



# Safety and Environmental Annual Report 2006

EC Joint Research Centre Institute for Energy  
June 2007

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### **Mission of the Institute for Energy**

The Institute for Energy provides scientific and technical support for the conception, development, implementation and monitoring of community policies related to energy. Special emphasis is given to the security of energy supply and to sustainable and safe energy production.

### **European Commission**

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## **GLOSSARY**

	<b>Dutch</b>	<b>English</b>
<b>BHV</b>	Bedrijfs Hulp Verlening	Company Emergency Organisation
<b>BNP</b>	Bedrijfsnoodplan	Company Emergency Plan
<b>CPR</b>	Commissie voor de Preventie van Rampen door gevaarlijke stoffen	Committee for the prevention of disasters by dangerous goods: old guideline for storage of dangerous goods
<b>EMS</b>	Environmental Management System	Environmental Management System
<b>HFR</b>	High Flux Reactor	High Flux Reactor
<b>HSC</b>	Health and Safety Committee	Health and Safety Committee
<b>IE</b>	Institute for Energy	Institute for Energy
<b>INO</b>	Interne Noodorganisatie	Internal Emergency Plan
<b>ISO</b>	International Organisation for Standardisation	International Organisation for Standardisation
<b>JRC</b>	Joint Research Centre	Joint Research Centre
<b>KFD</b>	VROM Kernfysische Dienst	Dutch Emission Guideline
<b>NER</b>	Nederlandse Emissie Richtlijn	Nuclear Research and Consultancy Group
<b>NRG</b>	Nuclear Research and Consultancy Group	Health and Safety Management System
<b>H&amp;S MS</b>	Health and Safety Management System	Occupational Health and Safety Management System
<b>OHSAS</b>	Occupational Health and Safety Management System	Occupational Health and Safety Management System
<b>PGS</b>	Publicatiereeks Gevaarlijke Stoffen	Publication Series for Dangerous Goods: new guideline for storage of dangerous goods
<b>RBP</b>	Rampbestrijdingsplan	Disaster Fighting Plan
<b>SES</b>	Safety, Environment, Security	Safety, Environment, Security
<b>Wm</b>	Wet milieubeheer	Environmental Management Act
<b>Wvo</b>	Wet verontreiniging oppervlaktewateren	Surface water pollution Act

### **PURPOSE:**

This document is the integrated safety and environmental annual report 2006 of the JRC-IE. The report describes safety and environmental activities, targets, impacts and the management system of the Institute. This report is published annually.

# HEALTH, SAFETY AND WELL-BEING

## Background

Over the last couple of years Safety, Health and Well-Being has received continuous attention and is a very high priority for the Institute. In 2004 the management decided to replace the existing general site safety regulations by an OHSAS 18001<sup>1</sup> based Safety and Health Management System (S&H MS). Since then efforts have been taken to form this S&H MS of which this safety and environmental annual report is one step in the process of developing and implementing the S&H MS. In 2006 the European Commission adopted the Decision (C(2006)1623) on 'Establishing a Harmonised Policy for Health and Safety at Work for all Commission staff'. The JRC has started the implementation of this decision and the first steps have been taken at IE in 2006.

## Inspections and audits

At the Institute, various internal and external persons frequently carry out inspections and audits. The Director, the Heads of Unit, the SES Sector Head and internal auditors are examples of the internal personnel involved.

External personnel including the Medical Service of the European Commission (Luxembourg), representatives of the fire insurers, external auditors, the municipality and other inspection services of national authorities visited the Institute on several occasions. Inspection reports were always followed by action plans where applicable.

## Health and Safety Committee

The Health and Safety Committee (HSC) of the Institute is comprised of eight staff members, nominated equally by the personnel representatives and the Director. The main task of the committee is to advise the Director on health, safety and well-being matters. The frequency of meetings should be once a month with the exception of the main holiday periods. Due to the implementation of the Commission Decision of 15 July 2005 on 'improving social dialogue in the Commission through Joint Committees' a new Committee was nominated and new Internal Rules of Procedures were set up in 2006. Therefore the Committee had only 4 meetings in 2006.

