

# AREVA AND SUSTAINABLE DEVELOPMENT – 2003 REPORT

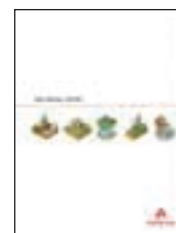


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> To learn more, see the 2003 Summary Annual Report and the 2003 Annual Report, available at [www.aveva.com](http://www.aveva.com) or upon request at:  
 AREVA  
 Financial Communications Department  
 27-29, rue Le Peletier – 75009 Paris  
 Tel. : 33 (0)1 44 83 71 00





## > MESSAGE FROM THE CHAIRMAN

*“We believe that sustainable development is not just a matter for specialists. It involves each of us in our work and in our daily lives.”*

Our first report helped establish the status of our entities' sustainable development performance and identify areas for improvement. This second report will report on our **continuous improvement process**, including accomplishments and projects initiated as well as difficulties encountered and ground yet to be covered.

Two new tools support this process. Our **AREVA Way self-assessment model**, which allows each unit to assess its own performance against our sustainable development commitments, was implemented by seven entities in 2003 and will be implemented throughout the entire group in 2004. Similarly, the **AREVA values charter** developed in 2003, founded on the UN Global Compact, lays down ethical principles of action and rules of conduct for our group. The charter will be distributed to our employees and regular suppliers in 2004.

**We wanted our 2002 report to strengthen dialogue with our stakeholders.** To that end, we organized internal as well as external discussion sessions. The critique and suggestions received are helping us to improve our initiative, and we have taken them into account in our report.

In 2003, **energy issues and their environmental consequences** once again asserted their importance, whether in connection with the national energy debate in France or the continuing talks on climate change at the international level.

The acquisition of Alstom's transmission and distribution operations in early 2004 broadened our group's energy products, systems and services. Over the coming months, we will devote considerable effort to extending the sustainable development initiative to these operations.

We wish to continue the dialogue. I invite any person or organization so inclined to share their views, questions and comments with us. In so doing, we can improve together.

ANNE LAUVERGEON

# AREVA profile

**With manufacturing facilities in over 40 countries and a sales network in over 100, AREVA offers customers technological solutions for nuclear power generation and electricity transmission and distribution.**

The group also provides interconnect systems to the telecommunications, computer and automotive markets. These businesses engage AREVA's 70,000 employees in the 21st century's greatest challenges: making energy and communication resources available to all, protecting the planet, and acting responsibly towards future generations.

**[www.aveva.com](http://www.aveva.com)**



## > FRONT END DIVISION

This division includes the group's business lines involved in producing nuclear fuel for electric power generation: uranium mining, concentration, conversion and enrichment, and nuclear fuel fabrication. Customers buy uranium concentrates from AREVA and contract for commercial processing and fuel fabrication services, retaining ownership of their materials throughout these operations.

### Business Units

Mining
Chemistry
Enrichment
Fuel



## > REACTORS AND SERVICES DIVISION

This division designs and builds pressurized water reactors (PWR), boiling water reactors (BWR) and research/test reactors. It also provides products and services for the daily maintenance and operation of all types of nuclear power plants. AREVA is dedicated to helping its customers meet increasingly demanding requirements by working to reduce kilowatt-hour costs and ensure total plant safety.

### Business Units

Reactors
Equipment
Nuclear Services
Nuclear Measurement
Consulting and Information Systems
Mechanical Systems
Technicatome

**€8.255B\***

2003 sales  
(€8.265B in 2002)

**€342 M\***

2003 operating income  
(€180M in 2002)

**€389 M\***

2003 consolidated net income  
(€240M in 2002)

**48,011\***

employees

\*2003 figures do not include the AREVA T&D division, which joined the AREVA group on January 9, 2004. (For more information, see the 2003 Annual Report.)



> BACK END DIVISION

This division encompasses the treatment and recycling of fuel that has been used in nuclear power plants. As part of the sustainable development and environmental protection process, AREVA has developed best-in-breed technologies to separate materials and recycle 96% of the spent fuel. The group also provides solutions to customers opting for interim storage of their used fuel.



> TRANSMISSION AND DISTRIBUTION DIVISION

This division provides equipment, systems and services to the medium- and high-voltage energy markets. Its products are used to transmit and distribute electricity from the power plant to the final user while managing information flows, ensuring reliable, safe, high-quality power distribution and efficient electric grid operations.



> CONNECTORS DIVISION

This high-precision industry designs and manufactures electrical, electronic and optical connectors, flexible microcircuitry and interconnection systems. Connectors are used to join cables and equipment to electrical and electronic components and are essential to the operation of a multitude of industrial and consumer products. AREVA is active in this market through its subsidiary FCI.

Business Units

- Treatment
- Recycling
- Engineering
- Cleanup
- Logistics

Business Units

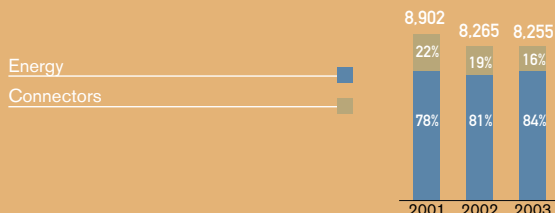
- Electrical Distribution Systems
- Transmission Projects
- Medium Voltage
- High Voltage
- Energy Automation and Information
- T&D Services

Business Units

- Communications Data Consumer
- Automotive
- Electrical Power Interconnect
- Microconnections

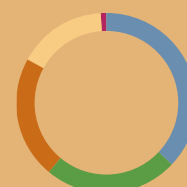
Change in sales\*

in millions of euros



Sales by region\*

- France 37%
- Europe (excluding France) 24%
- North & South America 22%
- Asia-Pacific 16%
- Africa 1%



# Our role in key sustainable development issues

One of the 21st century's greatest challenges is to fight poverty and underdevelopment while conserving natural resources and preserving the environment for future generations. For energy, an essential component of this lofty goal, the challenge consists of meeting rising development-driven demand while combating climate change.

As a supplier of solutions for nuclear power generation and electricity supply, AREVA is directly concerned by these global issues.

## THE ENERGY CHALLENGES

**There can be no economic, social or health development without energy.** All of the World Health Organization's studies show this. Accessible drinking water and improved health conditions are not possible without energy. If a majority of mankind is not to be left behind in the development race, we must be prepared to meet a sharp increase in energy demand.

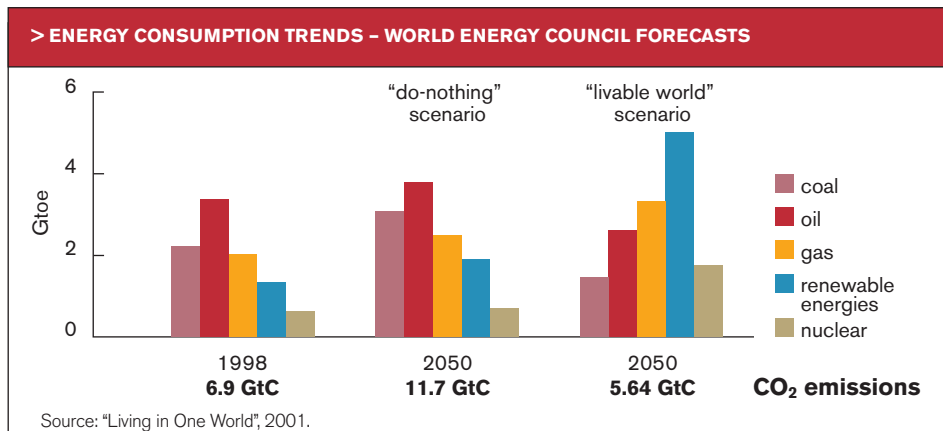
**The current energy model, relying heavily on the use of fossil fuels, is not sustainable.** It consumes natural resources much faster than they can be replaced. It also increases atmospheric concentrations of CO<sub>2</sub>, responsible for amplifying the greenhouse effect and its economic and ecological impacts.

Steps must be taken quickly to counter this situation:

- Improve energy efficiency (fight overconsumption, change lifestyles, adopt less energy intensive growth models...).
- Give priority to developing energies with minimal greenhouse gas emissions, such as nuclear power and renewable energies.
- Practice carbon sequestration.

The World Energy Council compared two scenarios on either end of the spectrum:

- The "do-nothing" scenario: economic and ecological crises resulting from rising fossil energy prices and global warming translate into lower economic and demographic growth.
- The "livable world" scenario: economic development goes hand in hand with greenhouse gas reduction. The rise in energy demand accompanying economic development is met by much greater reliance on renewable energies – the majority from hydropower – and on nuclear power.



<http://www.worldenergy.org/wec-geis/>

## > WHAT IS SUSTAINABLE DEVELOPMENT?

Sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland report, "Our Common Future", 1987).

Raising power lines in North Africa



This is achieved through a continuous improvement initiative. For the company, continuous improvement is built on the three equal pillars of a long-range vision: economic development, addressing the expectations of our employees and stakeholders, and respect for the environment.

## NUCLEAR POWER IS ESSENTIAL TO GREENHOUSE GAS REDUCTION

**Nuclear power alone cannot confront these challenges, but there can be no sustainable solution without it.** Worldwide installed nuclear generating capacity – accounting for almost 17% of all power generation – reduces CO<sub>2</sub> emissions by 2.2 billion metric tons per year, or the equivalent of two-thirds of Europe's annual emissions. This number might double or even triple over the next thirty years. The economic growth of developing countries will inevitably lead to an increase in greenhouse gas emissions. To compensate for such an increase and maintain worldwide equilibrium, developed nations will have to maintain and develop nuclear power. These nations can ensure rigorous control of the risks associated with nuclear energy and responsible radioactive waste management. The performance already achieved in these areas speaks volumes. The situation in Finland and the US, where final disposal sites for high-level, long-lived waste have been successfully chosen through the democratic process, shows that the radioactive waste management question can be resolved. The nuclear industry never ceases to make progress, in particular by developing advanced reactors with enhanced performance, both economically and in terms of risk and waste management.

These are little-known facts. Nuclear power continues to be the target of questioning and debate. To achieve greater acceptance of this form of energy, dialogue must be encouraged and the industry must be more transparent.

## WHAT AREVA IS DOING

**As the world leader in nuclear power, AREVA brings solutions** for building ever-safer and more cost-effective reactors, maintaining them, and managing their nuclear fuel. By treating the used fuel, we offer a proven method of recycling reusable materials (some 96% of the used fuel), reducing final waste volumes (to almost five times less than for untreated fuel) and packaging the waste into forms safe for storage and later disposal.

