

**-The 4th Sodium Handling Technology Training Course's Curriculum-
-Nuclear Researchers Exchange Program in 2006-**

Week-1

9/5(TUE)			
AM	8:30-12:00	✓ Arriving Tsuruga, then move to Kushikawa company housing	Mr. Uchida, Mr. Hattori (and Ms. Ishimaru) will meet you at Kushikawa company housing.
PM	13:00-17:00	✓ Guidance of the Kushikawa Apartment ✓ Moving-in Procedure for the apartment ✓ Guidance of Tsuruga City Y. Hattori *1	Mr. Hattori (and Ishimaru) will take care.

9/6 (WED)		Training Items	Training Contents
AM	9:00-12:00	✓ Orientation of the Course ✓ Tour to MC square (Monju Exhibition Hall) M. Sawada *2	Curriculum of the Course Several Formalities for Entering to Monju About Making of Official Training Report
PM	13:10-16:45	<Sight Tour> ✓ Monju Tour (FBR Plant) I Shibahara *3	Monju Plant (Operation Floor inside in C/V, Central Control Room, etc.) In-Service Inspection Facility
	18:00-	✓ Welcome Party	*At the Kushikawa Guest House

*1: Staff of International Training Information Section at INITC

*2: General Manager of International Training Information Section at INITC

*3: Technical Public Relations of INITC

9/7 (THU)		Training Items	Training Contents
AM	9:00-12:00	<Lecture> ✓ Basic Knowledge about Sodium M. Sawada	-Chemical and Physical Properties of Sodium -Feature of Sodium Combustion and Effect to the body by Sodium Aerosol -Caution on Sodium Fire Extinguish -Reason for Using Sodium as a Coolant of FBR

PM	13:00-17:00	<Exercise> Measurement of Sodium Physical Properties A. Miyamoto *4	5 kinds of Sodium Physical Properties Density Melting Point & Specific Heat (measuring at the same time) Dynamic Viscosity and Surface Tension
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*4: Staff of Training Section (INITC)

9/8 (FRI)		Training Items	Training Contents
AM	9:00-12:00	<Lecture> ✓ Design and Feature of FBR Plant System ✓ Design and Feature of FBR Reactor Core Y. Matsuno *5	-Comparison between FBR and LWR on Plant System Design and its specifications -Comparison between FBR and LWR on Core Design and its specifications
PM	13:00-17:00	<Lecture> ✓ Design and Feature of Sodium Components for Monju M. Kamei *6	-Design Feature of Heat Transfer System -Design Feature of Main Sodium Components Reactor Vessel Mechanical Pump Intermediate Heat Exchanger Steam Generator

*5: Former Director of PNC

*6: Former Director of PNC

Week-2

9/11 (MON)		Training Items	Training Contents
	9:00-9:20	<Opening Ceremony> ✓ Opening ceremony for lecture at the Wakasa-wan Energy Research Center *	*Suburb of Tsuruga City
AM	09:30-12:30	<Special Lecture> ✓ Attendance to the Educational Seminar * *Special Speech by Dr. Bouchard **: Nuclear Energy Development turned to the Future Society -Trend in the World- *Special Speech by Dr. Machi ***: Nuclear Energy Policy in Japan	*Seminar: "Tsuruga Nuclear Summer College" **Special Advisor of CEA (France) ***Commissioner of AEC ****Head of Fukui Energy Research & Development Centralization project Office

		*Special Speech by Mr. Kuruba**** History of Nuclear Public Administration in Fukui Prefecture-Symbiosis between Nuclear Power and Local-	
PM	13:30-14:15	<Special Event> ✓ Site Tour of the Wakasa-wan Energy Research Center	-Various Science Devices, Cyclotron, etc.
	14:20-15:00 15:00-18:20	✓ Orientation ✓ Participating to the debate with Japanese students *, Conclusion and Result of Presentation	-Explanation of “Tsuruga Summer Institute on Nuclear Energy 2006”, Self-Introduction and Making 7 Groups for the Discussion, etc *One of the event of the Tsuruga Nuclear Summer College

* Joint to the welcome party of Tsuruga Nuclear Summer College from 19:00 at the Kushikawa Guest House

9/12 (TUE)		Training Items	Training Contents
AM	9:00-12:00	<Exercise> ✓ Sodium Fire Extinguishing T. Watanabe *7 & K. Hamano *8	-Wearing of Sodium Safety Suits and Oxygen Inhalation -Visibility under Sodium Aerosol Environment -Demonstration of Sodium Fire Fighting by Using General Extinguisher
PM	13:00-15:00	<Exercise-1> ✓ Chemical Reaction ✓ Waste Treatment of Sodium Compound T. Watanabe & K. Hamano	-Observation of Sodium Chemical Reaction between Sodium and Water under 2 cases (Air and Nitrogen Gas Atmosphere) -Observation of Chemical Reaction between Sodium and Insulator -Water & Steam Cleaning -Clean Up Field
	15:10-17:00	<Exercise-2> ✓ Preliminary preparation for Sodium Loop Operation T. Watanabe & K. Hamano	-Learn of Outline of Sodium Loop System's Configuration -Learn of Outline of Sodium Loop Operation Control System