## Health related activities

The members of staff of the Institute are under the medical supervision of the Medical Service of the European Commission. The doctor and his staff visited the Petten site regularly for the annual medical check ups for personnel.

With finalising the renovation of building 313, a gym was realised and is now successfully in use by a large part of staff. At this gym several different classes can be followed including fitness, aerobics etc.



<sup>1</sup> An international occupational health and safety management system specification, embracing BS8800, AS/NZ 4801, NSAI SR 320 and a number of other publications, developed to be compatible with the ISO 9001 (Quality) and ISO 14001 (Environmental) management systems standards.

The Institute also subsidises participation in a range of external sporting activities, i.e. member of local sport clubs, classes and tournaments, annual sports events organised between different departments of the European Commission or between Research Institutes.

## Safety related training and instructions

The JRC-IE organized internal and external training for its staff as shown in the table below.

Table Safety related training of JRC-IE staff

Emergency Training	Specific tools	Specific procedures
First Aid	Hoisting in a safe way	Radiation Protection - different levels
BHV new	Advanced security driving	Risk management
BHV refreshment		Transition CPR 15 → PGS 15



Furthermore, each newcomer receives general safety instructions specific to the Petten Research Location. Job-specific instructions are given by the Unit/Sector to which he/she belongs. Contractors and external companies working at the JRC-IE received the "Safety regulations for third parties working at the JRC-IE Petten site" and all external persons working on site have been shown the video 'General safety regulations at the Research Location Petten'.

## Emergency preparedness

To increase the emergency awareness of all staff, exercises at BNP and INO level have been carried out. Evacuation exercises were held in all buildings of the JRC-IE. An accident with harmful substances was used as a scenario for an INO exercise.

In 2005 the process of reviewing the disaster repression plan was started by the municipality. Representatives of the Institute were actively involved in this process. In 2006 the document was sent to the KFD for review.

Due to the changes in the disaster repression plan the internal documentation of IE on emergency preparedness were reviewed and updated.



## Near accidents and accidents

In 2006 44 near accidents/accidents were reported. 4 resulted in a consultation with a general practitioner (2 of these accidents occurred with persons from an external company). No accident requiring a report to the authorities occurred.

The progressive increase in reported near accidents/accidents (8 in 2004, 17 in 2005) is considered to be due to better implementation of the reporting system and an increase in the safety culture and not due to an increasingly unsafe working environment. For the next couple of years more awareness of unsafe situations is expected.

A serious accident occurred in 2005, which had and still has severe consequences to the staff member. While the accident occurred late in 2005, the seriousness of the consequences was clear only in the beginning of 2006, thus this was not reported in the Annual Report of 2005. This accident has brought out several points for improvement in the organization of construction work, reporting, registering and investigating of near accidents/accidents, safety culture and the clarification of the procedures relating to accidents.

Following this accident the rate of inspections has been increased. The inspections focus especially on construction work on the site which is particularly extensive because of the ongoing renovation. The system of work permits has been improved and material to fence off areas such as safety barriers have been ordered to be used when necessary. Although there is still room for improvement, these measures have already enhanced the safety of staff and external workers.

## Radiological workers

About 20% of the JRC-IE staff is registered as a radiological worker. The measurement and registration of their exposure to ionising radiation is contracted with NRG. All doses were well below the legal limits as defined in the Council Directive 80/836/Euratom and amending Directives.

The total dose of the radiological workers was higher than in the previous year. The reason for this is due to the exposure of one person, nevertheless this dose was still well below the legal limit. An evaluation of this deviation from the usual dose rate was performed directly. These measurements did not show the cause of the increase.

In the table below the data is shown of the cumulative doses of 2006. It includes the dose of external staff. About one third has a annual dose limit of 6 mSv and two third of 20 mSv. For non-radiological workers the annual dose limit is 1 mSv.

*Table Dose of exposed people*

Year	Dose (mSv)		Number of persons			
	Cumulative	Average	Total	< 1 mSv	1-6 mSv	6-20 mSv
2004	10,22	0,19	56	56	0	0
2005	8,46	0,18	47	47	0	0
2006	11,25	0,20	55	54	1	0

# ENVIRONMENT

## Background

In the second half of 2006 IE started the preparation for the recertification of ISO 14001. The recertification audit was planned for January 2007.