Our first priority is a very high level of nuclear safety in all of our operations. At AREVA, this is the bedrock of our industrial policy and we devote considerable resources to it every year. We also rigorously apply treaties and regulations aimed at preventing the proliferation of nuclear weapons.

At AREVA, we are prepared to assume our responsibilities fully as a corporate member of society. We have strengthened our policies on transparency and communication to improve how we answer the legitimate questions that our activities may raise. We support dispassionate debate based on fact, and we are firmly committed to greater dialogue and consensus-building with all of our stakeholders.

## > NUMBERS TALK

- 2.4 billion people live on less than 2 dollars a day
- 2 billion people do not have access to electricity
- 1.3 billion people do not have access to drinkable water
- oil reserves that took over 1 million years to accumulate are burned each year
- the earth's temperature could increase 2 to 6°C (~4 to 12°F) during the 21st century

# Our commitments

**Sustainable development is a keystone of our industrial strategy** for achieving profitable, socially responsible and environmentally respectful growth. That goal gives rise to 10 commitments.



## CUSTOMER SATISFACTION

Listening to our customers, anticipating their needs, supporting their growth, increasing and measuring their satisfaction.



## FINANCIAL PERFORMANCE

Ensuring the group's sustainability through long-term profitable growth.



## GOVERNANCE

Conducting our operations responsibly in accordance with the group's values; regularly assessing and faithfully reporting on our performance to shareholders and all stakeholders.



## ECONOMIC DEVELOPMENT





## RESPECT FOR THE ENVIRONMENT

### RESPECT FOR THE ENVIRONMENT

Minimizing our environmental impacts by reducing our consumption of natural resources, controlling our releases and optimizing waste management.

#### INNOVATION

Developing and deploying the most advanced technologies to anticipate customer needs and increase our competitive advantage while meeting health, safety and environmental protection requirements.

#### CONTINUOUS IMPROVEMENT

Deploying a continuous improvement initiative based on sharing best practices from throughout the group.

#### RISK MANAGEMENT AND PREVENTION

Ensuring the highest levels of safety to preserve the health and well-being of our employees and members of the public, and to protect our environment.

#### COMMUNITY INVOLVEMENT

Participating in the economic and social development of communities in which the group operates.

#### COMMITMENT TO EMPLOYEES

Promoting our employees' professional development and providing excellent work conditions.

#### DIALOGUE AND CONSENSUS-BUILDING

Establishing and nurturing relations based on trust with our stakeholders.



## MEETING STAKEHOLDERS' EXPECTATIONS



# Governance

**AREVA is committed to managing its operations responsibly and to reporting on them regularly and faithfully to all stakeholders.**

## **AN ORGANIZATION ALIGNED WITH PRINCIPLES OF GOOD GOVERNANCE**

The Executive Board provides leadership and management for the group. The sixteen-member Supervisory Board, including four independents and three employee-elected representatives, provides oversight and represents the shareholders. Four committees support the Supervisory Board: the strategy committee, the audit committee, the compensation and nominating committee, and the nuclear cleanup and decommissioning funding committee. This last committee reviews estimates of future cleanup and dismantling expenses, oversees funds earmarked for these expenses, and monitors the financial management strategy for the corresponding assets.

*More detailed information on these committees is provided in the Summary Annual Report and in the Annual Report.*

AREVA's science and ethics committee reviews major social issues linked to the energy sector and formulates recommendations to the chairman of the Executive Board.

### **> MEMBERS OF THE SCIENCE AND ETHICS COMMITTEE**

Chaired by Professor **Maurice Tubiana**, former chairman of the Académie de médecine, member of the Académie des sciences, where he chairs the environment committee, and chairman of the Centre Antoine-Béclère.

The following members form the AREVA's science and ethics committee:

- **Roger Balian**, chairman of the Société française de physique and member of the Académie des sciences;
- **Francis Balle**, professor at Université Paris II, former member of the Conseil supérieur de l'audiovisuel (CSA);
- **Geneviève Barrier-Jacob**, professor emeritus at Necker children's hospital, former director of the Paris medical emergency services (SAMU), and former vice-chairman of the French National Ethics Committee;
- **Patrick Champagne**, sociologist with the Institut national de la recherche agronomique (INRA);
- **Georges Charpak**, Nobel Prize in Physics;
- **Hubert Curien**, former chairman of the Académie des sciences, former minister;
- **Georges David**, professor, member of the Académie de médecine, former member of the French National Ethics Committee;
- **François Ewald**, professor at Conservatoire national des arts et métiers (CNAM) and member of the Environmental Charter Commission chaired by Yves Coppens;
- **Roland Masse**, member of the Académie des technologies, associate member of the Académie de médecine, former chairman of the Office de protection contre les rayonnements ionisants (OPRI);
- **Michel Serres**, science historian, member of the Académie française;
- **Alain Touraine**, sociologist, dean of the École des hautes études en sciences sociales.

*“Good governance, a fundamental criterion for long-term development, presupposes that business ethics are thought through before corporate decisions are made, have been explained to the employees, and can be verified in action.”*

**GENEVIÈVE BARRIER-JACOB**  
MEMBER OF THE AREVA ETHICS  
COMMITTEE, FORMER VICE-  
CHAIRMAN OF THE FRENCH  
NATIONAL ETHICS COMMITTEE



## OBJECTIVES

**PRESENT** THE CHARTER TO THE CENTRAL WORK COUNCILS AND DISTRIBUTE IT TO EMPLOYEES

**INSTITUTE** A NETWORK OF CORRESPONDENTS FOR THE GROUP'S BUSINESS ETHICS ADVISOR

**INTERNATIONALIZE** THE AWARENESS SEMINAR ON THE GROUP'S ETHICS AND VALUES

**INITIATE** THE PROCESS OF COMPLIANCE VERIFICATIONS SIGNED BY THE HEADS OF THE SUBSIDIARIES

### THE AREVA VALUES CHARTER

**The fruit of management deliberation, the AREVA values charter is founded on the nine principles of the UN Global Compact** for sustainable development and on OECD guidelines for businesses. It is structured around seven values that give rise to auditable principles of action and rules of conduct.

The Executive Board presented the charter to the Supervisory Board in June 2003, and the chairman explained it to senior executives in November 2003. It will be distributed to our employees in 2004, once the central work councils of the main subsidiaries have been informed. Regular subcontractors and suppliers will also be asked to subscribe to the charter. It is management's responsibility to implement the charter. Beginning in 2004, each subsidiary president will report on implementation annually by means of a compliance letter to its leading shareholder.

Our business ethics advisor was appointed at the end of 2002 and will act as a sounding board and advisor on matters relating to ethics and adherence to group values. He will handle cases presented to him, supported as needed by the appropriate corporate departments. He will spearhead an ethics network to be established throughout the group.

The ethics advisory committee created in late 2003 will monitor the charter's implementation. The committee is chaired by the group's vice-president of legal affairs and its members include the business ethics advisor, members of the science and ethics committee, and operating managers.

AREVA University has made ethics and values a key training subject and plans to build awareness among more than one hundred senior managers of all nationalities by the end of 2004.

### > FOCUS

#### PARTICIPATION IN THE UN GLOBAL COMPACT <sup>(1)</sup>

**AREVA subscribed to the UN Global Compact in March 2003. The Compact rallies companies – more than 1,000 at latest count –, labor organizations and civil society organizations around nine universal principles on human rights, labor standards and environmental protection.**

**(1) <http://www.unglobalcompact.org>**

UN  
headquarters (USA)



# Our initiative

*“As young managers, we are completely convinced of the importance of sustainable development and are now waiting for the investments, the long-term programs and the evidence of our leaders’ personal commitment that measure up to our expectations.”*

**PATRICK  
COGEMA, FRANCE**

**AREVA's continuous improvement initiative is based on defined performance objectives and on assessing and tracking each entity's performance.**

The table on the following pages gives a snapshot of key projects and their current status. More detailed information is provided in the following chapters.

PRINCIPLES	OBJECTIVES
GOVERNANCE AND LEADERSHIP	Develop the group's values charter
	<ul style="list-style-type: none"> <li>• Build management awareness of our ethics and values</li> </ul>
CONTINUOUS IMPROVEMENT	Organize a sustainable development and continuous progress symposium
	Implement AREVA Way in six pilot units
	<ul style="list-style-type: none"> <li>• Strengthen sustainable development training</li> </ul>
	<ul style="list-style-type: none"> <li>• Continue efforts to make SDCI reporting more reliable</li> </ul>
RISK MANAGEMENT AND PREVENTION	Extend nuclear safety inspectors' mission to entire group
	Perform simplified risk assessments (SRA) or their equivalent on 100% of the non-nuclear environmentally significant sites
FINANCIAL PERFORMANCE	Restore positive cash flow in the Connectors division
	<ul style="list-style-type: none"> <li>• Strengthen sustainable development as part of the purchasing process</li> </ul>
INNOVATION	<ul style="list-style-type: none"> <li>• Develop eco-design initiatives</li> </ul>
CUSTOMER SATISFACTION	Put customer satisfaction surveys into widespread use
COMMITMENT TO EMPLOYEES	Establish a European works council
	Put internal opinion surveys into widespread use
	<ul style="list-style-type: none"> <li>• Achieve average lost time accident frequency rate of <math>\leq 5</math> and average lost time accident severity rate of <math>\leq 0.2</math></li> </ul>
	Add HHA-type health section to environmental analyses of environmentally significant sites
	Reduce maximum dose exposures in group facilities to 20 mSv/man-year, including countries where regulations allow greater exposures
COMMUNITY INVOLVEMENT	Participate in local economic development
	Consult with employees on preferred areas for patronage and sponsorship
	Map stakeholder relations at three pilot sites
DIALOGUE AND CONSENSUS-BUILDING	Increase dialogue with NGOs
	<ul style="list-style-type: none"> <li>• Standardize content of existing environmental reports and extend publication to all environmentally significant sites</li> </ul>
	Implement EMS at all sites and obtain ISO 14001 certification for the EMS of environmentally significant sites (ESR)
RESPECT FOR THE ENVIRONMENT	Reduce water usage by 20% (excluding Eurodif and Célestin reactors at Marcoule)
	Reduce energy consumption by 15% (excluding Eurodif)
	Develop an assessment method for building energy efficiency and apply it to all existing service premises with a surface area exceeding 1,000 m <sup>2</sup>
	Standardize radiological impact assessment models for main nuclear sites
	Reduce direct emissions of greenhouse gases by 20%
	Reduce the Connectors division's air emissions of chlorinated solvents by 80%
	Reduce the tonnage of final conventional waste placed in landfills by 30%
	Reduce the volume of packaged radioactive waste from operations shipped to disposal sites by 10%

