SAFETY TRIP REPORT

ON US-JAPAN EXCHANGE PROGRAM

(FuY 2005)

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Report on 2006 Site Visits of the Joint Working Group of the Japan-US Coordinating Committee of Fusion Energy on Safety in Inter-Institutional Collaborations (Japan-US Safety Monitoring Joint Working Group)

February 22-27, 2006

PURPOSE

The Japan-US Safety Monitoring Joint Working Group (JWG) was established to work on understanding and addressing the various issues regarding safety in inter-institutional collaborations, to examine these issues, to develop methods of resolving them, and to make a set of recommendations directed to the governmental and operational institutions of both parties. The purpose of the site visits by the JWG was to evaluate the programmatic aspects of environmental, safety and health (ES&H) programs in U.S. fusion research facilities informally by touring laboratory areas and meeting with researchers and safety professionals. Based on these interactions, the JWG members were able to share information and provide suggestions in an effort to reduce the likelihood of bodily injury and/or property damage. The JWG encourages that good approaches and practices developed at a certain institution should be utilized to improve ES&H programs at other institutions, and to provide guidance for necessary safety orientation programs for foreign collaborators.

EXECUTIVE SUMMARY

The Japanese delegation for the 2006 JWG site visits consisted of the following individuals:

Hiromi Hayashi	Manager, Safety and Health Promotion Bureau	NIFS
Nobuyuki Hosogane	Deputy Director, Div. Tokamak System Technology	JAEA
Akira Kohyama	Professor, Institute of Advanced Energy	Kyoto Univ.
Takayoshi Norimatsu	Professor, Institute of Laser Engineering	Osaka Univ.
Yuichi Takase	Professor, Graduate School of Frontier Sciences	Univ. of Tokyo
Tatsuhiko Uda	Director, Safety & Environmental Research Center	NIFS

This was the first time that representatives of ICF (Norimatsu) and fusion technology (Kohyama) participated in this activity. Rick Savercool, Fusion Safety Manager of General Atomics, traveled with the Japanese delegation to all sites visited. The Japanese delegation noted substantial improvements in safety records since the last visit. At most institutions, ES&H policies are based on the concept of Integrated Safety Management (ISM). DOE provides the basic guidelines of ISM, but its implementation is tailored to suit the specific needs of each institution. Each institution has a comprehensive training program which has

been useful in raising the awareness of hazards and reducing the number of accidents/incidents. At many institutions ES&H related information is readily available electronically. The overall evaluation of the 2006 site visits by the JWG is highly satisfactory, especially from the viewpoint of mutual understanding of differences in safety culture between the two countries. At institutes with many visiting scientists or workers from outside, it is extremely important for everyone to have enough knowledge of safety.

SITES VISITED

Princeton Plasma Physics Laboratory (PPPL) (Wednesday, Feb. 22, 2006)

Personnel contacted:

R. Hawryluk	Deputy Lab Director
H. Neilson	NCSX Project Manager
A. von Halle	NSTX Engineering Head
J. Anderson	Head, ES&H and Infrastructure Support
J. Levine	Head, ES&H
Mike Williams	Head, PPPL Engineering

R. Hawryluk: Future Directions in Safety at PPPL

- Health and safety programs within DOE have improved steadily and are expected to improve further
- Health and safety records at PPPL have improved dramatically.
- ISM is implemented.
- Hazard Awareness training course and Safety Forum are used effectively.
- Leading indicators are being used to prevent incidents.

H. Neilson: NCSX Overview

- Described NCSX mission and design.
- NCSX is in construction stage.
- In-house fabrication and safety management were described.
- Safety, technical, cost, and schedule responsibilities are aligned.

(comment)

At JAEA, the leader of the Hazard Awareness Meeting held before the start of work is changed often to avoid carelessness due to being accustomed to the work. PPPL agreed with its effectiveness, and emphasized the importance of communication at change of shift.

A. von Halle: NSTX Overview

- NSTX power systems, operation, recent upgrades were described.

