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ISOE INFORMATION SHEET

**CONCLUSIONS AND RECOMMENDATIONS
FROM THE 4th EUROPEAN ISOE WORKSHOP
ON OCCUPATIONAL EXPOSURE MANAGEMENT
AT NUCLEAR POWER PLANTS**

ISOE European Technical Centre - Information Sheet No. 37

This information sheet summarizes the main conclusions and recommendations from the 4th European ISOE Workshop on Occupational Exposure Management at Nuclear Power Plants, held in Lyon, France, 24-26 March 2004. It also gives some excerpts from a few presentations.

Introduction

The European ISOE Technical Centre co-organised with the International Atomic Energy Agency, the Fourth European ISOE Workshop on Occupational Exposure at Nuclear Power Plants in March 2004, at Lyon, France. 190 participants from 26 countries, European (all countries from western and central Europe with nuclear power plants) American (Canada and United States) and Asian (China, Japan, Korea) attended the meeting with a good balance between utilities, regulatory bodies and contractors. The IAEA supported participants from Central and Eastern European countries as well as from Eastern Asia. The workshop allowed 35 oral presentations and 28 posters presentations to be provided. A very informative exhibition was held by vendors and allowed participants to know more about their products during the coffee-breaks. All participants were split into small groups devoted to 10 pre-selected themes. Each group met twice and reached recommendations.

Five main recommendations were agreed on by the participants:

1. There is a need for harmonising regulations in order to maintain a high status of radiological protection at an international level in a deregulated context;
2. The regulatory bodies should also harmonise the contents of training, particularly in the context of workforce ageing;
3. The international organisations and regulatory bodies should take the lead to harmonise at the international level a dose passport for itinerant workers;
4. Radiological protection indicators should be selected to help in optimising doses, provide indication for continuous improvement, estimate the effectiveness of radiological protection departments, provide means for benchmarking, create consistency between sites;
5. The radiological protection teams should increase their assistance “patrols” at workplaces.

For the first time, two specific meetings have preceded the workshop:

- one for the radiological protection managers from the NPPs; 30 participants attended that meeting;
- one for the senior representatives of the authorities; two topics were discussed there, the management of outside workers and the use of ISOE by the regulatory bodies.

Conclusions and recommendations from the Workshop

A specific session on the radiological protection at the design stage of installations was mainly devoted to the new pressurised water reactor EPR. The Finish operator (TVO) and regulatory body (STUK) described their expectations in terms of occupational radiological protection. EDF, the French operator set-up a reasonable target of not exceeding 0.5 man.Sv per year (averaged for the life time of the reactor).

For the small group discussions, the participants as topics of interest particularly selected two topics:

- The setting up of radiological protection indicators (evaluation of the ALARA criteria)
- The needs in education and training in radiological protection

The first was already one of the most selected topics at Portoroz (3rd European ISOE workshop in 2002) showing the growing importance of management of radiological protection and efficiency aspects in deregulated markets. The impact of deregulation was raised for the first time in 1998 at Malmö (first European ISOE Workshop)

The other topics for work in small groups were all selected by quite a number of participants and dealt with “Workers involvement and awareness”, “Impact of deregulation”, “Plant self assessment programs”, “Occupational exposure in case of emergency”, “Management of itinerant workers” and “Loss of knowledge”.

Setting up of radiological protection indicators

In the context of competition, the setting up of goals and radiological protection indicators appears to the participants to be a very important management tool. These tools are more and more often used in the plants. Their goals must be measurable, realistic and challenging. They must be communicated to all stakeholders. The radiological protection specialists according to goals set up by the management may propose them. They should be then discussed with regulatory body. Deviations from the goals should require post job reviews.

Recommendations

Radiological protection indicators should be selected to help in optimising doses, provide indication for continuous improvement, estimate the effectiveness of radiological protection departments, provide means for benchmarking, create consistency between sites.