Key achievements in 2003	Progress chart
Charter presented to senior managers in November 2003 <input checked="" type="checkbox"/>	
First awareness-building session held in Paris in November 2003 <input checked="" type="checkbox"/>	<b>ONGOING</b>
260 AREVA managers, including T&D, met on February 2-3, 2004 <input checked="" type="checkbox"/>	
Self-assessments performed by 16 entities <input checked="" type="checkbox"/>	
50 managers trained in AREVA Way, including 15 continuous improvement leaders <input checked="" type="checkbox"/> Creation of a self-training CD-ROM on sustainable development	<b>ONGOING</b>
Organization of 2002 lessons learned, audits at eight sites <input checked="" type="checkbox"/>	<b>ONGOING</b>
First inspections performed at Framatome ANP sites <input checked="" type="checkbox"/>	
Objective 40% completed at end-2003	
2003 operating income in Connectors before restructuring: €21M	
Provide UN Global Compact principles to group suppliers	<b>ONGOING</b>
Eco-design training organized with Université de Troyes, France, in December 2003 <input checked="" type="checkbox"/>	<b>ONGOING</b>
Framatome conducted customer satisfaction survey worldwide <input checked="" type="checkbox"/>	<b>ONGOING</b>
Agreement signed December 3, 2003 <input checked="" type="checkbox"/>	
COGEMA performed internal opinion survey in July 2003 <input checked="" type="checkbox"/>	<b>ONGOING</b>
The group's occupational safety policy was put into writing <input checked="" type="checkbox"/>	
HHAs completed at COGEMA-La Hague, COGEMA-Marcoule, SICN-Annecy and Cézus-Jarrie sites	
Mining BU action plan in Niger: maximum of 18 mSv for all employees starting November 2003	
Second enterprise village established in Creusot, France Sponsorship of Maison de l'Image in Chalon-sur-Saône, France	<b>ONGOING</b>
More than 80 employees interviewed in France, the US and Germany <input checked="" type="checkbox"/>	
COGEMA-La Hague and former Limousin mines in France and Lingen site in Germany chosen <input checked="" type="checkbox"/>	
Participation in Comité 21, partnership with Planète Urgence (formerly Congé Solidaire), SOS Sahel <input checked="" type="checkbox"/>	<b>ONGOING</b>
Environmental report preparation methodology incorporating labor and social aspects developed	
ISO 14001 certification for COGEMA-Pierrelatte, COGEMA-Marcoule and Jeumont (France), FCI sites in Markham (Canada) and Kyongju (South Korea), Cominak (Niger) and COGEMA-Logistics <input checked="" type="checkbox"/>	
Study conducted on optimization of COGEMA-Marcoule water usage	
Study completed on optimization of energy consumption at COGEMA-La Hague	
Method under development	
In-house "radiological impact" task force set up	
Study conducted on elimination of SF <sub>6</sub> releases at Comurhex-Pierrelatte	
Methylene chloride eliminated in Ishioka (Japan)	
Continued inventory and employee awareness building activities, reduction of industrial waste by 24%	
Installed decontamination and recycling process for lead from Marcoule cleanup and dismantling operations	

● New objective Completed In progress  Verified by Ernst & Young in 2004

### Upcoming milestones

- Distribute charter to employees and regular suppliers  
Have each head of subsidiary sign an annual letter of compliance  
Organize four other sessions in 2004
- Integrate AREVA Way into business and budget processes no later than 2005, including AREVA T&D  
Continue leadership training in continuous improvement  
Distribute CD-ROM to managers  
Extend reporting scope to include AREVA T&D
- Establish nuclear safety charter in 2004  
Make INES scale the standard for incident reporting at all of the group's nuclear sites worldwide  
Continue to work towards the objective
- Develop and disseminate the group's purchasing charter
- Set up an eco-design network
- Standardize the customer satisfaction survey format and approach
- Adopt standard format based on 18-24 month cycle
- Perform external occupational safety audits at 100% of the sites by the end of 2006  
Continue to work towards the objective
- Continue improvement program for applying ALARA principle  
Aim to comply with this limit for services performed for other nuclear companies  
Redevelop Pontarlier plant site  
Set up network of economic development correspondents at the main sites
- Specify the main lines of the group's patronage and sponsorship strategy
- Anchor stakeholder mapping initiative in AREVA Way process to ensure gradual implementation  
Continue to work towards the objective
- Gradual broadening of scope to all environmentally significant sites
- Establish simplified EMS for service businesses and other sites with minimal environmental risk
- Apply method to Tricastin site
- Establish action plan with quantified objectives for all environmentally significant sites
- Finalize method, identify premises concerned
- Broaden validation of radiological impact calculation models to include major nuclear sites
- Continue efforts to eliminate SF<sub>6</sub> releases at Comurhex-Pierrelatte
- Continue to work towards the objective
- Continue to build awareness about selective sorting and waste minimization
- Redefine radioactive waste reduction objection based on type of storage/disposal

# Organization and management systems

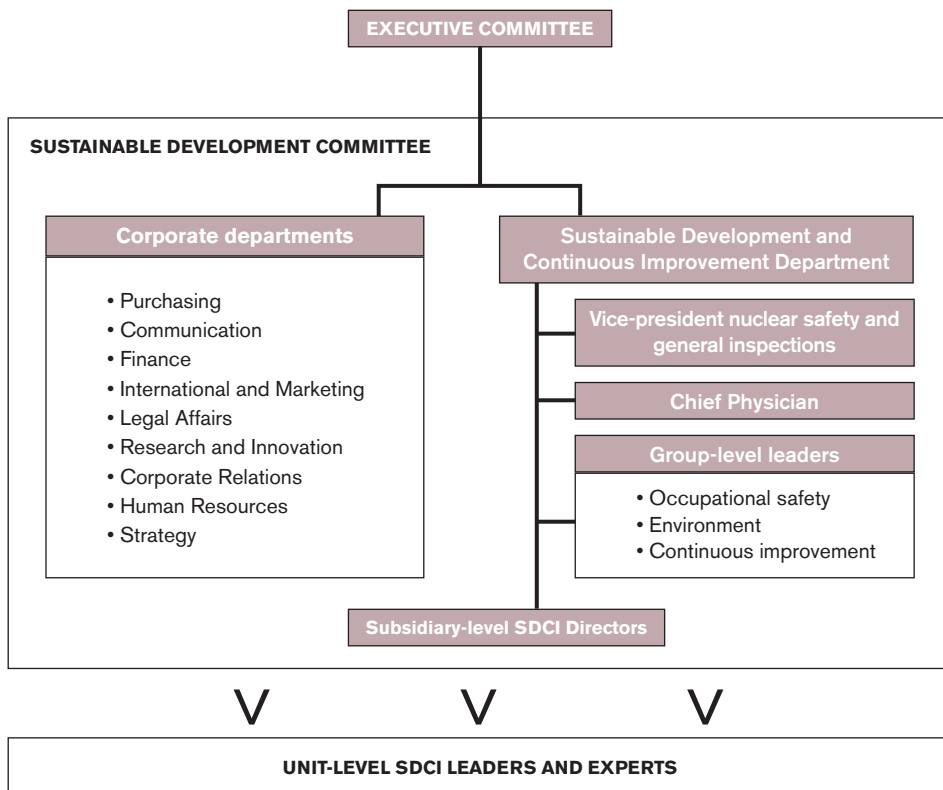
**Every level of the AREVA group is involved in our Sustainable Development and Continuous Improvement initiative, whose driving force is the Executive Committee.** The initiative is based on several years practice with certified management systems. A specially developed set of management criteria and performance indicators, which together form what we call the AREVA Way, sustain and support our initiative (see p. 14).

## A DEDICATED ORGANIZATION

**Our initiative is spearheaded by the Sustainable Development and Continuous Improvement Department (SDCI),** which oversees our programs for nuclear safety, the environment, health, occupational safety, continuous improvement and local economic development. The Sustainable Development Committee, made up of representatives from the applicable corporate departments and SDCI leaders from our first-tier subsidiaries, meets monthly to discuss current issues and review progress.

At the subsidiary, business unit and site levels, we have established a network of leaders and subject area experts to implement our policy.

We also designed a self-training CD-ROM on sustainable development and continuous improvement. Developed as a tool for in-house trainers, it will also help each individual apply these principles in their daily work.



*“Our site was certified under ISO 14001 in December 2001. Aside from certification, we have always sought to maintain high standards in order to improve our system continually. Thanks to the involvement of our employees, support from our customers and participation by our suppliers, we successfully renewed our certification in August 2003.”*

**JOHN GOH**  
FCI OPERATIONS MANAGER  
FOR DONGGUAN, CHINA





## OBJECTIVES

**INTENSIFY** SUSTAINABLE DEVELOPMENT TRAINING

**CONTINUALLY IMPROVE** REPORTING RELIABILITY

## CERTIFIED MANAGEMENT SYSTEMS

**AREVA companies have used continuous improvement practices for many years.**

- The Nuclear Power and Connectors businesses were among the first to establish quality assurance systems in the 1970s.
- Over the past ten years, these quality assurance systems have evolved into total quality management initiatives aimed at continuously improving the quality of our products, services and processes.

Our management systems are recognized by independent certification organizations:

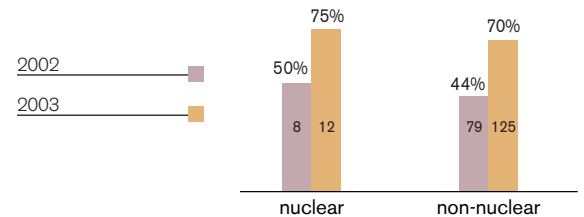
- 75% of our nuclear sites and 70% of our non-nuclear sites are certified under ISO 9001:2000.
- FCI uses the ISO/TS quality assurance system model for several years, and five new sites received ISO/TS 16949 certification in 2003.
- ISO14001-compliant environmental management systems (EMS) are in place at 67% of our nuclear sites and 58% of the other sites with significant environmental aspects (see list, p. 45).
- In the health and safety field, OHSAS 18001 certification initiatives are in progress.

## PERFORMANCE DRIVERS

**We have put tools in place at AREVA to measure our environmental, social and financial performance** so that we can draw comparisons among subsidiaries, quantify improvement and roll out action plans. We updated our 2002 guide for measuring sustainable development to include lessons learned in the 2003 version and adapt measurement methods to the distinctive features of each region in which we operate. And thanks to audits conducted at eight sites in France, Germany and the United States, we have identified ways of making sustainable development reporting even more reliable.

We will continue to pursue these efforts, continuously improve sustainable development reporting, and regularly enrich it with new social indicators.

