-Table-1 Training Curriculum of Sodium Handling Technology (Draft)-

Week-1: [Basic Knowledge of Sodium & Sodium Handling Exercise]

9/27	(MON)	Training Items	Training Contents
AM	9:30-10:10	-Opening Session and Introduction -Training Orientation	
	10:10-12:00	Outline of Prototype FBR Monju T. Aoki	 Current Status of FBR Development in Japan Feature of FBR Heat Transfer System Main Plant Specifications
PM	13:10-13:50	Visit to Monju Exhibition Hall T. Aoki	
	14:00-15:10	Visit to Monju Plant T. Aoki	Overview of Monju Center Control Room Sodium Leakage Accident Occurred Place (Secondary Cooling System)
	15:20-16:00	Visit to ISI Facility T. Aoki	ISI: In-Service Inspection
	16:10-17:00	Visit to Sodium Handling Training Facility & Maintenance Training Faculty T. Aoki	Cutting Sodium Observation of Small Sodium Combustion (~5 g) Overview of Cut Model of Sodium Equipment, etc.
	18:00-20:00	Reception (at the Kushikawa Guest House)	(Welcome Party)

9/28 (TUE)		Training Items	Training Contents
AM	9:00-12:00	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 of Using Sodium as a FBR Coolant
PM	13:00-17:00	*Exercise Measurement of Sodium Physical Properties K. Ozawa & A. Miyamoto	-5 kinds of Sodium Physical Properties Density Melting Point/Specific Heat Dynamic Viscosity Surface Tension

9/29 (WED)		Training Items	Training Contents
AM	9:00-12:00	*Exercise Sodium Fire Extinguishing T. Watanabe & K. Ozawa	 -Learning of "How to use Sodium Extinguisher?" -Wearing of Sodium Safety Suits and Oxygen Inhalation -Visibility under Sodium Aerosol Environment -Sodium Fire Extinguishing -Confirmation of Dangerousness when using General Extinguisher for Sodium Fire Extinguishing
PM	13:00-17:00	*Exercise Treatment of Sodium Chemical Compounds T. Watanabe & K. Ozawa	 -Treatment of Sodium Chemical Compounds -Observation of Sodium Combustion under Nitrogen Gas Atmosphere -Confirmation of Combustible of Sodium Safety Suits when burned Sodium Sticking on

9/30 (THU)		Training Items	Training Contents
AM	9:00-12:00	Fundamental Knowledge on Sodium Handling Working M. Sawada	-Mechanism of Sodium Spontaneous Ignition -Caution Matters on Sodium Handling Working - Accident Examples on Sodium Handling Working
PM	13:00-17:00	*Exercise -Sodium Handling Working -Chemical Reaction between Sodium and Water -Chemical Reaction between Na and Insulator -Demonstration of Accident Case T. Watanabe & K. Ozawa	 Observation of Sodium Spontaneous Ignition Phenomenon Wiping or Removing Sodium on or inside of Complicated Structure Treatment of Sodium Chemical Compounds Observation of Chemical Reaction between Sodium and Water under 2 cases (Air and Nitrogen Gas Atmosphere) Observation of Chemical Reaction between Sodium and Insulator Confirmation of Dangerousness in the case of Treatment Small Piping inside filled Sodium by Alcohol Cleaning

10/1 (FRI)		Training Items	Training Contents
AM	9:00-12:00	Design and Feature of FBR Plant System Y. Matsuno	 Comparison between FBR and LWR for Plant system and its specifications Loop Type Design Features of Main FBR Systems Structural Analysis Method of Sodium Components (Feature of Structural Design for High Temperature) FBR Instrumentation System
PM	13:00-14:30	World FBR Information H. Oshita	Current Status FBR Development and its Operation in the World Example of Various kinds of FBR Accidents

Week-2: [Sodium Loop Operation]

10/4 (MON)		Training Items	Training Contents
AM	9:00-12:00	*Preparation for Exercise Sodium Loop Operation Procedure T. Watanabe	-Learning of Sodium Loop in the Sodium Training Facility -Learning of Sodium Loop Control System -Field Check (Location of Sodium Components, Valves and Instruments)
РМ	13:00-17:00	*Exercise -Preheating Operation -Study for "How to charge sodium into the loop?" T. Watanabe	-Preheating Operation used Control System -Confirmation of Preheating Data -Discussing about Charging Operation by trainees