- 90% availability is achieved.
- NSTX ES&H support was summarized.

J. Anderson: PPPL Safety Program

- Safety service organization and resources were described.
- Roles and responsibilities of line managers, individual worker, facility managers and OSHA competent persons were described (vertical and horizontal dimensions).
- Elements responsible for current successes are assessment planning, lessons learned, hazard awareness and analysis, identifying and using competent persons, and sharing resources.
- Future challenges include offsite research, pursuit of VPP status, and moving from reaction to prevention.
- Accident-free workplace is possible, and should strive for it.

J. Levine: PPPL Safety Performance

- PPPL safety performance has improved dramatically over the last four years: recordable injury and illness $33 \rightarrow 3$, days away and restricted $28 \rightarrow 0$.

A. von Halle: NSTX Visitor Support

- Lab-wide engineering design implementation and NSTX training requirements were described.
- PPPL requires any individual to be trained and to pass appropriate tests to gain access to the NSTX test cell. Certifications must be renewed every two years, typically. This procedure is considered to help scientists/workers keep necessary safety knowledge up to date and to contribute to formation of a safety conscious culture. The JWG concurs that such a system is very important for ensuring the safety of foreign collaborators.

Tour of NCSX Manufacturing Facility

- There was a furnace to cure coil insulation. Coils were being wound inside a clean room.
- Voltage displays on power supply control panels were large and easy to read.
- First aid kits were equipped inside the building.
- Crane slings were color coded and their capacities were clearly marked.

(comment)

The JWG confirmed that Job Hazard Analysis (JHA) is performed before the start of NCSX coil winding work. However, JHA sheets had not been revised since the start of the work in July, 2005. The JWG thought that in general, some hazards are found during the course of work, and pointed out the necessity to revise the JHA sheets.

Tour of NSTX

- NSTX was being prepared for experimental campaign. The baking temperature is 350 C.

- The levels of static magnetic field and RF electromagnetic fields are measured, and are less than the restricted level.
- Automated External Defibrillator (AED) is not available for use by lab personnel. Emergency rescue unit will arrive in 2-3 minutes, so it is not necessary to provide AED.
- There was a cable rack in the passageway (tunnel) to D site. It may be a hazard for tall people. It seems that hard hat is needed.
- It is good to see safety related posters and injury statistics where people can see, such as hallways, other than workplaces.

Univ. Rochester Laboratory for Laser Energetics (LLE) (Thursday, Feb. 23, 2006)

Personnel contacted:

S. Loucks	Deputy Director, Director of Engineering, Chief Safety Officer
D. Meyerhofer	Experimental Division Director
D. Maywar	OMEGA Laser Scientist
S. Morse	OMEGA EP Project Manager
K. Marshall	Research Engineer, Chemical Safety Officer
H. Kramer	Research Engineer, Electrical Safety Officer
E. Kowaluk	Technical Associate, Laser Safety Officer

Presentations

- Basic research activities on the OMEGA laser system were briefed by S. Loucks and D. Meyerhofer.
- Training programs for research staff and students, including laser safety, chemical safety and electrical safety, were presented by E. Kowaluk, K. Marshall and H. Kramer.

Tour of OMEGA and OMEGA EP (only from viewing decks for visitors)

- OMEGA EP is now under construction. The whole building is a clean room. Safety control for workers on heights were explained.
- Implosion experiments using cryogenic deuterium-tritium targets will start next April.
- The tritium content will increase gradually from 0.1% to 50%. Technical and safety issues are being investigated.
- Construction of OMEGA EP will be completed in 2008. Thermo-nuclear gain of 0.2 to 0.3 is expected in Fast Ignition experiments.
- AED was available for emergency use.

Impression and comments

1) A good safety management system seems to be in place. Training programs on lasers, chemicals and

electricity were well arranged for the current status of collaborative experiments. Since the laser system and plasma diagnostic tools were operated by well-trained technicians, it seemed that there was little chance for visiting scientists to access the target chamber area.