### Number and % of ISO 9001:2000-certified sites



## > KEY CERTIFICATIONS IN 2003

### ISO 14001 certification

The COGEMA-Pierrelatte, COGEMA-Marcoule and Jeumont sites (France), Cominak (Niger), and the FCI sites in Markham (Canada) and Kyongju (South Korea), COGEMA-Logistics

### OHSAS 18001 certification

The Cézus-Jarrie site (France)

### ISO 9001:2000 certification

The SGN sites, the North American sites of FCI's EPI<sup>(1)</sup> business unit, Technicatome's operations and Euriware's systems integration and outsourced applications maintenance business lines

### ISO/TS 16949 certification

FCI's sites at La Ferté-Bernard (France), Ishioka (Japan), Markham (Canada), Kyongju (South Korea), Cochin (India)

(1) Electrical Power Interconnect.

# AREVA Way

**AREVA established the AREVA Way self-assessment model in 2002** to implement our sustainable development policy through a process of continuous improvement.

**AREVA Way revolves around the group's 10 sustainable development commitments.**

Each commitment gives rise to a set of performance improvement goals. Each goal, in turn, is broken down into several continuous improvement criteria, adding up to a total of 100. For each of these criteria, AREVA's businesses assess their practices and performance on a scale of 1 to 4, backed by evidence of their achievements.

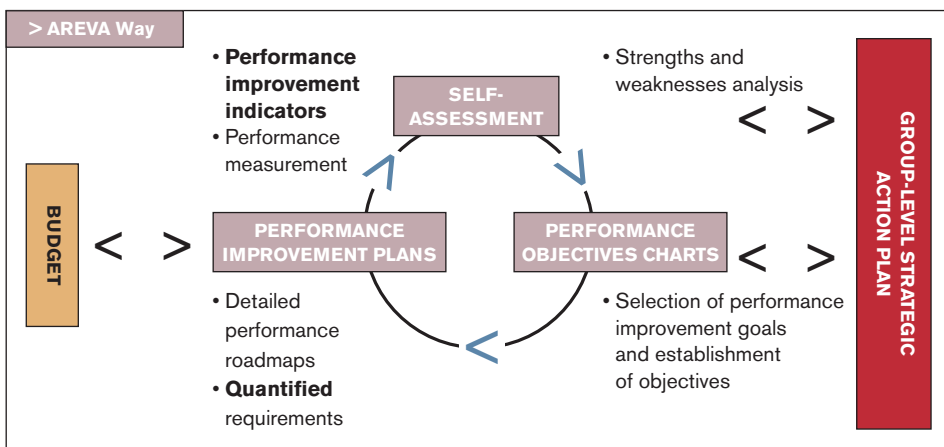
The four assessment levels correspond to varying stages of performance improvement: initiated, deployed, operational and excellence. This progression is indicative of a growing command of methodologies, a widening scope of coverage, increasing stakeholder involvement and ultimately better performance.

**PRINCIPLE 6: RESPECT FOR THE ENVIRONMENT**  
**GOAL 61. ENVIRONMENTAL POLICY AND ISSUES**

**613. Environmental analysis and risk mapping**

- 1** | Environmental impacts and risks are only identified when problems arise (neighborhood, regulator, employee complaints, etc.).
- 2** | A pro-active approach is used to identify major impacts and related risks.
- 3** | The identification approach is systematically and exhaustively conducted, resulting in an environmental analysis and a risk map.  
 • Major environmental aspects are prioritized to provide data used in developing environmental performance improvement objectives.
- 4** | The environmental analysis is regularly presented to the stakeholders involved.  
 • The environmental analysis and risk map are regularly revised to factor in operating feedback and opinions expressed by the stakeholders involved.

AREVA Way was implemented by 16 of the group's companies in 2003. We will gradually roll it out in all units, the goal being to integrate it into the strategic and budgetary management process. 2003 was a landmark year in that respect, for we systematically examined the business units' sustainable development indicators – relating to occupational safety, radiation protection and the environment – when they presented their proposed 2004 budgets.



*“Our site has five years of self-assessment practice based on the EFQM. For the past 18 months, we have been looking for a tool to take us further. AREVA Way is more specific to AREVA's values and objectives. It is like a continuous improvement roadmap that allows each of us to see where we are and to map out an itinerary towards excellence. It also strengthens the ties among the units, and in that it is very unifying.”*

**PASCAL VAN DORSELAER**  
 DIRECTOR OF FCI'S CÉZUS  
 DE MONTREUIL-JUIGNÉ AND  
 PAIMBŒUF SITES



## OBJECTIVES

**COMPLETE** AREVA WAY SELF-ASSESSMENTS IN ALL UNITS BEFORE THE END OF 2004

**INTEGRATE** AREVA WAY INTO STRATEGIC AND BUDGETARY PROCESSES, INCLUDING THOSE OF AREVA T&D, NO LATER THAN 2005

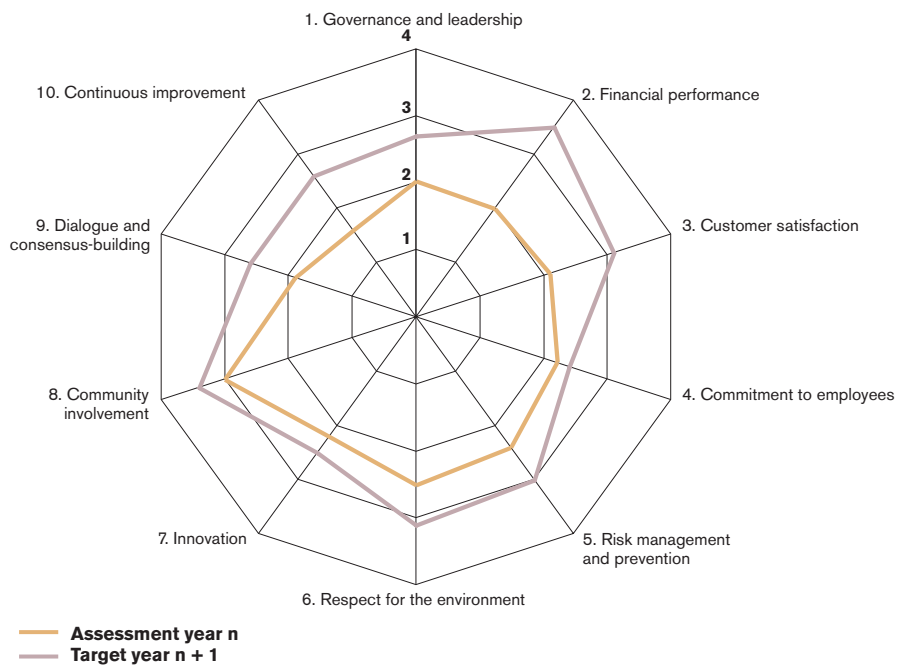
> The self-assessment on the 10 sustainable development commitments is presented in the form of “radar screens” for each unit.

Performance improvement goals clearly emerge through an analysis of the radar screen. Then the goals are prioritized in accordance with AREVA's overall strategic action plan and budget.

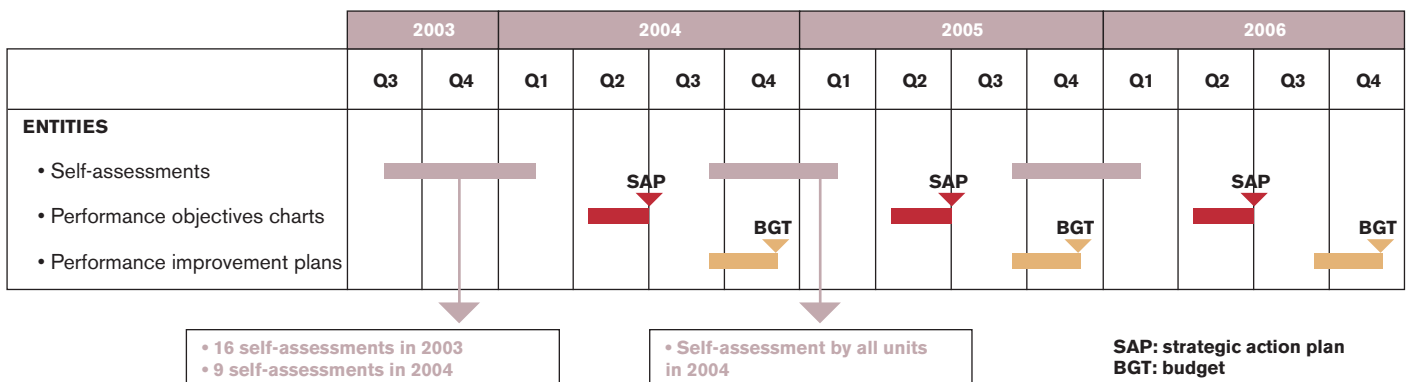
A network of continuous improvement leaders, trained at AREVA University, spearheads the initiative at the affiliate level.

Fifteen continuous improvement leaders were trained in 2003.

### Sample presentation of the results of a self-assessment



### > Rollout of AREVA Way



# Risk management

Risk management and prevention are a part of our culture and are pervasive in our practices.

## AN INTEGRATED APPROACH TO RISK MANAGEMENT

**We have set up an organization and applied resources to identifying, preventing and managing risk** relating to our operations, whether technological, human or financial in nature.

Our approach to risk management consists of an ongoing and documented process of risk identification, prioritization, optimization, insurance and monitoring supported by emergency management and monitoring plans. Proceeding in this manner optimizes the availability and use of resources while reducing costs.

The Risk Management and Insurance Department oversees our subsidiaries' approaches to ensure consistency and provides them with the necessary methodological tools. The Department is supported by the risk management and insurance functions at each subsidiary and by our risk management entities: the Department of Nuclear Safety and General Inspectorate, and the health, safety and environment leaders.

We gained a comprehensive view of the risk our operations entail through the risk mapping project, completed in 2002. We rely on the risk map to define action plans and will update it annually. The risk map goes hand in hand with by our multi-year audit plan covering all subsidiaries.

*The Annual Report provides more detailed information on risk factors and insurance coverage.*



**Hands-on safety tours: a practice widely implemented, with 4,170 tours in 2002**

## > FOCUS

### DEPARTMENT OF NUCLEAR SAFETY AND GENERAL INSPECTORATE

Organized in 2003, the Department of Nuclear Safety and General Inspectorate is in charge of:

- Defining, establishing and coordinating nuclear safety and radiation protection programs throughout the group.
- Proposing and implementing an annual inspection program for the nuclear sites.
- Reporting on performance improvements and best practices and their implementation throughout the group.
- Spearheading monitoring of nuclear safety regulations and providing leadership for a network of nuclear safety experts.

