

# The Information System on Occupational Exposure (ISOE)

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The OECD Nuclear Energy Agency (NEA) has long been interested in the issues relating to the radiological protection of occupationally exposed workers. In response to pressures from market liberalisation and competitiveness and ageing of the global nuclear power plant fleet, radiological protection personnel at nuclear power plants worldwide have found that occupational exposures are best managed through job planning, implementation and review to ensure that exposures are “as low as reasonably achievable” (ALARA). A prerequisite for applying this principle of optimisation to occupational radiological protection is the timely exchange of dose reduction data and information among stakeholders.

To facilitate this global approach to work management, the NEA launched the Information System on Occupational Exposure (ISOE) in 1992 as a joint programme among countries interested in technical information exchange. The objective of ISOE is to provide an international forum for radiological protection experts from utilities and national regulatory authorities to discuss and coordinate international co-operative undertakings for the radiological protection of nuclear power plant workers. Since 1993, the International Atomic Energy Agency (IAEA) has co-sponsored the ISOE programme, thus allowing the participation of utilities and authorities from non-NEA member countries; since 1997, the NEA and the IAEA have formed a Joint Secretariat for the programme.

As a technical exchange initiative, the ISOE programme includes a global occupational exposure data collection and analysis network, culminating in the world's largest occupational exposure database for nuclear power plants, and a vital information exchange programme for sharing dose reduction information and experience. Since its inception,

*“... the exchange and analysis of information on individual and collective radiation doses to the personnel of nuclear installations and to the employees of contractors, as well as on dose-reduction techniques, is essential to implement effective dose-control programmes and to apply the ALARA principle...”*

ISOE Terms and Conditions (2004)

ISOE members have used this dual system to exchange occupational exposure data and information for use in dose trend analyses, technique comparisons, and cost-benefit and other analyses facilitating the application of the ALARA principle in local radiological protection programmes.

## ISOE participation

Since 1992, the number of actively participating commercial nuclear power plants has continued to increase as the benefits of the programme become more widely known. As of 31 December 2005, the ISOE programme included 71 participating utilities (332 operating reactor units; 39 units shut down) in 29 countries, and participating authorities from 25 countries. The four ISOE Technical Centres (Europe, North America, Asia and the IAEA)<sup>1</sup> manage the programme's day-to-day technical operations, providing data collection, analyses and technical support to the participants.

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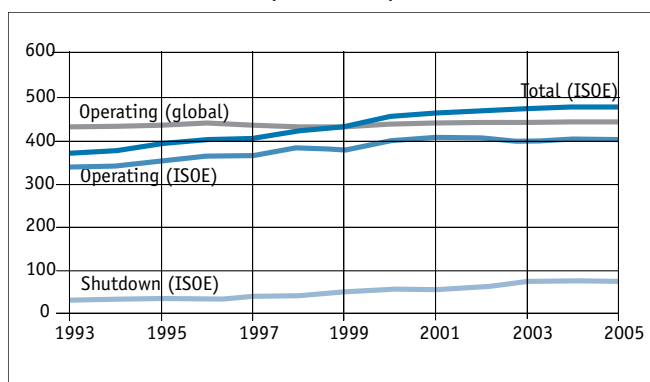
## ISOE products and services

The unique value of ISOE is based on the combination of its important integration of global occupational dose data, dose reduction experience, analyses, information exchange and the ability to bring utilities and regulators together in a common forum. The ISOE programme offers a variety of products in the occupational exposure arena, a selection of which are described below.

### The ISOE occupational exposure database

ISOE provides the world's largest database on occupational exposure at commercial nuclear power plants. Occupational exposure data collected annually from participants is made available to ISOE members through the database. In addition to the detailed data provided directly by participating utilities, participating authorities also contribute official national data in cases where some of their licensees may not yet be ISOE members. The ISOE database thus includes information on occupational exposure levels and trends at 478 reactor units (402 operating; 76 in cold-shutdown or some stage of decommissioning) in 29 countries, covering some 91% of the world's operating commercial power reactors. The largest blocks of reactors not yet included in the database are in the Russian Federation and in India.

**Figure 1. Number of units included in the ISOE database (1993-2005)**



The ISOE database is divided into four parts including:

- dose information for operating units, e.g. annual collective dose for normal operation, maintenance/refuelling outages, unplanned outage periods, annual collective dose for certain tasks and worker categories;

- plant-specific information pertinent to dose reduction, such as materials, water chemistry, start-up/shutdown procedures, cobalt reduction programmes, etc.;
- radiological protection information associated with specific operations, procedures, equipment or tasks, such as effective dose reduction, effective decontamination and implementation of work management principles;
- dose information for units that are shut down or being decommissioned.

The database contains a data analyses module allowing radiological protection managers to perform various benchmarking analyses, and forms a solid basis for studies on doses related to certain jobs and tasks in a nuclear power plant, such as refuelling or insulation work. Using the ISOE database, exposure trends can be displayed by country, by reactor type or by other criteria such as sister-unit grouping.