2) A sign that is visible along the hallway indicating the location of the AED is recommended.

Oak Ridge National Laboratory (ORNL) (Friday, Feb. 24, 2006)

Personnel contacted:

S. Milora	Fusion Energy Division Director
J. Moore	DOE Site Office representative
W. Gardner	FED Division Safety Officer
A. Murphy	Research Support Group Leader
K. Downer	Director Environmental, Safety, Health and Quality
K. Jeskie	Operations Manager, Physical Sciences Directorate
K. Edwards	Metals & Ceramics Research Support Group Leader

Presentations from ORNL

- Overview of ORNL Environmental, Safety and Health.
- DOE's expectations and requirements stem from federal regulations, DOE contract with UT-Battelle, and the principles of Integrated Safety Management (ISM).
- Overview of implementation of ISM through SBMS (Systems-Based Management System), concept and implementation of work control and the LSM (Laboratory Space Management) program, feedback and continuous improvement, and training as it pertains to research staff and visitors/guest workers.
- Overview of ORNL Fusion Program of Fusion Energy Division (FED), experimental programs and facilities including offsite work, typical hazards dealt with, and how safety factors into their program/project planning.
- Fusion materials program overview, typical hazards dealt with, safety support/training for visitors/guests.
- FED work control process implementation and review, management involvement in safety information and training for visitors/guests.
- ORNL is managed and operated by UT (The University of Tennessee) and Battelle. FED supports ITER.
- UT-Battelle's management philosophy is simultaneous excellence in science and technology, in laboratory operations/ES&H, and in community service.

- ORNL has continuously improved safety since FY 00.
- Hazard analysis of new experiment seemed to be well done.
- As a result RII (Recordable Injury/ Illness) and DART (Days Away, Restricted, or Transfer) cases have decreased yearly.
- Definition of injury related terms, for example RII and DART are shown explicitly.

Site tour

Pellet lab

- Labels of coolant in/out, and exhaust gas out are well shown visually.
- Large PC displays are placed on a tall rack with small area. It will fall down if there is earthquake.
- Although earthquakes have never occurred in this area, it should be fixed on the rack to prevent movement.
- At the entrance to each lab, signs identifying what kind of hazards exist are displayed. This is useful.

ICRF lab

- Sharply cut steel was exposed. It should be covered by rubber sheet or equivalent.
- Exhaust gas line from the vacuum pump was connected tightly by metal joint, but one place seemed to be connected loosely with adhesive tape.
- Gas cylinders are clearly color coded, for example beige for helium, orange for nitrogen, black for oxygen.
- Protection eyeglasses and hearing protection were available.

Chemicals

- Generally chemicals are managed properly.
- Aliquot quantity of chemicals are stored in a flammable liquid storage cabinet.
- MSDS is provided and stored chemicals seemed to be accounted properly electronically. However, there was no record of inventory at the cabinet. It is better to show a record of inventory for each chemical at the storage cabinet.
- Hazardous chemicals should be stored in a lockable cabinet.

7625 Facility

- Serious hazards were not found.
- There are no stairs or catwalk for crane maintenance. Crane maintenance staff use a JLG man-lift to reach the crane and the maintenance staff use the correct fall protection PPE.

Spallation Neutron Source (SNS)

- The facility is under construction.

Beryllium handling safety

- ORNL has established a beryllium handling safety technology and occupational safety management system. Information of safety management system for worker safety and health would be helpful for Japanese safety officers and researchers.

Health and emergency

- Three physicians are permanently stationed on site. In emergency an injured person could be transferred to a hospital in Knoxville by helicopter.