Originally established by COGEMA in 2001, the general inspectorate saw their role expanded in 2003 to include all of the group's nuclear facilities.

## OBJECTIVES

**ESTABLISH** A NUCLEAR SAFETY CHARTER IN 2004

**PERFORM** A SIMPLIFIED RISK ASSESSMENT (SRA) OR EQUIVALENT ON 100% OF THE NON-NUCLEAR ENVIRONMENTALLY SIGNIFICANT SITES BEFORE THE END OF 2006

**STANDARDIZE** THE USE OF THE INES SCALE FOR INCIDENT REPORTING BY ALL OF THE GROUP'S NUCLEAR SITES

## MANAGING TECHNOLOGICAL RISK

**Our greatest risk relates to the operation of our industrial facilities,** including fifteen nuclear plants and eight plants regulated under the Seveso II European directive, and to the transport of nuclear materials and hazardous products.

We factor risk prevention and management into the design of our facilities and assume our responsibilities in this regard throughout operations. Stringent national and international regulations govern those operations, and our facilities are subject to regular inspection by the competent authorities. According to the International Atomic Energy Agency, nuclear safety refers to the achievement of proper operating conditions, prevention of accidents or mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation hazards.

Nuclear safety relies on:

### • Organizational principles

- Clearly defined responsibilities for operations and for oversight and inspection.
- Safety departments that provide first-level support.
- Second-level verification by the group's nuclear safety inspectors.
- Response capabilities that are regularly tested during emergency drills.

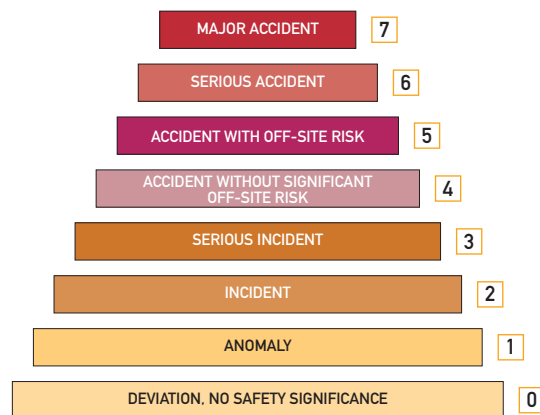
### • Action principles

- A continuous improvement initiative designed to ensure a very high level of safety at all times for facility and transportation operations.
- A safety culture sustained by training to maintain a high level of skill and vigilance among employees and subcontractors alike.

### • Regular and transparent reporting on plant safety

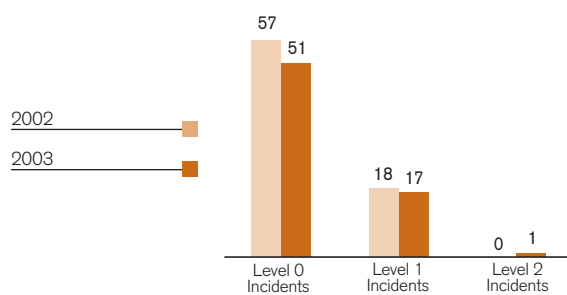
- Significant incidents immediately reported to the national safety authorities.
- Annual report to Local Information Commissions (France) by each site.

## International Nuclear Event Scale



In France, nuclear facility incidents are assessed based on the International Nuclear Event Scale (INES). They are classified on a scale of 0 (deviation with no safety significance) to 7 (major accident with extensive health and environmental impacts). A similar scale is used for radioactive materials transportation. Reporting and classification practices vary according to the regulations of the country in question.

## Number of reported incidents at French nuclear sites (INES scale)

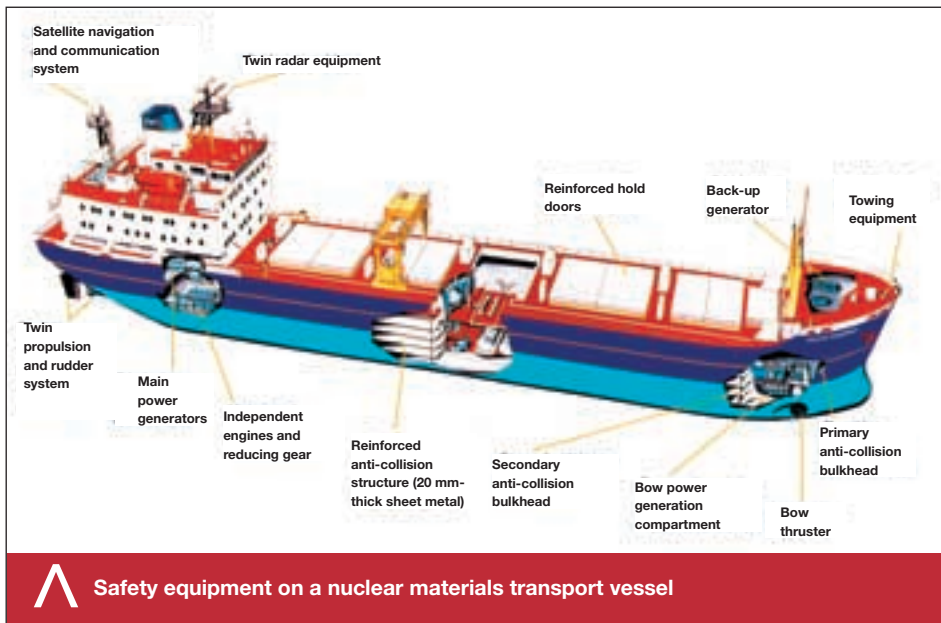


# Risk management

Our nuclear materials transportation operations are also governed by safety requirements:

- Our transport casks meet International Atomic Energy Agency safety standards and are designed to protect the public and the environment from any release of radioactivity under the most extreme circumstances.
- The ships we use to transport radioactive materials comply with the International Maritime Organization's most stringent recommendations (double hull, multiple barriers, special navigation and monitoring systems).
- We deploy mechanisms and means to prevent and limit impacts in the event of an accident.

Nuclear materials diversion is an issue of international concern. This issue is addressed through international treaties (the Convention on the Physical Protection of Nuclear Material and the Euratom treaty) and national regulations, with prevention being primarily the responsibility of governmental authorities. At AREVA, we strictly enforce measures defined and verified by the authorities, and we refuse to work with countries that have not signed the international treaties on this matter. We observe national and international regulations at all times regarding the use, quantity, type and location of materials.



## > FOCUS

**IN 2003, A LEVEL 2 INCIDENT** occurred at the **COGEMA-Pierrelatte site in France** when a **safety-related structural component of a tank containing liquid cleaning effluent became detached during an on-site transfer**. **Though there were no health or environmental impacts from the incident, it was classified as a level 2 event due to deficient tank design and violation of procedures**. **We immediately conducted an in-depth review of safety procedures and practices at the site and established action plans to prevent the recurrence of this type of event.**

AREVA is engaged in a process to systematically identify environmental risks and liabilities:

- We assessed our future cleanup and dismantling expenses, set up a fund to cover these expenses exclusively, and are overseeing the fund management program for these assets.
- We conducted simplified risk assessments (SRA) at sites with significant environmental aspects.
- In 2003, we launched our risk management and prevention plan for facilities regulated under Seveso directives.

Using our own technologies and substitution products, we have been able to limit the use of hazardous chemicals. Under the French decontamination and elimination plan for polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCTs), we eliminated 106 contaminated pieces of equipment in France in 2003. We continued to pinpoint any possibly contaminated equipment. At the end of 2003, 679 pieces of equipment remained to be removed by 2010. Our goals for 2004 will be updated to include newly integrated AREVA T&D, including the corresponding identification work.

Through AREVA's environmental management systems, risk management is in continuous improvement (see p. 44).



**^** Local safety formation, COGEMA-La Hague used fuel treatment plant (Cherbourg, France)

## > BEST PRACTICE

### THE SIMPLIFIED RISK ASSESSMENT

**(SRA) is a method for assessing risks and identifying sources of ground pollution at industrial sites based on past and present activities. It is used to classify sites into three distinct categories: sites requiring no further investigation, sites to be monitored following a specific monitoring plan, and sites requiring in-depth investigation. How a site is classified depends on its environment and how it is used, the type of information available, and the state of scientific and technical knowledge in the matter. The classification could therefore change. Additional analyses, soil surveys and Detailed Risk Assessments (DRA) could be performed.**

**At AREVA, we perform these analyses and assessments as often as necessary, as COGEMA-Miramas and SICN-Anecy did in 2003.**

# ECONOMIC RESPONSIBILITY



Reactor vessel head arriving in the US from the Chalon plant in France for delivery to the Three Mile Island plant



## OUR COMMITMENTS

**FINANCIAL PERFORMANCE: ENSURING THE GROUP'S SUSTAINABILITY THROUGH LONG-TERM PROFITABLE GROWTH.**

**INNOVATION: DEVELOPING AND DEPLOYING THE MOST ADVANCED TECHNOLOGIES TO ANTICIPATE CUSTOMER NEEDS AND INCREASE OUR COMPETITIVE ADVANTAGE WHILE MEETING HEALTH, SAFETY AND ENVIRONMENTAL PROTECTION REQUIREMENTS.**

**CUSTOMER SATISFACTION: LISTENING TO OUR CUSTOMERS, ANTICIPATING THEIR NEEDS, SUPPORTING THEIR GROWTH, INCREASING AND MEASURING THEIR SATISFACTION.**

---

## 2003 HIGHLIGHTS

- > GROUP OPERATING INCOME UP 90%, recovery of the Connectors business.
- > WORLDWIDE CUSTOMER SATISFACTION SURVEY conducted by the Reactors and Services division.
- > TWO "AREVA TECHNICAL DAYS" SESSIONS HELD to provide information to the financial community about the technical and financial aspects of our operations (July 2003 – Reactors and Services division, December 2003 – Front End division).
- > AGREEMENT WITH URENCO SIGNED ON NOVEMBER 24, 2003, giving AREVA 50% of the share capital in Enrichment Technology Company (ETC) and thus access to ultracentrifugation technology for construction of the proposed Georges Besse II enrichment plant (subject to approval by the competent authorities).
- > AREVA-SIEMENS TEAM AWARDED CONTRACT valued at €3 billion to build an EPR reactor in Finland (December 2003).