Needs in education and training in radiological protection

The participants pointed out the discrepancies between countries in terms of training both at initial and refreshing levels and the need for harmonisation. They stressed on the one hand the ageing of skilled workers as well as on the other hand the fact that many workers are well trained and committed to dose reduction. They also stressed the need for practical more than theoretical training, as experience appears often as important as training in achieving workers' involvement and awareness.

Recommendations

The regulatory bodies should harmonise the contents of training;

The management should check and supervise regularly the implementation of training;

The training courses should comprise practical exercises, use of mock up and awareness packages adapted to tasks and risks.

Deregulation and radiological protection

The problem of the impact of deregulation on radiological protection was raised for the first time at Malmö in 1998 (first EC/ISOE Workshop). At that time, it appeared not to be a real concern. Two years later in 2000 at Tarragona (second European ISOE Workshop), the deregulation appeared clearly as a real challenge for the future for radiological protection. It led to a recommendation from the participants: "To consider new "Radiation Protection" management techniques to avoid the potential negative impacts of deregulation on exposures, while keeping radiation protection independent from operation and maintenance of the plant".

Recommendations

The regulatory bodies should pay more attention to the deregulation process and negotiate with NPPs the minimum number of radiological protection and safety staff allowing to maintain a high status of radiological protection and ALARA;

There is a need for harmonising regulations in order to maintain a high status of radiological protection at an international level in a deregulated context;

The Lyon workshop confirmed what appeared for the first time at Portoroz, an "important reduction in radiological protection staff sizing, and loss of skilfulness". The present radiological protection specialists gave then warnings and recommendations.

The management should pay more attention to keep the quality of their contractors work through training and work management.

Other recommendations from the groups

Recommendations

The other working groups made recommendations endorsed by the participants to the workshop.

*The international organisations and regulatory bodies take the lead to harmonise at the international level a **dose passport**;*

*The radiological protection teams increase their **assistance “patrols”** at workplaces;*

*Management and governments should recognise the **ageing of workforce** in NPPs and favour closer links with universities, personnel development plans, and adequate budget for long-term workforce replacement.*

Distinguished papers excerpts

Three technical presentations were distinguished and invited to make their presentation in 2005 at the Miami ISOE North American international ALARA symposium in the United States of America. These papers were dealing with both technical and managerial problems and proposed very practical solutions:

“Advantages of combining gamma scanning techniques and 3D dose simulation in dose optimisation problems”; F. Vermeersch, SCK•CEN Mol, Belgium

This paper presents a method of combining results from gamma scanning equipment with a 3D dose simulation tool with the aim to achieving a reliable dose characterisation of the work site in order to perform dose assessment and optimisation for work planned in the area. The gamma scanning allows determining source positions, source geometry and sourcing composition. Hot spots that could be missed by traditional methods can be picked up. The combination of the gamma scanning and the radio-geometrical model makes it possible to perform a quantitative analysis of the source strengths leading to adapted dose assessments and optimisation.