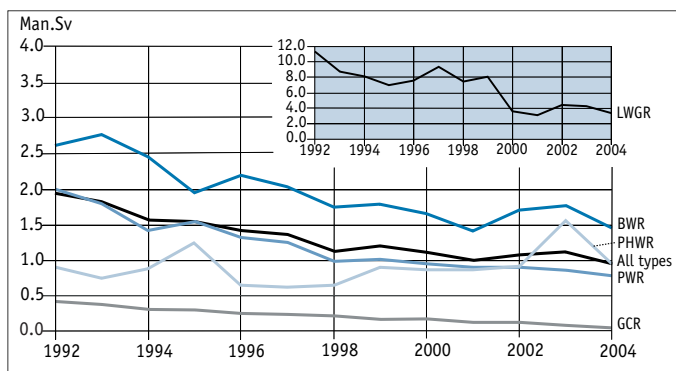
### ISOE annual reports

The ISOE annual reports summarise recent information on levels and trends of average annual collective dose at the reactors covered by the database, and provide special data analyses and dose studies undertaken by the ISOE Working Group on Data Analysis, summaries of ISOE symposia, and information on principal events in participating countries. Figure 2 shows the general trend in average collective dose per operating reactor from 1992 to 2004, as communicated in the Fourteenth Annual Report of the ISOE Programme for 2004. The annual reports are available to all interested parties on the NEA website (see Further reading for details).

### Detailed studies, analyses and information

ISOE members are supported in their day-to-day radiological protection responsibilities through the work of the four ISOE Technical Centres. The centres provide detailed studies, analyses and information on current issues in operational radiological protection. The dosimetric data and other plant-related information available from the participants provide an ideal basis for studies on dose and dose trends related to specific jobs and tasks, such as refuelling, steam generator replacement, insulation work, etc. Studies undertaken by the Technical Centres are distributed to ISOE members as ISOE information sheets. Recent information sheets have included topics ranging from regional dosimetric results, to trends in outage duration and surveys on practices regarding internal contamination management. Of increasing importance is the support that the centres supply in response to special requests for rapid technical feedback, and through

**Figure 2: Average collective dose for operating reactors in ISOE, 1992-2004**



the organisation of site benchmarking visits for dose reduction information exchange amongst the Technical Centres. The latter aspect is particularly important in facilitating the exchange of practical information between ISOE regions.

### Information exchange network

While ISOE is well-known for its occupational exposure data and analyses, the strength of the system comes from its primary objective to share such information broadly amongst its participants. This important information exchange component facilitates the learning of lessons from experience, the growth and optimisation of expertise, and the increase of value of participation.

The ISOE information exchange network comprises many diverse components, both technical and social. On the technical side, ISOE includes a system for rapid communication of radiological protection information through the web-based ISOE information network and e-mailing system. The objective of the ISOE network is to provide the ISOE membership with a “one-stop”, web-based ISOE/ALARA information and experience exchange portal on dose reduction and ALARA resources. This restricted-access portal provides members with online access to ISOE products and publications, web fora for real-time communications amongst participants, and the extensive ISOE occupational exposure database (previously only available to members on CD-ROM).

Human interaction also remains an important component within the communication network, as demonstrated by the annual ISOE International ALARA Symposium on occupational exposure management at nuclear power plants. Organised by the Technical Centres, the objective of these open symposia is to provide a forum for radiological protection professionals from the nuclear industry and regulatory authorities to exchange practical information and experience on occupational exposure issues

in nuclear power plants. Technical Centres also host regional symposia to meet regional needs. The combination of international and regional ISOE ALARA symposia helps radiological protection professionals to meet, discuss and share information, and to build linkages and synergies between the ISOE regions which will facilitate the development of a global approach to work management. Finally, the ISOE programme regularly produces the ISOE Newsletter to keep its membership informed of topics of interest to the ISOE community.

### Next steps for ISOE

As it approaches its 15<sup>th</sup> year of experience in operational radiological protection, the ISOE programme has embarked on a strategic review of its operations in order to promote its use and optimise its value to participants. The strength of ISOE is based on its combination of technical information, communications, and utility and regulatory involvement. In order to build on these strengths, the ISOE programme will continue to undertake its core activities of collecting and analysing occupational exposure data, and providing an information sharing forum for participating utilities and regulators to exchange good practice and experience in occupational exposure reduction at nuclear power plants. Additionally, the programme will implement improvements to better meet user needs identified through a strategic programme analysis and direct feedback from its users, focusing on user needs, information exchange and organisational aspects.

ISOE has proved successful in helping radiological protection experts at utilities and regulatory authorities to better manage occupational exposures at nuclear power plants. It intends, as part of its next four-year mandate, to continue to build on existing strengths to make ISOE a primary information source and communications network for the occupational radiological protection community. ■

### Note

1. The ISOE Technical Centres are: Asian Region: Asian Technical Centre, Japan Nuclear Energy Safety Organisation (Japan); European Region: European Technical Centre, CEPN (France); North American Region: North American Technical Centre (United States); Non-NEA countries: IAEA Technical Centre, International Atomic Energy Agency (Austria).

### Further reading

More information on the joint NEA/IAEA Information System on Occupational Exposure can be found at [www.nea.fr/html/jointproj/iso.html](http://www.nea.fr/html/jointproj/iso.html) and [www.isoe-network.net](http://www.isoe-network.net).