*"First, investors want companies to deliver consistently good financial performance. Many types of risk threaten performance, such as image or reputation risks. 'Exemplary' companies, according to socially responsible investment criteria (SRI), usually manage their risk better, are more innovative and have employees who are highly motivated, leading to better mid- and long-term financial performance."*

**XAVIER DE BAYSER**  
PRESIDENT OF THE IDEAM  
ASSET MANAGEMENT FUND



# Financial performance

**For AREVA, sustainable development is built on a solid financial structure and on the ability to create long-term value.**

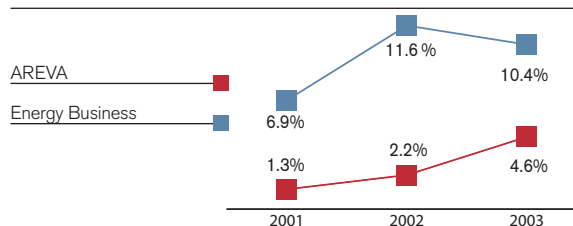
## FOCUSING ON CREATING VALUE

### MEASURING THE RETURN ON CAPITAL EMPLOYED

AREVA's industrial operations require large amounts of capital. We measure the return on invested capital to assure our shareholders of a satisfactory return, year after year. This indicator, called ROACE, is integrated into our investment approach as well as into our budget and strategic processes. In 2003, consolidated ROACE increased despite the still unfavorable impact of the Connectors business, which is progressing in its recovery.

#### Change in ROACE <sup>(1)</sup>

(in %)



(1) Return on average capital employed: ratio of after-tax operating income to average capital employed during the year. See calculation methods in the 2003 Annual Report (management report, chapter 5).

### ACTIVATE ALL POTENTIAL SYNERGIES

We are reorganizing and constantly reducing our costs to adapt to market demand. Restructuring costs were €217 million in 2003, compared with €345 million in 2002. Most of these costs were incurred in the Connectors business (€134 million in 2003, €269 million in 2002), which was back in the black in 2003 with operating income of €21 million before restructuring. In energy, significant expenses were recorded (€83 million in 2003 versus €76 million in 2002), mainly to fund early retirements.

We will continue these programs and extend our review to the newly acquired Transmission & Distribution division in 2004.

### REWARDING OUR SHAREHOLDERS

From AREVA's creation on September 3, 2001 to the end of 2003, annualized total shareholder return (TSR\*) was 22.9%. This high return reflects a strong dividend policy and a sharp increase in the share price (45%) in 2003.

	2003	2002	2001
Average price for the year (A)	168€	175€	182€
Net dividend (B)	6.20€	6.20€	18.48€
Rate of return (B)/(A)*	5.5%	5.3%	15.3%
Total shareholder return**	22.9%	5.6%	20.1%***

\* With tax credit.

\*\* Annualized TSR with dividends (not including tax credit) reinvested since September 3, 2001.

\*\*\* Rate calculated for the period September 2001 – December 2001.

## > BEST PRACTICE

### AREVA TECHNICAL DAYS

Our Technical Days are designed to provide a broad spectrum of information to the financial community on the technical and financial aspects of AREVA's operations. They also help us understand what the financial markets expect from us. Four sessions have been held since AREVA was formed:

- June 2002  
Overview of operations
- December 2002  
Presentation of the Back End division
- July 2003  
Presentation of the Reactors and Services division
- December 2003  
Presentation of the Front End division

## INVESTING IN THE FUTURE

**We are pursuing a major and sustained investment program** to ensure our long-term development. In energy, we invested on average almost €300 million per year for the last three years to improve and maintain our facilities and to identify new uranium deposits.

To pave the way for transition from the “gaseous diffusion” to the “gas centrifuge” enrichment technology – a major technological leap forward – AREVA signed an agreement with Urenco in 2003 to acquire 50% of ETC, a company that develops and manufactures the world’s most efficient centrifuges. The future Georges Besse II plant, which will use this technology, is expected to enter into service in 2007.

## MAINTAINING A FINANCIAL STRUCTURE COHERENT WITH OUR OPERATIONS

**At the end of 2003, AREVA had consolidated equity of €4.113 billion**, compared with €4.02 billion in 2002, and net cash<sup>(2)</sup> of €1.236 billion, compared with €731 million in 2002. These gains are explained by the generation of substantial cash from operating activities<sup>(3)</sup>, particularly in the energy sector (€958 million).

Cash will drop sharply in 2004 with payment of the Transmission & Distribution business, purchased from Alstom in the early part of the year.

## PLANNING FOR DISMANTLING AS SOON AS OUR FACILITIES ENTER SERVICE

**As a nuclear facility operator, AREVA must decommission and dismantle its facilities at the end of their service life.** Programs are already under way to plan for the decommissioning of many of our facilities, as distant in the future as this may be. We have estimated the future decommissioning expenses of our facilities. AREVA’s share of those expenses is €4.3 billion. To cover that cost, we created a portfolio of financial assets earmarked for future decommissioning and dismantling expenses. The after-tax market value of this portfolio at year-end 2003 was €2.2 billion. Assuming a reasonable net annual rate of return of 3.6% and based on prudent assumptions regarding expenditure dates, the portfolio can cover all of our expenses without tapping into our cash position.

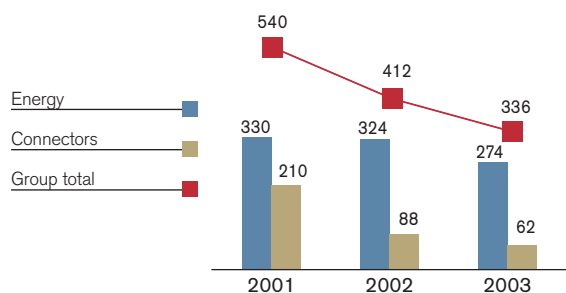
## CONTINUING OUR DIALOGUE WITH THE FINANCIAL COMMUNITY

**In 2003, we continued our programs to enhance the financial community’s understanding of our businesses.** A hundred members of that community – analysts and investors, bankers and business lawyers – grasped the group’s industrial realities during a tour of the plant that manufactures heavy components for nuclear power plants and a tour of CETIC, the testing and qualification center for plant maintenance and operating techniques, at the Chalon-sur-Saône site.

The group’s 2002 sustainable development report also promoted dialogue with representatives of the financial community. Asked about the report, most pointed to the clearly structured information congruent with Global Reporting Initiative (GRI) directives, as well as to the need for precision and perspective regarding commitments and actual performance.

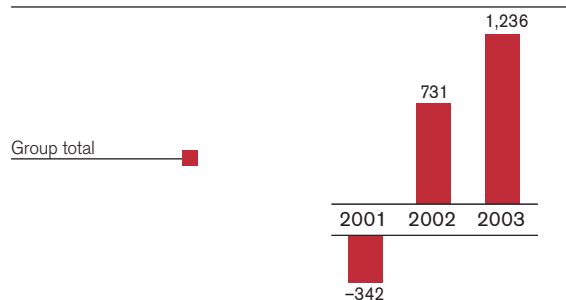
### Net operating CAPEX

(in millions of €)



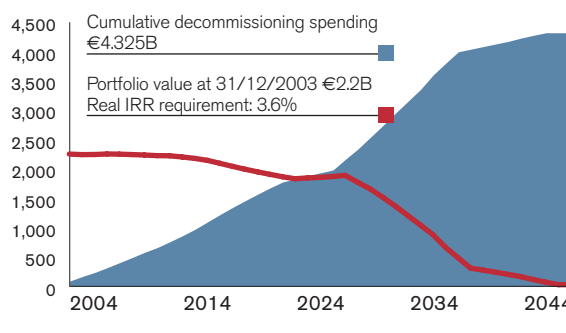
### Change in net cash position<sup>(2)</sup>

(in millions of €)



### Decommissioning spending (forecast) and changes in earmarked portfolio (forecast)

(in millions of €)



<sup>(2)</sup> Cash and cash equivalents less debt.

<sup>(3)</sup> EBITDA +/- change in working capital requirement less net capital expenditure.

**AREVA continually improves the technical and environmental performance of our products and services. We earmarked €286 million for R&D in 2003.**

**We have 2,700 research scientists working for us, both inside and outside the group.**

## **NUCLEAR POWER: PURSUING REACTOR RESEARCH AND DEVELOPING APPLICATIONS FOR THE FUTURE**

**R&D on next-generation reactor concepts** (Generation IV initiative) continued throughout 2003. We are directing our efforts at high-temperature and very high-temperature reactors.

Nuclear power may serve new purposes, such as large-scale hydrogen production, urban heating and water desalination. These advances rely on continued research on reactors and reactor fuel.

## **CONNECTORS: DEVELOPING NEW PRODUCTS**

**FCI pursued research and development despite the difficult economic situation**, devoting close to 12% of its sales revenue to R&D and new product development in 2003.

Working collaboratively with several customers, FCI came up with innovative product designs with enhanced functionalities, such as the connector for the latest high-speed Pentium® 5 processor by Intel®.

## **INSPIRING INNOVATION**

**Every year, we give AREVA Innovation Awards** to best-in-breed technologies developed by our colleagues.

### **> WINNING PROJECTS AT THE 2003 AREVA INNOVATION AWARDS**

- AirMax VS™, a line of high-speed connectors developed by FCI to meet customer requirements at the lowest cost.
- SIERION, a control valve for nuclear and thermal power plants requiring no external power supply.
- HELPS, a proton exchange membrane (PEM) fuel cell prototype developed by Héliion (Technicatome) with applications for the naval and ground transport industries.
- New generation gloves for sealed glove boxes that are twice as strong as any other product on the market, developed by COGEMA in partnership with Hutchinson.
- ARTUR, an automated robotic manipulator designed by Framatome ANP to inspect and maintain primary PWR piping.

### **> FOCUS**

**PRO-NATURA<sup>(1)</sup>, AN NGO, DEVELOPED A CARBONIZATION PROCESS to convert biomass (agricultural residues, renewable natural biomass) into charcoal. This household fuel performs just like charcoal, but costs less, helping to eliminate problems of fuel scarcity, transport and cost in Africa. The compact charcoal machine is mobile, operates with practically no external power supply and does not emit toxic gases. Only two people are needed to operate it, and it can produce three metric tons of biomass charcoal a day. With AREVA's support, a pilot facility will be built in South Africa.**

**(1) <http://www.pronatura.org>**

## OBJECTIVE

EXPAND ECO-DESIGN INITIATIVES

### PERFORMING TECHNOLOGY TRANSFER

**We conducted two major technology transfer operations in 2003.**

Our technologies were chosen to convert defense plutonium into MOX fuel in connection with the US-Russian disarmament agreements, while in Japan we are supporting preparations for start-up of the Rokkasho-Mura used fuel treatment plant, which is based on the design of COGEMA-La Hague's UP3 plant.