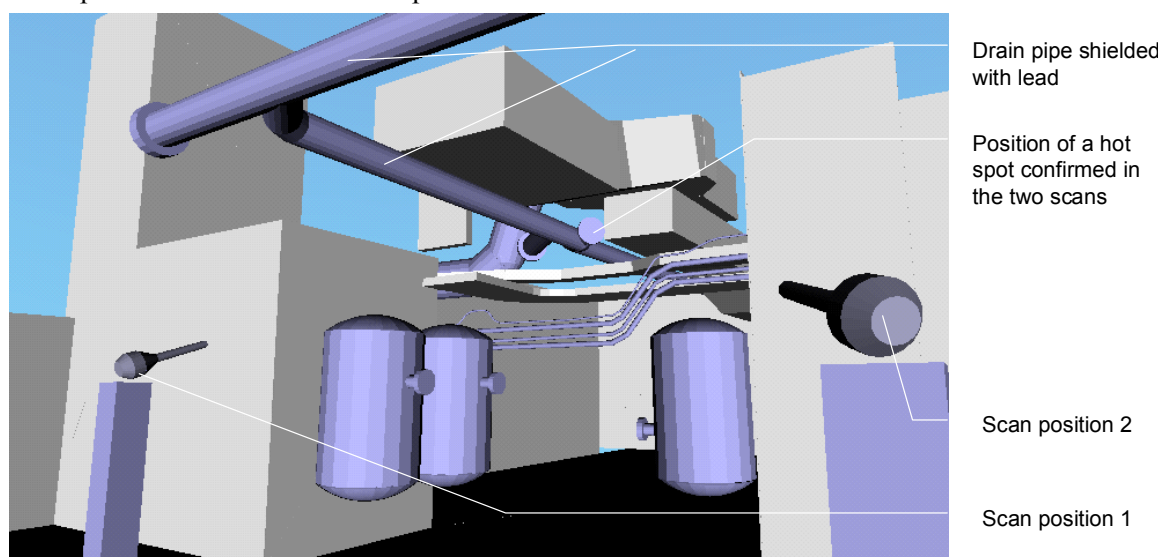


Figure. VISIPLAN model of the site geometry indicating the position of the gamma scanner during the two scans

“Recent International Developments on Contamination Limits on Packages”; J. Hesse, RWE Power, Germany / B. Lorenz, GNS, Germany

This paper presents the results of the IAEA Co-ordinated Research Project (CRP) on the Radiological Aspects of Package and Conveyance of Non-Fixed Contamination. One of the major tasks of the CRP has been from 2001 to 2003 to develop a new model for contamination limits for the Transport of radioactive material. This model to calculate doses from non-fixed surface is described in the presentation.

It takes care of the types of radionuclides, the types of packages, the realistic description of tasks during a transport, the different exposure pathways and the possible exposures of workers and the public. The results of the model are presented in Bq/cm² corresponding for each nuclide to dose constraints of 2 mSv/year for the workers and 0.3 mSv/year for the public.

Table. Final results (part of the complete table) for surface contamination levels in Bq/cm²

Nuclide	Derived Level Workers [Bq/cm ²]				Derived Level Public [Bq/cm ²]				Overall Min.
	W-SM	W-SR	W-LR	W-FF	P-SM	P-SR	P-LR	P-FF	
Cm-248	0,1	1,6	2,1	1,7	31	6	68	46	0,1
Co-55	135	134	305	407	1,8E+5	1,9E+4	4,0E+3	7,6E+3	134
Co-56	81	80	185	249	9,7E+4	1,1E+4	2,3E+3	4,5E+3	80
Co-57	2,3E+3	2,2E+3	4,9E+3	6,4E+3	2,3E+6	2,8E+5	6,8E+4	1,3E+5	2,2E+3
Co-58	270	268	621	834	3,2E+5	3,6E+4	7,9E+3	1,5E+4	268
Co-58m	1,2E+5	1,3E+5	1,3E+5	1,3E+5	3,5E+8	7,1E+7	3,1E+8	3,5E+8	1,2E+5
Co-60	109	108	245	323	1,1E+5	1,3E+4	3,2E+3	6,1E+3	108
Cr-51	8,2E+3	8,2E+3	1,8E+4	2,4E+4	1,0E+7	1,1E+6	2,4E+5	4,7E+5	8,2E+3
Cs-129	893	886	2,1E+3	2,8E+3	1,2E+6	1,2E+5	2,6E+4	4,9E+4	886
Cs-131	7,7E+3	7,7E+3	1,7E+4	2,2E+4	1,0E+7	1,1E+6	2,4E+5	4,6E+5	7,7E+3
Cs-132	362	359	836	1,1E+3	4,7E+5	5,0E+4	1,0E+4	2,0E+4	359
Cs-134	129	128	227	266	1,7E+5	2,0E+4	4,9E+3	9,3E+3	128
Cs-134m	6,4E+3	6,4E+3	1,1E+4	1,2E+4	1,2E+7	1,2E+6	2,6E+5	5,0E+5	6,4E+3
Cs-135	4,0E+3	4,6E+3	4,6E+3	4,6E+3	6,7E+6	1,4E+6	1,5E+7	1,0E+7	4,0E+3
Cs-136	122	121	274	363	1,6E+5	1,7E+4	3,6E+3	6,9E+3	121
Cs-137	284	283	439	487	3,8E+5	5,0E+4	1,3E+4	2,5E+4	283
Cu-64	1,3E+3	1,3E+3	2,8E+3	3,6E+3	1,8E+6	1,9E+5	4,0E+4	7,6E+4	1,3E+3