## The main operational items in 2006

In 2006 the Institute continued the renovation of the buildings 308, 309 and 313 which was started in 2005. The JRC-IE expects energy savings resulting from the construction types and the materials used. See the chapter 'Renovation' below. There were no major changes in scientific installations in 2006.

## Renovation

The renovation of twin buildings 308 and 309 was started. They did not meet current technical building requirements/standards and the conviction that exploitation costs could be lowered significantly at the same time. The new building would also provide modern and comfortable working environment for staff. The main driver for this was that a feasibility study indicated that a complete renovation of the existing buildings would result in similar costs to those for new construction.

Both buildings did not have a ventilation system or cooling capacity. All electrical installations (including lighting) and the original one pipe heating system were outdated. Therefore a considerable amount of energy was wasted.

A state-of-the-art climate system for both heating and cooling capacity and a forced ventilation system with energy recuperation are foreseen in the project. The benefits of using climate ceiling systems in offices have been recognised for a number of years. Besides items such as space saving technology, "user friendly", flexibility and lowered maintenance costs, climate ceiling systems consume less electricity (up to 15%) because of the more modest chilled water temperature requirements and the enhanced scope for free cooling. The system has also a far greater life expectancy and therefore can be considered more environmentally friendly than conventional systems. Similarly the reduced level of plant required minimises the potential for noise pollution, further the process involved limits the possibility of end user dissatisfaction.

The gas consumption in building 308 and 309 is expected to be reduced by at least 30% and special attention was paid to the design to add a good insulation layer (façade and roof) combined with major improvements of the "sealing" of the building. The old wooden frames will be replaced by an aluminium curtain wall with enhanced thermal insulating glass with a heat reflecting coating, a good solar factor and a high value for the daylight penetration factor. New electronic sun blinds in office areas can be operated both locally and centrally.

An automatic lighting system, with features such as infra red detection, daylight compensation and centralised management of common areas, ensures the proper comfort levels regarding light intensity.

In order to optimize the performance of the climate control system, installations are connected to an upgraded building management system for advanced automatic control.

## **Inspections and audits**

The IE has an audit programme covering a period of 3 years. In this programme it is defined which areas of the environmental licence are covered during the internal audits and inspections.

Periodical Internal Commission audits are performed by Directorate-General ADMIN and on DG JRC level. Inspections are also performed together with experts from different authorities. The results of these inspections are taken up in action plans. The progress of these action plans are reviewed periodically.

## **Environmental licence**

There were no changes which have led to a change in the licence. There were two announcements according to Environmental Act art. 8.19. One was related to an extension of a building, the other concerns to an extension of an installation.

## **Environment related training and instructions**

Similar to safety, each newcomer receives a general instruction on the EMS system and related work instructions. The Unit/Sector to which he/she belongs provides job specific instructions for the newcomer.

A training was organized for laboratory managers and other interested parties on the changes from CPR 15 to PGS 15. One person has followed training for basic environmental law.

The Company Emergency Staff (BHV) and the site fire brigade had an exercise in 2006 based on a scenario with environmental impact.

## **Environmental incidents, significant malfunctions**

In 2006 there was one minor environmental incident. The incident occurred while an external company transported old equipment for disposal. The IE has reported this incident to the local authority and has taken immediate action to prevent environmental damage. There were no malfunctions on installations with environmental impact.

## **Building Management System (BMS)**

The BMS is a system that registers different utility data like water, electricity and gas consumption. The BMS has been improved in the course of 2006 by recalibration of the measurement equipment as there were deviations of readings. The deviations were discovered through a monthly manual check of all probes regarding water, electricity and gas. At this stage, some manual checks are still conducted and no deviations have been found.

## **Energy scan**

The Institute requested Royal Haskoning to perform an energy scan on several buildings. The energy scan has been performed in early 2007 on several buildings on site. The buildings which are undergoing major renovations were not included in the scan. However, these buildings were included in the analysis of the energy usage in order to have a correct overview of the total usage. The results of the scan will be presented in the Annual Report of 2007.

