. Capuder, J. Reed and L. Quigley, <i>Monsanto Research Corp.</i>	264	VII-1	Tritium Practices—Past and Present V. P. Gede, <i>Lawrence Livermore Laboratory</i> and P. D. Gildea, <i>Sandia National Laboratories, Livermore</i>	334
VI-13	RTNS-II Tritium Scrubber Design and Performance B. Schumacher, <i>Lawrence Livermore Laboratory</i>	267	VII-2	Design and Construction of the Tritium Systems Test Assembly J. L. Anderson, <i>Los Alamos Scientific Laboratory</i>	341
VI-14	A Tritium Monitoring System Using a Modified Kanne Chamber for Use in Tritium Contaminating Environments D. F. Anderson and R. D. Hiebert, <i>Los Alamos Scientific Laboratory</i>	274	VII-3	Performance and Improvements of the Tritium Handling Facility at Los Alamos Scientific Laboratory J. E. Nasise, <i>Los Alamos Scientific Laboratory</i>	347
VI-15	Valves and Tritium Generators (U-Beds) for TSDS F. C. Capuder, R. L. Reece, R. L. Stephenson, W. A. Slusher and W. R. Wilkes, <i>Monsanto Research Corp.</i>	278	VII-4	Tritium Storage and Delivery System for the Tokamak Fusion Test Reactor H. Phillips, L. Yemin, N. Youssef, <i>Ebasco Services, Inc.</i> ; C. Pierce, <i>PPPL</i> and R. Watkins, W. Wilkes and J. Gill, <i>Monsanto Research Corp.</i>	353
VI-16	Computer Control of the TFTR Tritium Storage and Delivery System N. Youssef; H. Phillips; L. Yemin, <i>Ebasco Services, Inc.</i> and J. Dong and C. Pierce, <i>PPPL</i>	281	VII-5	Control System for Sandia National Laboratories Vacuum Effluent Recovery System W. R. Wall, R. D. Ristau and P. D. Gildea, <i>Sandia National Laboratories, Livermore</i>	360
VI-17	Tritium Recovery from Solid Breeders: Implications of the Existing Data K. R. Okula and D. K. Sze, <i>University of Wisconsin</i>	286	VII-6	Development of Tritium Production Technology in Nuclear Fusion Research Program of Japan T. Abe, K. Yamaguchi, H. Kudo, M. Tanase, E. Shikata, H. Umei, K. Tachikawa and K. Tanaka, <i>Japan Atomic Energy Research Institute</i>	367
VI-18	Preliminary Analysis of the Safety and Environmental Impact of the Tritium Systems Test Assembly R. V. Carlson and R. A. Jalbert, <i>Los Alamos Scientific Laboratory</i>	293	VII-7	Tritium Experience at RTNS-II C. M. Logan, J. C. Davis, T. A. Gibson, D. W. Heikkinen, B. J. Schumacher and M. S. Singh, <i>Lawrence Livermore Laboratory</i>	372
VI-19	Safety Related Tritium Research Required to Support Commercial Fusion Power Reactors K. E. Lind; J. D. Levine; J. J. Mauro and L. Yemin, <i>Ebasco Services, Inc.</i> and H. J. Howe and C. W. Pierce, <i>Princeton Plasma Physics Laboratory</i>	299	VII-8	Design of a Demonstration Tritium Recovery Plant for Chalk River T. E. Harrison, <i>Atomic Energy of Canada Limited</i>	377
VI-20	Tritium Cleanup Systems for TFTR L. Yemin and R. Rossmassler, <i>Ebasco Services, Inc.</i>	304	VII-9	An Analysis of Experimental Air Detritiation Data Using TSOAK-M1 R. H. Land, M. Minkoff and V. A. Maroni, <i>Argonne National Laboratory</i>	381
VI-21	Tritium Management in Fusion Synfuel Designs T. R. Galloway, <i>Lawrence Livermore Laboratory</i>	308	RESEARCH APPLICATIONS		
VI-22	Tritium in Fusion Reactor Components J. S. Watson, P. W. Fisher and J. B. Talbot, <i>Oak Ridge National Laboratory</i>	319	VIII-1	Recent Research on Cryogenic Deuterium-Tritium P. C. Souers, E. M. Fearon, R. L. Stark and R. T. Tsugawa, <i>Lawrence Livermore Laboratory</i>	387

VIII-2	Environmental Tritium Applications to Atmospheric and Oceanographic Research A. S. Mason and H. G. Ostlund, <i>University of Miami</i>	392	VIII-7	Recovery of Tritium From Aqueous Waste Using Combined Electrolysis Catalytic Exchange T. K. Mills, R. E. Ellis and M. L. Rogers, <i>Monsanto Research Corp.</i>	422
VIII-3	Separation of Hydrogen Isotope by Pd-Alloy Membrane Y. Izumoji, Y. Tsuzuki and Y. Osawa, <i>Mitsubishi Atomic Power Ind., Inc.</i>	397	VIII-8	Tritium Transfer Process Using the CRNL Wetproof Catalyst K. T. Chuang and W. J. Holtslander, <i>Atomic Energy of Canada Limited</i>	425
VIII-4	Catalytic Oxidation of Tritium—Effect of Isotopic Swamping S. Tanaka and R. Kiyose, <i>University of Tokyo</i>	404	VIII-9	Tritium Isotope Separation from Light and Heavy Water by Bipolar Electrolysis M. Petek, D. W. Ramey, R. D. Taylor and E. H. Kobisk, <i>Oak Ridge National Laboratory</i>	429
VIII-5	The ELEX Process for Tritium Separation from Aqueous Effluents A. Bruggeman, W. Doyen, R. Leysen, L. Meynendonckx, M. Monsecour and W. R. A. Goossens, <i>Studiecentrum Voor Kernenergie, MOL</i>	411		Author Index	435
VIII-6	Tritium Removal by Hydrogen Isotopic Exchange Between Hydrogen Gas and Water on Hydrophobic Catalyst T. Morishita, H. Izawa, S. Isomura and R. Nakane, <i>Inst. Phys. & Chem. Res., Saitama, Japan</i>	415		List of Attendees	437