*7: Team Leader for Maintenance Training Team of Training Section (INITC)

*8: Staff of Training Section (INITC)

9/13 (WED)		Training Items	Training Contents
AM	9:00-12:00	<Exercise> ✓ Sodium Loop Operation (Preheating) T. Watanabe & K. Hamano	-Preheating Operation used Control System -Confirmation of Preheating Data -Discussion for Charging Operation by Trainee

PM	13:00-17:00	<u><Exercise></u> ✓ Sodium Loop Operation (Sodium Charge) ✓ Sodium Loop Operation (Sodium Drain) T. Watanabe & K. Hamano	-Gas Pressure Control -Charging Valves Operation -Draining Valves Operation -Confirmation of Sodium Draining Circuit by Gas Pressure
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9/14 (THU)		Training Items	Training Contents
AM	9:00-12:00	<u><Lecture></u> ✓ Sodium Corrosion Mechanism & Sodium Purification Control in Monju M. Sawada	-Material Corrosion Mechanism by Sodium -Measurement Theory of Plugging Meter -Control of Impurity in the Reactor Plant
PM	13:00-17:00	<u><Exercise></u> ✓ Sodium Loop Operation (Sodium Purification) T. Watanabe & K. Hamano	-Measurement Impurities in Sodium Loop used Plugging Meter -Charging & Draining Sodium Operation

9/15 (FRI)		Training Items	Training Contents
AM	9:00-10:30	<u><Making Report></u> ✓ Free time for Making of Report	
PM	11:30-12:30	<u><Special Lecture></u> ✓ Attendance to the Educational Seminar * Personnel Development for Nuclear Engineers in France Ms. Romanetti **:	*Seminar: "Tsuruga Nuclear Summer College" **International Contact Person of INSTN (Institute National of Technology Nuclear), CEA (France)
	13:30-15:10	<u><Special Lecture></u> ✓ Attendance to the Educational Seminar * Development Program on Innovative Reactors (GEN-4) Dr. C. Latge **	*Seminar: "Tsuruga Nuclear Summer College" **Research Director of Cadarache, CEA (France)

Week-3

9/19 (TUE)		Training Items	Training Contents
AM	9:00-10:00	<Lecture-1> ✓ Fundamental Knowledge on Sodium Handling Working M. Sawada	(Lecture-1) -Mechanism of Sodium Spontaneous Ignition -Caution Matters on Sodium Handling Working -Accident Examples on Sodium Handling Working
	10:10-12:00	<Lecture-2> ✓ Cleaning and Repairing Technologies S. Raboin	(Lecture-2) -Cleaning Methods -Approach to Hydrogen Risks
PM	13:00-17:00	<Exercise> ✓ Sodium Handling Working ✓ Demonstration of Accident Example K. Ozawa & K. Hamano	-Observation of Sodium Spontaneous Ignition -Wiping or Removing Sodium on or inside of Complicated Structure -Confirmation dangerousness in the case of Treatment for filled Sodium inside Small Piping by Alcohol Cleaning

*9/18 is a national holiday.

9/20 (WED)		Training Items	Training Contents
AM	9:00-12:00	<Exercise> ✓ Sodium Boundary Open Working T. Watanabe	-Working Procedure Open of Vapor Trap (V/T) in Sodium Loop under Inert Gas Atmosphere -Making Boundary by Using Vinyl Bag
PM	13:00-17:00	<Exercise> ✓ Sodium Boundary Open Working T. Watanabe	-Open Boundary and Take Out V/T -Cleaning Up of V/T -Restoration to the former condition

9/21 (THU)		Training Items	Training Contents
AM	9:00-12:00	<Lecture> ✓ Introduction of Monju Heat Transfer System ✓ Outline of Monju Start Up & Shutdown Operation N. Koyagoshi*9	-Introduction of Heat Transfer System's Operation -Transition of Plant State During Start Up Operation

PM	13:00-17:00	<u><Exercise></u> ✓ Outline of Monju Simulator ✓ Simulator Operation for Monju Start Up N. Koyagoshi	-Introduction Monju Simulator System -Simulator Operation Procedure -Critical Operation -Start Up Operation of Turbine Generator -Connecting Operation to Electrical Grid
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*9: Team Leader for Operation Training Team of Training Section (INITC)

9/22 (FRI)		Training Items	Training Contents
AM	9:00-12:00	<u><Exercise></u> ✓ Simulator Operation for Monju Power Up N. Koyagoshi	-Automatically Operation Mode -Start Up of Main Water Charging Pump -Plant Control System
PM	13:00-17:00	<u><Exercise></u> ✓ Simulator Operation under Abnormal Condition N. Koyagoshi	-Reactor Trip by Manual -Sodium Leak in Primary System -Sodium Leak in Secondary System -Heat Pipe Rapture in Steam Generator -Loss of Electric Power