(comments)

- The JWG pointed out that the storage cabinet for flammable chemicals in the pellet lab was not locked and there was no storage record. The explanation was as follows: ORNL system gives entry permission to registered persons only, and records kinds of flammable chemicals and amount at the control center. However, storage cabinets in a common room with many registered persons should be locked, and seemed to be actually locked.
- There was no interruption sign where vacuum tubes and valves were left on the floor near the equipment. It was not certain whether a rule exists to display an interruption sign after zoning a working area for safety.
- No chock was set to casters of heavy experimental equipment that was not being used. It is likely that there was no need to chock casters because there is no earthquake danger. However, since there is a possibility of pushing it accidentally, chocks should be used for safety.

General Atomics (GA) (Monday, Feb. 27, 2006)

Personnel contacted:

P. Petersen	DIII-D Assistant Program Manager
A. Kellman	Manager, DIII-D Operations
B. Cary	Manager, Electrical Systems Engineering
P. Taylor	Manager, Radiation Safety & Measurement
M. Dunlap	Manager, Fusion and Advanced Technologies QA
K. Asmussen	Manager, Licensing Safety and Nuclear Compliance
R. Lee	Fusion Education Manager
R. Savercool	Fusion Safety Manager
R. Kuhn	Assistant Fusion Safety Manager
M. Foster	DOE Field Program Manager (OAK/Berkeley Office)

A. Kellman: Safety Activities for DIII-D Operations

- GA and Fusion safety organization consisting of members from DIII-D and other divisions form

an interlocking team.

- Safety Program at DIII-D is based on ISM. Clear roles and responsibilities for general work and DIII-D specifics, knowledge consistent with responsibilities, balanced priorities, identification of safety standards and requirements were explained.
- DIII-D access control system provides a graded level of safety depending on the hazard level.
- Operation tasks covered under Hazardous Work Authorization were explained. Hazards and their mitigation countermeasures adopted for each task were discussed.

P. Petersen: DIII-D Program Highlights, Past Accomplishment, Current Activities and Future Goals

- DIII-D facility, program highlights, past accomplishments, current activities and future goals were explained.
- DIII-D has been in vent for upgrading, modifying, installing new or existing systems since April 2005.
- Major activities include reorientation of the 210 NBI beam line, modification of the lower divertor, conditioning of new 1.5 MW gyrotrons, and upgrade of TF-coil system to 10 s.

K. Asmussen: Licensing, Safety and Nuclear Compliance

- Licensing Safety and Nuclear Compliance, Security Administration and GA Safety Committee execute GA's corporate safety program.
- Plant Safety Committee (GA Safety Committee), organized by members of operating groups, reviews company safety performance, perform periodic inspections, provides communication and direction to/with organizational safety committees and reports to upper management.
- Licensing Safety and Nuclear Compliance is responsible for licensing, health physics (radiation safety), industrial safety, industrial hygiene, environmental compliance, and export compliance.

P. Taylor: DIII-D Radiation Management Safety and Past Level

- Following issues were explained: DIII-D Radiation Source, Radiation Limits, Exposure History, Radiation Procedures, Personal Monitoring Program, Site Boundary Monitoring Program, Radiation Program Reviewed & Documented, ALARA Program.
- DIII-D worker exposure is limited to 1600 mrem/yr, less than 1/3 of the legal limit (5000 mrem/yr) on the basis of ALARA.
- To reduce exposure during a vent and to improve work procedures, objective limits of the total personnel exposure and individual exposures are predetermined, taking into account planned work and the dose rate at the beginning of vent.
- To avoid high exposure to a particular worker from vent work, the maximum difference between the highest dose received by an individual and the average of the 3 highest individual doses was

predetermined to be less than 25% in 2003, and resulted in achievement of 8%.

- For vent work from April 2005 through March 2006, the maximum individual exposure limit is 1100 mrem. The maximum difference is less than 25% from the average of the 10 highest individual exposures. The sample number to be averaged was increased because of the long duration of the vent.