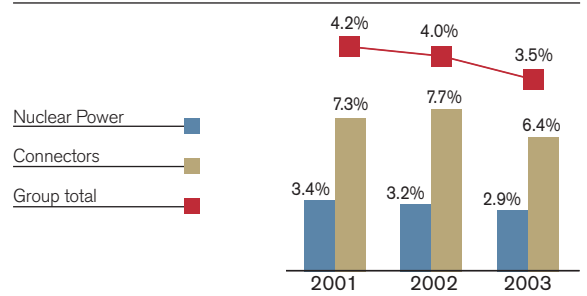
We are also supporting training in the fields of nuclear power, mining and advanced technologies in South Africa under a cooperative agreement with the South African government. AREVA University trained 37 South Africans in 2003. A joint training organization is being created and will further strengthen the exchange of information and knowledge.

### FINDING NEW OPPORTUNITIES FOR INNOVATION

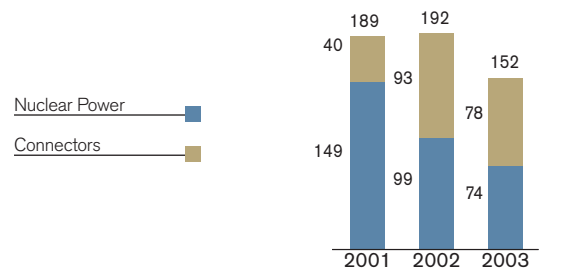
**Outside the nuclear sector, we continued to support innovative technologies in 2003,** including partnership with Pro-Natura (see Focus, left) and development of a prototype facility for organic waste destruction using supercritical water in association with the Centre national de la recherche scientifique (CNRS) and the Aquitaine region.

### R&D expenditures

(in % of sales)



### Patent applications



# Customer relations

**Customer satisfaction is the guarantee of sustainability.** It is a fundamental value for AREVA as a group and one of our 10 sustainable development commitments.

## OBJECTIVE

**STANDARDIZE CUSTOMER SATISFACTION SURVEY FORMATS AND APPROACHES AND EXTEND THEIR USE TO THE ENTIRE GROUP**

**In 2003, AREVA bolstered its presence** in France, Germany and the United States, countries where it has its deepest roots, as well as in Russia, Japan, Taiwan, China and South Korea. We are now structured commercially around major accounts, strengthening our local presence and guaranteeing greater responsiveness.

Our customers want comprehensive, integrated offers. We reply with real solutions, such as the “alliancing” contracts developed by Framatome ANP. This original concept in partnering based on shared risk and benefits has met with great success in the United States.

Customers expect suppliers to help them reduce costs. Minimizing nuclear power plant outages for fuel reloading is just one of the ways AREVA contributes.

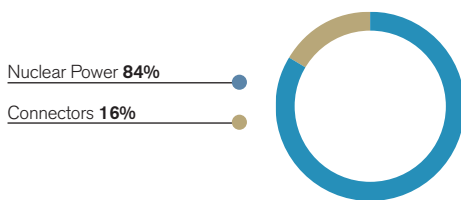
AREVA uses tools to measure customer satisfaction as part of its continuous improvement initiative. For example, Framatome ANP conducted more than 300 face-to-face interviews with 26 utilities in 18 countries in 2003. The satisfaction survey results will be available in mid-2004.

Another tool is the Lynx integrated customer claims processing database developed by the Connectors division. Lynx provides a complete picture of claims, optimizes their processing and encourages experience sharing. Deployment is well on its way.

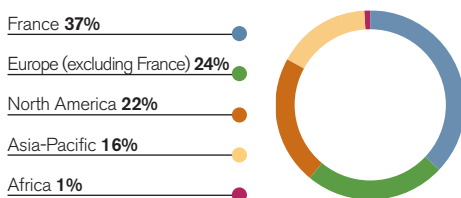
*“We had a quality issue in 2001 that prompted some customers to stop buying our products. We fought to hold onto them. We were able to transform this crisis into a positive driver for organizational change and greater commitment to customer satisfaction. Where before we were on the verge of losing business from automotive equipment manufacturers Delphi and Valeo, now we are the preferred supplier of the first and about to be added to the VIP list of the second!”*

**MARC MOULINIER**  
SENIOR VICE-PRESIDENT  
DIRECTOR OF FCI'S  
AUTOMOTIVE BUSINESS UNIT

### 2003 sales by business unit



### 2003 sales by region



### > BEST PRACTICE

**SOUTH KOREAN FIRM SVDO** singled out FCI Kyongju from among a hundred other suppliers in 2003 for improved product quality and delivery.

**Suppliers contribute indirectly, but fundamentally, to the production of our goods and services.** We are banking on our special relationships with our suppliers to encourage them to implement sustainable development criteria along with us.

## OBJECTIVES

**ESTABLISH AND DISSEMINATE AN AREVA PURCHASING CHARTER IN 2004**

**INTEGRATE SUSTAINABLE DEVELOPMENT CLAUSES INTO AREVA'S GENERAL PURCHASING TERMS AND CONDITIONS IN 2004**

As a group, AREVA purchased goods and services for a total value of €2.880 billion in 2003. Of this, 77% was for the nuclear business. European suppliers accounted for 80% of the total, the United States for 11.5%, and Asia for 6.5%.

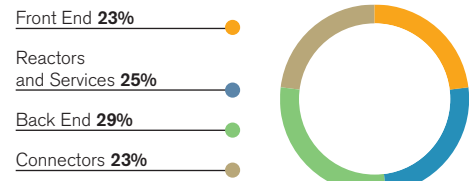
We strive to build relationships with our suppliers based on trust and mutual respect. The procurement strategy we developed in 2003 is based on a quality measurement system for products and services that measures supplier performance in terms of continuous improvement. We review the outlook for our major industrial programs and discuss the purchasing needs they may generate in annual information meetings with our suppliers.

The AREVA values charter will be distributed to regular suppliers in 2004 so that they may respect our values and abide by our rules of conduct. Our requirements, particularly in the area of human rights and environmental protection, will be specified in a purchasing charter and included in AREVA's general purchasing terms and conditions in 2004. We have already provided our regular suppliers with the UN Global Compact principles, and we encourage them to subscribe to them.

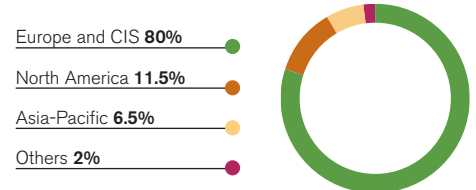
### > ANNUAL COGEMA-LA HAGUE DAY

More than 120 suppliers attended the annual COGEMA-La Hague day in February 2003. Discussions focused on procurement forecasts and how to achieve the cost reductions necessitated by the reduced workload. Suppliers were invited to offer comments and suggestions via a questionnaire that has already been put to good use.

### Subcontracted goods and services by business



### Subcontracted goods and services by region



### > BEST PRACTICE

**FOR TWO OF ITS THREE MAIN SITES, TECHNICATOME CHOSE to subcontract reproduction services to La Chrysalide, an association and employment help center for the mentally handicapped.**

# SOCIAL RESPONSIBILITY



The McClean Lake mill night  
shift operating crew  
(Saskatchewan, Canada)





## OUR COMMITMENTS

**COMMITMENT TO EMPLOYEES:**  
PROMOTING OUR EMPLOYEES'  
PROFESSIONAL DEVELOPMENT  
AND PROVIDING EXCELLENT WORK  
CONDITIONS.

**DIALOGUE AND CONSENSUS-  
BUILDING:** ESTABLISHING AND  
NURTURING RELATIONS BASED  
ON TRUST WITH OUR STAKEHOLDERS.

**COMMUNITY INVOLVEMENT:**  
PARTICIPATING IN THE ECONOMIC  
AND SOCIAL DEVELOPMENT  
OF COMMUNITIES IN WHICH  
THE GROUP OPERATES.

## 2003 HIGHLIGHTS

- > **CREATION** of the European work council.
- > **AREVA JOINS** the UN Global Compact (March 2003).
- > **AREVA PARTICIPATES** in the national energy debate (France).
- > **ESTABLISHMENT** of scientific and technical expertise management program.
- > **DIALOGUE** sessions on sustainable development attended by 150 of the group's young managers.
- > **RESTRUCTURING** of FCI units in consultation with labor partners, with the goal of minimizing the impact on jobs.

*“Giving people jobs is not enough any more. Competition is fierce, especially in China, and turns on key skills. The young people entering multinational companies today want more than a job. We have to be attractive, not just in terms of compensation, but also in terms of the potential for professional and personal growth and for striking a balance between them.”*

**THIERRY LACARNE**  
SENIOR VICE-PRESIDENT AND PRESIDENT  
OF FCI ASIA, IN CHARGE OF HUMAN RESOURCES  
AND ORGANIZATIONAL DEVELOPMENT



# Employee empowerment

**As of December 31, 2003, 48,011 people worked for AREVA, 39% of them outside France.** With the integration of AREVA T&D in early January 2004, our group grew to 70,000 people, 53% of whom worked outside France. The globalization of our workforce means that we must federate human resources management yet respect cultural differences.



**Mock-up of the Japan Nuclear Fuels Ltd (JNFL) site in Japan**

**To promote shared practices, AREVA continued to optimize its support functions in 2003**, especially human resources, for which the Human Resources Policies, Organization, Processes and Systems (HRPOPS) project is being conducted.

Priority goals are experience sharing and instilling a sense of belonging to the group.

**AREVA University** was created in 2002 to deploy a management model and shared values and to promote our scientific and technological expertise. In 2003, 800 managers took part in AREVA University programs.

- Test sessions on the group's objectives dealt with subjects such as ethics and values, raising awareness on sustainable development and continuous improvement, financial and stock market mechanisms, and internal controls awareness.
- On the subject of management globalization, 120 managers attended seven travelling seminars (see "Best practices").
- The Plant Directors Circle of 35 European site managers formed a network to exchange best industrial practices. The Circle will include the United States and Asia in 2004.

## > BEST PRACTICES

**THE CORPORATE UNIVERSITY BEST-IN-CLASS (CUBIC) AWARD** for second place in innovation went to AREVA University at the November 2003 ceremony held in the United States. The award lauded our travelling seminars, where 20 managers learn about the cultural universe of countries in which the group conducts business, promoting greater understanding of life styles and work habits.

**AT FRAMATOME ANP SITES** in Germany, an intranet-based suggestion system helped improve equipment and processes, such as an equipment washing system and closed fluid circuits. Technician expertise is thus a source of shared gains in product quality, resource consumption (€1 million in savings) and motivation.

## OBJECTIVES

**GENERALIZE THE USE OF SUGGESTION SYSTEMS**

**DISSEMINATE THE GROUP'S STRATEGY TO EMPLOYEES WIDELY**

### Sustainable development is a shared concern of particular interest to young employees.

Close to 150 young managers from each of our divisions met in Europe, Asia and the United States. They analyzed our 2002 sustainable development report with a view to enhancing its content and furthering the initiative. What emerged from these meetings is their desire to participate in the operational implementation of sustainable development and demand for strong management involvement.