10/5 ((TUE)	Training Items	Training Contents
AM	9:00-10:30	 Special Lecture(1) by France and Japan Sodium School Instructors F. Baque (France Sodium School) G. Rodriguez (") M. Sawada 	 Topics Experienced on Sodium Handling Technology in France Sodium School (by Mr. Baque) Important Notices regarding on Operation Technology of Sodium Loop (by Mr. Rodriguez) Trouble Examples Experienced on Operation Technology of Sodium Loop in JAPAN (by M. Sawada)
PM	13:00-14:00	*Study (How to Operate for Sodium Charging) T. Watanabe F. Baque & G. Rodriguez (France School)	-Group Discussion for Sodium Charging Operation
	14:00-16:00	*Exercise Sodium Charging Operation T. Watanabe F. Baque & G. Rodriguez (France School)	Gas and Sodium Valves Operation & EMP Starting Operation Confirmation of Sodium Charged Level Confirmation of Sodium Loop Data (Temp., Flow Rate, Pressure)
	16:00-17:00	*Exercise Sodium Draining Operation T. Watanabe F. Baque & G. Rodriguez (France School)	Gas and Sodium Valves Operation & EMP Stopping Operation Confirmation of Sodium Tank Level Confirmation of Completing Sodium Draining trough Gas Flow State

10/6 (WED)		Training Items	Training Contents
AM	9:00-12:00	 Special Lecture(2) by France and Japan Sodium School Instructors F. Baque (France Sodium School) G. Rodriguez (") M. Sawada 	(Content is now under Considering)
PM	13:00-16:00	*Exercise Sodium Sampling Operation T. Watanabe	-Sodium Charging Operation -Removing and Setting Up of Sodium Sampling Tube
	16:00-17:00	Sodium Draining Operation T. Watanabe	-Sodium Draining Operation

10/7 (THU)		Training Items	Training Contents
AM	9:00-12:00	Sodium Corrosion Mechanism & Sodium Purification Control M. Sawada	-Material Corrosion Mechanism by Sodium -Measurement Theory of Plugging Meter -Control of Impurity in the Reactor Plant
PM	13:00-16:00	*Exercise Sodium Purification System Operation T. Watanabe	-Sodium Charging Operation -Operation of Plugging Meter
	16:00-17:00	Sodium Draining Operation T. Watanabe	-Sodium Draining Operation

*10/8 is a holiday as birthday of JNC and 10/11 is also a national holiday.

Week-3: [Sodium Piping Leakage and Sodium Boundary Open Working]

10/12 (TUE)		Training Items	Training Contents
АМ	9:00-11:00	Preheating Operation T. Watanabe	-Preheating Operation
	11:00-12:00	Sodium Charging Operation T. Watanabe	-Sodium Charging Operation
PM	13:00-14:30	Preparing Operation for Sodium Piping Leakage T. Watanabe	-Valve Check of Sodium and Gas line -Confirmation of Preheating Data of Imitation Sodium Leakage Piping
	14:30-15:00	*Exercise Sodium Piping Leakage M. Sawada & T. Watanabe	-Observation of Sodium Leakage Phenomenon from Piping
	15:00-17:00	Clear Field & Sodium Draining Operation T. Watanabe	-Clear Away of Field - Sodium Draining Operation

10/13 (WED)		Training Items	Training Contents
AM	9:00-12:00	*Exercise Dismantling of Leaked Piping and Cleaning Up and Treatment of Sodium Chemical Compounds T. Watanabe	-Experience of Dismantling Working of Leaked Piping -Observation of Adhesion State of leaked Sodium inside Piping Insulator -Treatment Working of Sodium Chemical Compounds
PM	13:00-15:30	Monju Sodium Leakage Accident and Its Safety Measures M. Sawada	-Outline of Monju Accident -Cause of Monju Accident and Safety Measures for Preparation of Future Operation
	15:40-17:00	(Continue) M. Sawada	-Corrosion Mechanism of Steel Plate by Leaked Sodium Sodium-Iron Double Oxidization Type Corrosion Molten Salt Type Corrosion

10/14 (THU)		Training Items	Training Contents
AM	9:00-12:00	*Exercise Sodium Boundary Open Working T. Watanabe	-Explanation of Working Procedure Manual Open for Lid of Testing Tank in Sodium Loop under Inert Gas Atmosphere
PM	13:00-17:00	*Exercise Restoring Working T. Watanabe	-Return to the former condition

10/15 (FRI)		Training Items	Training Contents
AM	9:00-12:00	Basic Knowledge on Sodium Heat Transfer and Flow	-Fundamental Law of Heat Transfer -Heat Transfer Characteristic for Heat Exchanger -Heat Transfer Calculating Equation
PM	13:00-17:00	(continue) M. Sawada	-Natural Circulation in FBR (JOYO Natural Circulation Testing) -Fluid Pressure Loss -Various Properties of Sodium as Coolant