Week-4

9/25 (MON)		Training Items	Training Contents
AM	9:00-17:00	✓ Courtesy Visit to the Fukui Prefecture ✓ Courtesy Visit to the Tsuruga Mayor	The researchers joined to Fugen will also participate the visiting.
PM			

9/26 (TUE)		Training Items	Training Contents
AM	9:00-12:00	<u><Exercise></u> ✓ Overhaul Working for Sodium Pump's Mechanical Seal Part J. Otsuka, T. Uesugi, Maeda *10	-Dismantling Procedure for Monju Secondary Pump's Mechanical Seal Part -Setting Up of Maintenance Machine
PM	13:00-17:00	<u><Exercise></u> ✓ Dismantling Working J. Otsuka, T. Uesugi, Maeda	-Dismantling Working of Pump's Mechanical Seal Part

*10: Staffs of Training Section (INITC)

9/27 (WED)		Training Items	Training Contents
AM	9:00-12:00	<p><Exercise> ✓ Assembling Working J. Otsuka, T. Uesugi, Maeda</p>	- Assembling Procedure for Pump's Mechanical Seal Part -Assembling Working Pump's Mechanical Seal Part
PM	13:00-17:00	<p><Exercise> ✓ Assembling Working J. Otsuka, T. Uesugi, Maeda</p>	-Assembling Working (Continue) -Restoration Working -Data Check Centering Data Clearance Data Pump Rotating Check, etc.

9/28 (THU)		Training Items	Training Contents
AM	9:00-12:00	<p><Lecture> ✓ Monju Sodium Leakage Accident and Its Safety Measures M. Sawada</p>	-Outline of Monju Accident -Cause of Monju Accident and Its Safety Measures -Corrosion Mechanism of Steel Plate by Leaked Sodium Sodium-Iron Double Oxidization Type & Molten Salt Type Corrosion
PM	13:00-17:00	<p><Exercise> ✓ Demonstration of Sodium Piping Leakage T. Watanabe</p>	-Melting Sodium in the Special Sodium Tank -Confirmation of Preheating Data of Imitation Sodium Leakage Piping -Observation of Sodium Leakage Phenomenon from Piping

9/29 (FRI)		Training Items	Training Contents
AM	9:00-12:00	<p><Exercise> ✓ Dismantling of Leaked Piping T. Watanabe</p>	-Treatment of Leaked Piping -Observation of Bonded Sodium inside Piping Insulator
PM	13:00-17:00	<p><Sight Tour> ✓ Tour to LWR Plant</p>	Ooi Power Reactor Plant Visitor Center (Kansai Electric Company)

Week-5

10/1 (SUN)			
PM		<ul style="list-style-type: none"> ✓ Business Trip to Oarai Development Research Center (ORC) 	Move to Ibaraki Prefecture (about 100m far from Tokyo) Stay at Asahi Guest House in ORC (Sawada will escort)

10/2 (MON)		Training Items	Training Contents
AM	9:00-12:00	<Lecture> ✓ Sodium Boundary Open Working on JOYO MK-3 Reconstruction Project	((JOYO: Experimental Fast Reactor) -Secondary Main Piping Cutting -Main Dump Heat Exchanger -Safety Measure & Caution Points during Construction Working
PM	13:00-17:00	<Exercise> ✓ Field Survey	-JOYO Plant System -Secondary Main Piping Cutting Parts -Main Dump Heat Exchanger Parts, etc.

10/3 (TUE)		Training Items	Training Contents
AM	9:00-12:00	<Lecture & Exercise> ✓ R&D Discussion for Advanced Sodium Technologies with ORC Sodium Engineers	-Radioactive Sodium Treatment Technology (Basic Testing for Sodium Conversion) -Material Testing for Alloy Soaked in Sodium
PM	13:00-17:00	✓ R&D Discussion for HTTR (Hot Technology Testing Reactor) ✓ Leave from Oarai	-Comparison between Gas and Liquid Metal Coolant Return Back to Tsuruga

10/4 (WED)		Training Items	Training Contents
AM	9:00-12:00	<Discussion> ✓ Present Situation and Future Program of Monju H. Maeda *11	-Free Talk about Monju Project and Its Future Plan
PM	13:00-17:00	<Exercise> ✓ Demonstration of Chemical Reaction between Sodium and Concrete T. Watanabe	-Observation of Chemical Reaction Phenomenon from between Sodium and Concrete -Observation of Sodium Chemical Compounds produced by Reaction with Concrete (Confirmation of Erosion Situation by another Experiment)

10/5 (THU)		Training Items	Training Contents
AM	9:00-12:00	<u><Exercise></u> ✓ Observation of Produced Sodium Compounds ✓ Waste Treatment of Sodium Compounds T. Watanabe <u><Making Report></u> ✓ Making Report	-Confirmation of Erosion State on Concrete Surface -Water & Steam Cleaning Making Report
PM	13:00-17:00	<u><Making Report></u> ✓ Making Report ✓ Clean Up Apartment Room & Checking by JAEA	Making Report Issue Diploma
10/6 (FRI)		✓ Leaving from Tsuruga	Back to China from Kansai Airport