”ALARA versus Reactor Safety concern - a practical case”; S. Hennigor, B. Ögren, Forsmark NPP, Sweden

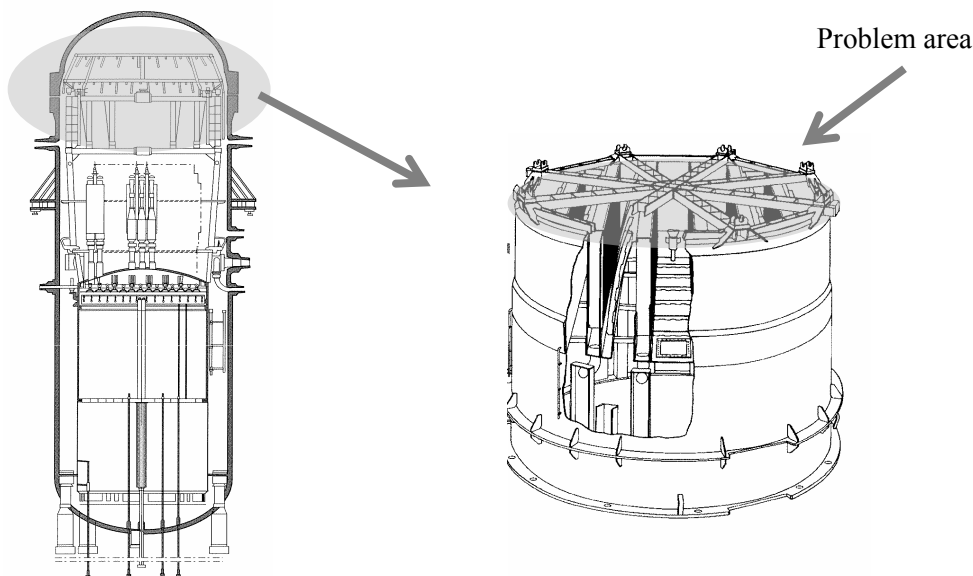


Figure. The problem area on the upper part of the steam dryer

This presentation is a very practical one describing the modification of the moist separator (upper part of the steam dryer) at Forsmark BWR that took place in 2003 due to cracks. It describes the preparation of the work as well as its implementation and results (165.5 man mSv and maximum individual dose of 10.3 mSv). It points out that such type of work should be prepared at least one year ahead to collecting appropriate dose rate data, making a formal and comprehensive risk assessment and performing real optimisation with the contractor. It stressed the role of training on mock-up and the need of establishing follow-up meetings and radiological check-points with pre defined alternate actions.

Conclusion

The success of this Workshop is largely due to the important organisational support from EDF in particular in providing the translation from English to French and French to English, while FRAMATOME and COGEMA Logistics provided the other translations from German and Spanish to English.

Many other papers proposed important and interesting conclusions and feedback experience analysis. Most of them are, including PowerPoint slides (depending on the agreement of the author), available on the ETC web site: <http://isoe.cepn.asso.fr/>

Click on "Workshops" button, select Lyon and click on "Program and downloadable papers"