M. Dunlap: DIII-D Quality Assurance Focused on Safety

Reference: Quality assurance program document – DIII-D program

- Documents that make up the DIII-D quality assurance are DOE Order DOE0414B, Energy Group Quality Assurance Manual, Energy Group Procedures, DIII-D Work Procedures, Quality Assurance Program Document (QAPD) 30200.
- QAPD is the top QA document for the DIII-D program, which is based on other QA documents listed above, states responsibilities in the DIII-D program, addresses how project activities will be accomplished, and addresses safety.
- Proactive QA activities contribute to the safety of personnel, equipment and the environment.
- There are 4 persons in charge of QA for all divisions and 2 in charge of Safety in Energy Division.
- The JWG asked about QA of the boronization procedure. The document of boronization procedure with more than 200 pages is reviewed after boronization work every year, and about 70 QA documents are also reviewed and improved every year. This procedure is thought to contribute to the safety of the boronization work and to the safety of the workers .

R. Savercool: Energy Safety Program

References: DIII-D Employee Safety Rules, Safety within GA

- The “DIII-D Employee Safety Rules” document is used to explain to new employees the safety rules and the required safety training. New employees are allowed to start work after completing them.

R. Lee: Fusion Education Program with demonstrations

- GA fusion education program is supported by DOE and GA funding, and provides education encouraged by DOE (fusion and plasma science and technology) using resources available at GA.
- The numbers of students and teachers participating in this education program are approximately 3000 and approximately 200 every year, respectively
- An important objective of the education program is to provide safety education using demonstrations that encourage curious students to learn science in a safe manner.
- Safety education includes a DIII-D facility tour for reinforcing real and perceived safety concerns, liquid nitrogen as an illustration of changing states of matter, HV tesla coil as illustration of a

simple plasma discharge, engineered interlocks in classroom demos and a teacher workshop for building equipment.

B. Cary: Heating & Current Drive Safety

- Neutral beam systems, RF & Microwave systems, HV systems, I & C systems and Power systems with notices of respective main hazards were described.

Tour of DIII-D site

- One-piece suits for in-vessel work were placed by a passage around DIII-D, where the JWG walked around without changing shoes. The JWG pointed out the possibility of tritium contamination. The reply was that no tritium remained in the vacuum vessel owing to exhaustion of tritium by 350 degree C baking, and that no internal exposure had been confirmed by bioassay tests. According to experience in JT-60, which is baked up to 300 degree C, tritium remains in carbon tiles, and tritium has been detected around ports where the temperature is relatively low compared to the main part of the vacuum vessel. Therefore, in-vessel workers put on a one-piece suit over another one-piece suit in the changing room when they enter the vacuum vessel. This is a big difference in radiation control between DIII-D and JT-60.
- The JWG pointed out the possibility of radioactive contamination around the DIII-D facility when welding/grinding work is performed around it. The reply was that activated parts are taken off and moved to a different controlled area where welding /grinding is allowed. Grinding work is also performed around the DIII-D facility after enclosing the working area to avoid contamination. (This was pointed out concerning work procedures described in DIII-D Employee Safety Rules. Description of the answer regarding grinding work is not certain.). Careful treatment of activated parts is important to avoid radiation contamination.
- Areas are classified by different colors: hazard area, limited area, permitted area, laser area.
- Tidying and cleaning up of working areas are recommended. Some pieces of equipment were placed in the passageway.
- First aid kits are equipped on shelves and AED's are accessible and well labeled.
- Because San Diego is located in a desert area, several cold water drinking fountains are provided throughout the facility to combat heat exhaustion A gate at the crosswalk in front of the entrance to the DIII-D building is equipped with a control switch to enable pedestrians to disable the opening of the gate while the crosswalk is in use.

University of California, San Diego (UCSD) (Monday, Feb. 27, 2006)

Personnel contacted:

G. Tynan	Principal Investigator PISCES Research Program
L. Chousal	PISCES Laboratory Safety Officer
R. Doerner	PISCES Materials Research Program Director
M. Tillack	Laser-Matter Interaction Group Research Director
M. Foster	DOE Field Program Manager (OAK/Berkeley Office)

G. Tynan: Brief Overview of UCSD Research Program

- Be-C, Be-W, Be-C-W PMI experiments, Edge/SOL plasma transport studies, Edge plasma/PFC model validation are performed at UCSD.
- Collaborative research, uniqueness of program capabilities and major facilities were explained.