Week-4: [Chemical Reaction Sodium-Concrete, Overhaul Sodium Pump Seal & Simulator Operation]

10/18 (MON)		Training Items	Training Contents
AM	9:00-12:00	Preparation for Reaction Experiment Between Sodium and Concrete T. Watanabe	-Preheating Operation
	13:00-14:30	(Continue)	-Charging Sodium Operation
РМ	14:30-15:30	*Exercise Chemical Reaction Experiment Between Sodium and Concrete M. Sawada & T. Watanabe	 Observation of Chemical Reaction Phenomenon Between Sodium and Concrete Observation of Sodium Chemical Compounds produced by Reaction with Concrete (Confirmation of Erosion Situation by another Experiment)
	15:30-17:00	Clear Field & Sodium Draining Operation T. Watanabe	-Clear Away of Field - Sodium Draining Operation

10/19 (TUE)		Training Items	Training Contents
AM	10:10-12:00	Design and Feature of Sodium Components M. Kamei	-Design Feature of Main Sodium Components -Design Feature and Structure of Mechanical Sodium Pump -Structure of Its Mechanical Seal Part
РМ	13:00-17:00	*Exercise Overhaul Working for Sodium Pump's Mechanical Seal Part (Dismantling Working) J. Ootsuka & T. Uesugi	-Dismantle Working Procedure of Mechanical Seal Part -Setting Up of Maintenance Machine -Dismantling Working

10/20 (WED)		Training Items	Training Contents
AM	9:00-12:00	*Exercise Overhaul Working for Sodium Pump's Mechanical Seal Part (Assembling Working) J. Ootsuka & T. Uesugi	-Assembling Working Procedure of Mechanical Seal Part -Assembling Working
PM	13:00-17:00	(Continue) J. Ootsuka & T. Uesugi	-Restoration Working -Data Check after finished Overhaul Working Centering Data Clearance Data Pump Rotating Check, etc.

10/21 (THU)		Training Items	Training Contents
AM	9:00-12:00	Reactivity Control on FBR Operation	-Reactivity Control on FBR Operation (Comparison with LWR)
		A. Kitano	-Various Feedback Relativities of FBR
PM	13:00-17:00	*Exercise Operation of Monju Training Simulator for Normal Operation Mode N. Koyakoshi	-Summary of Monju Training Simulator System - Operation of Training Simulator Operations on Critical, Power Up and Connecting Turbine

10/22 (FRI)		Training Items	Training Contents
AM	9:00-12:00	*Exercise Continue Operation of Training Simulator for Abnormal Operation Mode N. Koyakoshi	 Operation of Training Simulator System Operations under Secondary Sodium Leakage, SG Tube Broken, Lost of External Power, etc.
РМ	13:00-17:00	Question and Answer (Discussion) Making Report M. Sawada	

Week-5: [Tour to JOYO (FR) , Takahama Power Station (PWR) and Hugen (ATR)]

	Moving to OEC (Oarai Engineering Center, JNC)	
10/24 (SUN)	M. Sawada & C. Minami	Stay Guest House of OEC, in Ibaraki

10/25 (MON)			
AM	9:00-10:50	Visit to Experimental Fast Reactor JOYO	-Field Trip in JOYO
		M. Sawada & C. Minami	-Discussion with Director of JOYO
	11:00-12:00	Visit to Development Facility for Sodium Treatment	Take Lunch with Head of OEC
		M. Sawada & C. Minami	Take Lunch with Head of OEC
PM	13:00	Leaving Center	Return back to Tsuruga

10/26 (TUE)			
AM	9:00-17:00	Visit to Takahama Power Station (PWR)	-Takahama Power Station Visitor Hall of Kansai Electric Company (in
/PM		M. Sawada & C. Minami	Fukui)

10/27 (WED)			
AM /PM	9:00-17:00	Visit to Hugen Power Station (ATR) M. Sawada & C. Minami	-Decommissioning Scheme of Hugen
/1 101	18.00-20.00	Persontian (at the Kushikawa Cuest House)	(Farewell Party)
	18.00-20.00	Reception (at the Rushikawa Guest House)	(ratework rate)

10/28 (THU)		
АЪЛ	0.00-11.00	Greeting to Head Quarter Office & Monju
AM	9.00-11.00	M. Sawada
ЪМ		Leaving Tsuruga
PW		M. Sawada & C. Minami