## Environment related goals

Environmental goals are set for a period of 3 years in the Environmental programme 2006-2008. The specific goals for 2007 are fixed in the Environmental Annual plan. The goals of 2005 were included in the goals of 2006. In the text below the status of these goals are indicated.

### 1. Awareness and risk assessment

#### 1.1 Information to all staff

- Environmental issues will be presented in 2 unit meetings per year. (closed / average of 4 per unit)
- The environmental information to all staff through intranet will be increased. A dedicated intranet site will be developed and introduced. (closed)

#### 1.2 Hazardous substances

- Analyze the current processes for ordering, storage and handling of hazardous substances. (pending)

### 2. Consumption of natural resources

#### 2.1 Reduce consumption of natural resources

- Perform an energy scan which should show possibilities for reducing energy consumption. (pending)
- Defining actions coming from the energy scan. (pending)

### 3. Environmental performance indicators system

#### 3.1 Define environmental performance indicators

- Set up IE goals and Unit goals related to the environment. (closed)
- Improve the data management and the availability of reliable data on resources (e.g. use of: water, paper, energy, etc). (ongoing)

# ENVIRONMENTAL IMPACTS

## ENERGY

### Use of energy and improvement of energy-efficiency

Table Consumption of gas and electricity

Year	Gas (m3) (excl. HFR)	Gas CO2 emission (tonnes)	Electricity (kWh) (excl. HFR)	Electricity CO2 emission (tonnes)	Nr. days with temperature < 0°C
2004	435 324	775	2 932 122	1660	68
2005	440 662	784	2 588 599	1465	51
2006	455 356	811	2 804 447	1587	62

## AIR

### Use and emissions to air of substances that have an effect on the ozone layer and increase greenhouse effect.

The emissions to air originate mainly from test facilities in laboratories. These emissions are very low and where possible the laboratory managers are informed of ways to reduce the amount of emissions. In 2006 there were no emissions of substances to air which were above the legal limits.

### Cooling installations

In 2006 some of the installations have been refilled due to leakages.

Cooling agents	Installations refilled	Emission (kg)
R22	8 installations (2 were removed)	64.70
R134A	1 installation	0.50

### Replacement of Freon

In the "Lange termijn plan voor de vervanging van freon in koelcircuits op het GCO terrein in Petten" report in 2005 it is concluded that there are existing cooling machines working on R22 which have to be replaced before the 1st of January 2015.

The decommissioning of some old machines still running on R22 proceeded in 2006. However, the great majority of these cooling systems will only be decommissioned as part of the ongoing renovation of buildings and they will be removed during 2007.

As most of the machines will be decommissioned in 2007/2008 and the remaining will reach the end of their useful lifetime before January 2015, the complete Freon replacement plan will be concluded before the legal timeframe.

## WASTE

### Reuse of waste

Glass, metal, wood and paper are collected by the waste collection company SITA. SITA indicates that these materials are all recycled.

In addition to this the IE donates empty cartridges to a charitable cause.

Table Type of waste by volume or weight

Type of waste	2004	2005	2006
	Amount	Amount	Amount (kg)
Household waste*	36.5 t	1206 m <sup>3</sup>	111360
Paper and cardboard*	28 t	338 m <sup>3</sup>	14292
Wood*	60 m <sup>3</sup>	44 m <sup>3</sup>	7200
Glass*	3 m <sup>3</sup>	3 m <sup>3</sup>	250
Metal*	100 m <sup>3</sup>	32 m <sup>3</sup>	2400
Small chemical:			
Batteries	160	400	60
Cartridges	300 pieces	300 pieces	45 pieces
Laboratory mixed waste	0 kg	3.3 kg	19
Oil filters; oil containing products	60 kg	23 kg	13
Solvents	86 kg	5 kg	256
Spray containers, paint	90 kg	16.14 kg	15
Developer	272 kg	0	0
Oil	117 kg	64.1 kg	22
Acid	14 kg	0	0
Sodium/potassium	0 kg	0	0
Medical waste	n.a.	1 kg	0

\* The contract with the waste collection company was changed so the waste is now weighed in kg.