L. Chousal: PISCES Safety Program

- General laboratory safety and beryllium safety implemented for PISCES were explained.
- Chronic beryllium disease is caused by inhalation of airborne beryllium particles (1-10 micrometers), and acute beryllium disease by the short term inhalation of high airborne concentration of beryllium.
- To minimize beryllium exposure, the following safety measures are implemented: enclosure maintained at negative pressure, decontamination room, downdraft fume hood, HEPA filter etc. as engineering controls; enclosure personnel entry clothes, nitrile gloves, tyvek suits, breathing system, respirators as personal protective equipment.
- Periodic medical monitoring and environmental sampling are implemented to confirm safety of personnel and cleanliness of the laboratory.

R. Doerner: Philosophy and Practices of Safety Program in the PISCES Laboratory at UCSD

- Several layers of safety controls are implemented at PISCES as follows:
- Restriction of access to the enclosure; safety training for Be workers, entry key code.
- Back-up electric power in case of power failure to maintain negative pressure.
- Work within control of documented SOP: more than 3 persons required to work in the enclosure (one is outside the enclosure as a coordinator), computer controlled safety system while entry is in progress, operation procedure of breathing air system, sample removing procedure, decontamination procedure, etc.
- Students and post-docs are discouraged from being involved in Be activities.

Tour of PISCES-B

- Safety management and handling of beryllium is properly performed:
  - Occupational physical check are made properly.
  - If necessary, LBT (lymphatic blood test) are made.
  - Waste is stored in a safe keeping room upstairs, and waste is properly disposed.

- Hazard signs were displayed on doors.
- Some gas cylinders were labeled “EMPTY” or “IN SERVICE” while others were not labeled. A gas cylinder cap was put on another gas cylinder.
- A water fountain was equipped to wash eyes in case of emergency.
- Control console area is very limited in space.

Tour of laser lab

- There was a sign at the entrance to display what kind of laser is in operation.
- Protective glasses were available.

SAFETY PROGRAMS IN JAPAN (JAEA, NIFS, OSAKA UNIV.)

Safety Administration and Activities at JAEA Naka Fusion Institute.

N. Hosogane (JAEA)

- Organization of JAEA consists of R&D bases responsible for safety at each site and R&D sectors responsible for achievement of research objectives.
- QA system is planned to be applied to large complex facilities like JT-60, J-PARC to ensure safety.
- Safety trainings using equipment, work at heights, electric work, work with rotating machines, etc., are effective to experience situation similar to failures, and to learn how to avoid hazards.
- Personal exposure control during in-vessel work to install ferritic steel plates in JT-60 was explained.
- To avoid tritium contamination and internal exposure, an in-vessel worker is required to put on another one-piece working suit over a one-piece working suit to enter the torus hall, and to wear rubber gloves and a filter mask when he enters the vacuum vessel.
- Safety education programs for foreign visitors using safety guidebooks and video tapes edited in English are provided, as a result of US-Japan safety activity.
- In case of earthquakes above level 5, group leaders must confirm safety of group members including visitors.

Activities of Safety, Health and Environment in NIFS

T. Uda (NIFS)

- Activities of Safety, Health and Environment at NIFS were described.
- The Japan-US Safety Monitoring Joint Working Group was established to prevent accidents such as the oxygen deficiency accident that occurred in 1992.
- The new NIFS occupational safety management system was described. This system started on 1 April

2004, at the time of reorganization of NIFS.

- Safety management system is established by Safety, Health and Environment Committee and Safety, Health and Environment Promotion Division. Head of the Committee is General Director of NIFS and is responsible for safety management at NIFS. The Promotion Division is responsible for occupational safety management in the work place.
- Inspections of the work place by a safety manager are performed monthly.
- Inspections by industrial physician accompanied by health and environmental managers are performed weekly from view points of hygiene and health.
- As result of these inspections, incidents of warning or advice have decreased drastically.
- Recent incidents at NIFS were reported. Fortunately no accident resulting in worker injury has occurred.
    - Crane trouble: The 30 ton crane hook scratched the frame of a large shielding door by operator error.
    - Coolant water leak: Highly pressurized water leak occurred as a result of valve operation error.
- Publishing of safety handbook and safety training.
    - A new safety handbook was published in Oct. 2005 (in Japanese).
    - English version was published in 2001. A revised English version will be published shortly.
    - All personnel working at LHD must pass an examination based on this safety handbook.
- Administrative activities of radiation safety control system were described.

Safety Control in ILE, Osaka University

T. Norimatsu (Osaka)

- The Institute of Laser Engineering (ILE) is an establishment attached to Osaka University. In total 50 full time researchers, 30 temporary technical staff, and 200 students are engaged in research of laser fusion, high energy density physics and related applications.
- For safety and health control, 5 supervisors are assigned for radioisotopes, chemicals, high pressure gases, cranes and research environment. Each supervisor has 3 to 10 supporting staff.
- Four 2-hour lectures on laws, influences on health, and rules at each establishment, and a 4-hour training are required before starting use of radioisotopes. Annual refresher lectures are also required.
- To stimulate one's ability for prevision of danger, students are annually lectured on safe handling of laser, electricity and high-pressure gases.
- Some accidents in ILE and Osaka University are reported. In October 1991, two students lost their

lives in a disaster at the Faculty of Science and Engineering, Osaka University due to explosion of a SiH_4 cylinder. A check valve sheet attached to the cylinder was corroded by N_2O gas and N_2O mixed with SiH_4 in the cylinder.

GENERAL REMARKS

- The overall evaluation of the 2006 site visits by the JWG is highly satisfactory, especially from the viewpoint of mutual understanding of differences in safety culture between the two countries.
- It was very impressive that the ISM system was commonly used to explain the safety systems of the institutes visited. The ISM system seemed to be established and to be a kind of safety culture in the respective institutes. To further understand the ISM system, it is better to discuss it with concrete examples experienced, both good and bad.
- At institutes with many visiting scientists or workers from outside, it is extremely important for everyone to have enough knowledge of safety. In some institutes, the requirements to enter restricted places or perform hazardous work include not only to take safety education courses but also to pass safety tests periodically. This is a practical and effective way to refresh the safety knowledge of workers.
- Time allotted for tour of experimental facilities was short compared to previous visits.
- About forty Japanese researchers visit US labs and universities every year. However, it is difficult to find out whether safety problems occur to Japanese visiting researchers.
- Differences between Japanese and US regulation rules regarding radiation and chemicals should be considered. Discussion of different safety management policies between Japan and US, considering not only acute exposure effects but also chronic exposure effects, would be worthwhile.

ACKNOWLEDGMENTS

The US-Japan Safety Monitor Joint Working Group members would like to thank all the individuals who participated in the facility tours. The Japanese delegation is grateful to the hosting institutions for sharing their experience and for their gracious hospitality, and to Rick Savercool of GA for making detailed arrangements and for his generous hospitality throughout the trip.

APPENDIX I

Itinerary and Meeting Agenda for 2006 Site Visits of the Japan-US Safety Monitoring Joint Working Group

February 22-27, 2006

Tuesday, February 21, 2006

Japanese delegates arrive in U.S.