The amount for solvents is higher because there was a very low quantity disposed of in 2005 and there has been a clearout of chemicals in several laboratories in 2006.

During the execution phase of the renovation project waste management is performed by the main contractor.

## WATER

The consumption of water in different buildings was measured. However, for the facilities/laboratories in these buildings it is not reasonable to split the water consumption between household water and process water because the water consumption for processes is very low.

The FCTEST facility is the only facility which has a substantial consumption of water in the work process and is located in building 310. The facility has no separate measurement point so it is not possible to divide the household water from the process water. The test facility used an open loop system during 2006 which is why the water usage in that building is higher than normal. A closed loop system is now installed and in use.

Due to renovation works on site, building 309 was not in use for a large period in 2006. Temporary building 330 has taken over the function of building 309.

Table Water balance in m<sup>3</sup>

Building	2004	2005	2006
<b>Total</b>	<b>4402</b>	<b>3 334</b>	<b>4575</b>
113	n.a.	n.a.	39
300	n.a.	n.a.	239
308	n.a.	n.a.	348
309	n.a.	n.a.	129
310 (incl. FCTEST)	n.a.	n.a.	1188
311	n.a.	n.a.	0
312	n.a.	n.a.	740
313	n.a.	n.a.	85
314	n.a.	n.a.	127
315	n.a.	n.a.	138
320	n.a.	n.a.	23
325	n.a.	n.a.	145
330	n.a.	n.a.	323
Building site	n.a.	n.a.	144
Bluswater	n.a.	n.a.	907

## Emission to water

Table Release of heavy metals to the drain system

Metal	Concentration (mg/m <sup>3</sup> )		
	2004	2005	2006
Cadmium (Cd)	< 1.0	< 0.4	< 0.4
Chromium (Cr)	< 5.0	< 5.0	< 5.0
Copper (Cu)	54	64	64
Nickel (Ni)	< 5.0	< 5.0	< 5.0
Lead (Pb)	< 5	< 5.4	< 5.0
Zinc (Zn)	70	100	110
Mercury (Hg)	< 0.1	< 0.1	0.24
Arsenic (As)	< 2	< 2	2

Table Inorganic emissions to the drain system

Substance	Concentration (g/m <sup>3</sup> )		
	2004	2005	2006
Chloride(Cl <sup>-</sup> )	190	200	180

## SOIL

### Protection and clean up of soil

In the course of 2004 we executed an extensive investigation on the quality of the soil around the main buildings of the Institute (excluding the NRG complex). This investigation targeted mainly the possible existence of asbestos-like contaminants in the soil.

Two locations were found to be slightly contaminated (below the required intervention limit) with asbestos materials. The soil of these locations was removed and properly disposed of by a specialised company and filled again with clean sand.

Considering that the soil investigation campaign of 2004 showed a generally good quality of the soil in the area of the Institute (apart from the two locations where we intervened) no further actions have been taken on this issue.

An active soil protection policy was agreed upon at the Institute during 2006. Several areas recently returned to the natural area by having replanted them with native grasses to stabilise the sand and by replanting trees and shrubs that were condemned by construction works in new locations at the Institute. The artificial dune covering the SYSAF laboratory was also planted with native grasses not only to stabilise the sand but also to provide a more natural environment to the surrounding area.

## **EXTERNAL SAFETY**

### **Storage of dangerous substances and gases**

After an inspection one gas storage was adjusted to comply with the requirements for fire resistance. Another storage area was built to separate installations and gas bottles. Several other improvements were implemented to enhance the safety of storage of substances and gases.

### **ATEX**

In order to comply with the ATEX guidelines to reduce the risks of potentially explosive atmospheres, an external company performed an inventory of relevant laboratories and storages on the site. Different measures have been proposed and will be implemented to comply with the ATEX requirements.

**European Commission**

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**Abstract**

The Safety and Environmental Annual Report 2006 describes the health, safety and environmental activities, targets, impacts and management system of the JRC Institute for Energy in Petten.

The mission of the Joint Research Centre is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