PPPL - Wednesday, 2/22 (contact Jerry Levine)

0815 Arrival main gate for badges

0845 Welcome – R. Hawryluk (Deputy Lab Director)

0905 NSTX Overview– A. vonHalle (NSTX Eng. Head)

0935 NCSX Overview – H. Neilson (NCSX Project Manager)

1005 Break

1015 PPPL Safety Program – J. Anderson (Head, ES&H & Infrastructure Support)

1045 PPPL Safety Performance – J. Levine (Head, ES&H)

1100 Training/Handling of Foreign Visitors & Collaborators – A. vonHalle (NSTX Eng. Head)

1115 Tour of NCSX Manufacturing Facility, NSTX – H. Neilson, A. vonHalle

1215 Lunch

1300 Discussion & closing remarks

1330 Departure

Univ. Rochester - Thursday, 2/23 (contact Steven Loucks)

0800 Arrival main gate for badges

0830 Laboratory for Laser Energetics Overview (Coliseum) – S. Loucks

0910 Experimental Program – D. Meyerhofer

0940 OMEGA Operations – S. Loucks

1010 Break

1025 Tour OMEGA – D. Maywar

1045 Tour OMEGA EP – S. Morse

1115 Laser Safety – E. Kowaluk

1200 Lunch

1300 Chemical Safety – K. Marshall

1350 Electrical Safety – H. Kramer

1440 Wrap up – S. Loucks

1500 Adjourn

ORNL - Friday, 2/24 (contact Stan Milora)

0830 Arrive at Visitors Center for Badges (contact Stan Milora)

0900 Johnny Moore (DOE Site Office representative): DOE's expectations and requirements stemming from federal regulations, the DOE contract with UT-Battelle, and the principals of Integrated Safety Management (ISM)

0920 Welcome – Karen Downer (Director Environment, Safety, Health and Quality Directorate): Overview of ORNL ES&H

0935 Kim Jeskie (Operations Manager, Physical Sciences Directorate): Overview of the implementation of ISM through SBMS, the concept and implementation of work control and the LSM program, feedback and continuous improvement, and training as it pertains to research staff and visitors/guest workers

1000 Break

1015 Stan Milora (Fusion Energy Division Director) – Overview of the ORNL Fusion Program, experimental programs and facilities including offsite work, typical hazards dealt with, and how safety factors into our program/project planning

1035 Kennie Edwards (Metals and Ceramics Research Support Group Leader) – Fusion materials program overview, typical hazards dealt with, safety support/training for visitors/guests

1055 Walt Gardner (FED Division Safety Officer) – FED work control process implementation and review, safety as part division self-assessments, and management involvement in safety

1115 Presentations by our Japanese guests – Uda, Hosogame

1145 Lunch and discussions

1300 Tour Fusion Experimental Facilities (5800 labs and 7625 facilities)

1400 Tour the Spallation Neutron Source (SNS)

1600 Discussion/concluding remarks

1800 Working dinner and further information exchange

GA - Monday, 2/27 (contact Rick Savercool)

0815 Arrive DIII-D reception area and receive badges

0830 Welcome to GA and the Fusion Group – M. Foster

0840 DIII-D Program Highlights, Past Accomplishments, Current Activities and Future Goals – P. Petersen

0900 Operational Activities focused on Safety – A. Kellman

0915 Heating and Current Drive Activities focused on Safety – B. Cary

0930 DIII-D Radiation Management Safety and Past Levels – P. Taylor

0945 Morning Break

1000 Corporate Safety Program and support from LSNC – K. Asmussen

1015 Fusion Safety Program – R. Savercool

1100 Fusion Education Program with demos – R. Lee

1130 Lunch in reserved dining room at GA Cafeteria

1230 Tour DIII-D site

1315 Presentations by our Japanese guests – T. Norimatsu

1330 Closing Comments and Discussions

1345 Depart for UCSD

UCSD - Monday, 2/27 (contact Russ Doerner)

1400 Arrive Room 459 EBU2

1405 Brief overview of UCSD research program – G. Tynan

1415 General lab safety and THE integration with UCSD EH&S – L. Chousal

1430 Be safety and procedures in THE lab – R. Doerner

1455 Questions

1500 Short break

1510 Lab tour

1600 Closing Comments and Discussions

1615 Adjourn

Tuesday, February 28, 2006

Japanese delegates depart U.S.