In France, we held several in-house events during sustainable development week in June 2003. At COGEMA-La Hague, more than 900 employees and subcontractors took advantage of talks and demonstrations on subjects such as occupational safety, the environment, quality assurance, nuclear safety, and our programs devoted to them.

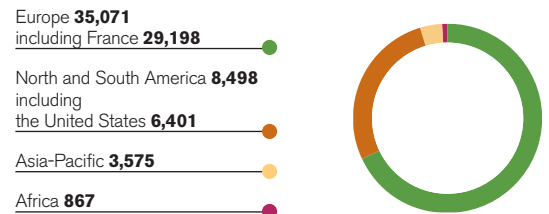
#### Young managers speak up

*“I would like our higher-ups to help us understand what sustainable development is, because when you ask around you, especially in the US, you realize that this concept is not familiar, let alone how to apply it in your everyday life and work.”*

**KEN**  
FRAMATOME ANP, USA

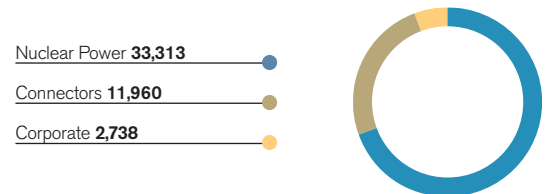
### Employees by region

(Excluding AREVA T&D, integrated on January 9, 2004)



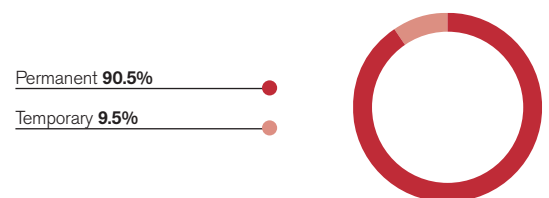
### Employees by business

(Excluding AREVA T&D, integrated on January 9, 2004)



### Employees by status

(Excluding AREVA T&D, integrated on January 9, 2004)



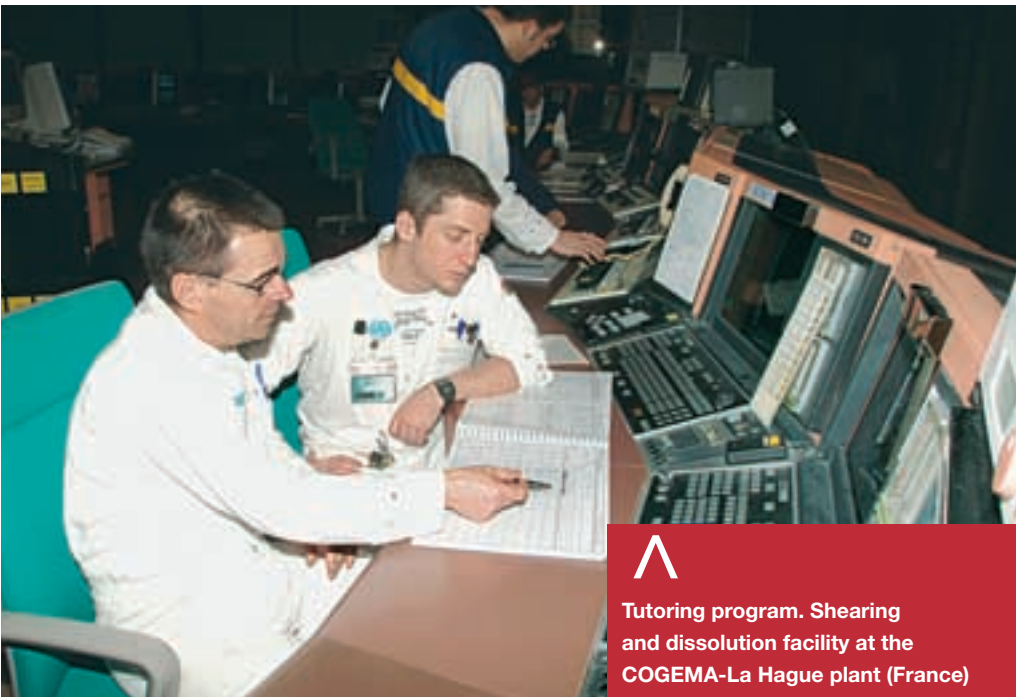
# Developing skills

Despite the challenges posed by deregulation and globalization in the energy sector and the economic pressures in all markets, our employees' advanced skills will enable us to spur growth while maintaining our technological excellence.

## MANAGING EXPERTISE

In 2003, we designed a scientific and technical management program to maintain a high level of technical expertise in all our activities and to plan ahead for the age pyramid. This involved defining our areas of expertise, identifying experts, and setting up processes to develop and enhance skills. Three levels of expertise were identified:

1. Expertise at the subsidiary level, involved in technical decision-making, performance qualification and budgeting (210 experts).
2. Expertise relied on by the entire group, involved in formulating recommendations on product policies and technical criteria (81 experts).
3. Expertise recognized by the international scientific and technical community and accepted as scientific and technical authority (7 experts).



Tutoring program. Shearing and dissolution facility at the COGEMA-La Hague plant (France)

## > BEST PRACTICES

**COGEMA-LA HAGUE SET UP A TUTORING PROGRAM** at its site in 2001 to train operators who are new to the job or taking on new responsibilities. Three hundred employees helped design a hundred booklets to document the training program, which alternated between classroom theory and hands-on sessions. The tutors, who used a common set of performance benchmarks, similarly passed on information and knowledge.

**FCI HAS USED A TOOL TO REVIEW KEY SKILLS** since 2001, enabling it to assess the risk of employee departures and define training and career development plans. In 2003, these skills reviews pertained to 350 employees in Europe, North America, South Korea and Japan.

## RETAINING TALENT, PASSING ON KNOWLEDGE

**Our jobs observatory is a tool that will help us plan** for changes in jobs and employment at AREVA. It will provide senior executives and operating managers with a strategic vision of existing skills and future needs, stimulating the mobility and training required to keep pace with them. All of our French entities will deploy this tool in 2004.

## DEVELOPING MANAGEMENT SKILLS

**To ensure the cohesiveness of our group, a career development plan for senior managers** and their successors is in place. The Development Center project, instituted at the group level in 2003, offers young engineers and managers identified as having potential by their supervisors the opportunity to learn about their strengths and weaknesses, and to build their individual career development plans accordingly. A hundred promising young managers have already attended three seminars in France, the United States and Germany, which focus on the first part of the process. The next step will be to develop personalized management training plans, working with supervisors and the corporate human resources department, starting in May 2004.

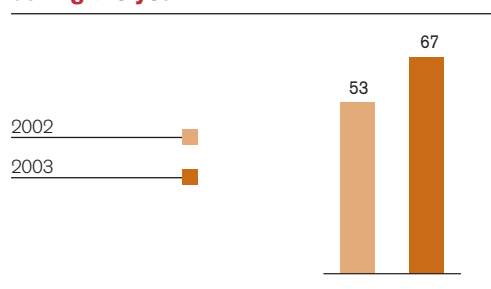
## PROMOTING PROFESSIONAL MOBILITY

**Mobility is a driver for improvement with multiple benefits:** skills renewal and sharing, diversification of career opportunities, development of an international culture... It also facilitates workforce adjustments to workloads and supports in-house reclassifications in the event of restructuring. For example, employees in the plant "Services" business unit split their time among our entities in Europe and the Americas, based on peak periods of activity linked to power plant outages. To support this mobility, we provide training in languages and local regulations and standards.

In 2003, 618 French employees took part in our mobility programs. Of these, 64% related to mobility within the same group of subsidiaries and 36% involved mobility between our first-tier subsidiaries.

Our leading human resources managers meet every month to facilitate mobility within the AREVA group in France. Mobility opportunities are published quarterly and distributed to all group employees.

**% of employees who had training during the year**



### Young managers speak up

*“For an international group such as AREVA, we should view sustainable development as a tremendous opportunity for social cohesion and experience sharing among our employees, and all the more so as the group expands.”*

**VIRGINIE**  
AREVA, FRANCE

# Strengthening internal dialogue

**A key driver in our human resources programs is harmonious relations with labor.** We encourage open exchange with all our employees and with their representatives.

## OBJECTIVE

**MAKE WIDESPREAD USE OF INTERNAL OPINION SURVEYS USING A STANDARDIZED FORMAT AND CONDUCT THEM EVERY 18 TO 24 MONTHS**

### CREATION OF THE EUROPEAN WORK COUNCIL

**We signed an agreement creating the European work council** with employee representatives on December 3, 2003. The council is a body for information and dialogue made up of employee representatives from each subsidiary with at least 100 employees and based in the European Union, including subsidiaries in countries that have been admitted to and will soon join the EU. Subsidiaries in other European countries, such as Switzerland and Turkey, will be included as observers. The council will meet twice a year.

### PURSuing INTERNAL OPINION SURVEYS

**COGEMA conducted an internal opinion survey in 2003** patterned after the Framatome ANP survey performed in 2002. Of the 20,551 questionnaires sent out, 6,507 responses were received, for a disappointing response rate of 32%. Though this does not cast doubt on the representativeness of the survey, it does constitute a lesson that will be taken into account. The main conclusions of the survey were that employees:

- Enjoy their work and their unit, but wish to be more involved in making the decisions that affect them and to participate more actively in performance improvement.
  - Have a positive image of their company, but want better communications among entities and greater attention to individual advancement objectives.
- We are developing an action plan in response to this survey, which will be communicated in 2004.

### VALUES AND SUSTAINABLE DEVELOPMENT CHARTERS, FERTILE GROUND FOR EXCHANGING IDEAS

**The establishment of our values charter supplied opportunities for dialogue** throughout AREVA. We also invited task forces of young managers to express their views on the sustainable development initiative.

## > BEST PRACTICE

**A NEW AGREEMENT ON EMPLOYMENT FOR THE HANDICAPPED WAS SIGNED** by management and labor at the COGEMA-Marcoule site for the 2003-2005 period. Under the agreement, 6% of new hires into the permanent workforce will be handicapped workers via open-ended employment agreements, fixed-term employment agreements of at least six months, temporary employment, integration into the labor force contracts, and training assignments of more than 150 hours. The site has also agreed to offer training to handicapped workers inside and outside the company and to subcontract with employment help centers for the handicapped.

# Anticipating and facilitating restructuring

## Our markets may change, requiring us to restructure.

We make every attempt to anticipate change and to minimize the impact on jobs.

From 2002 to 2003, our workforce declined by 2,136 people, mainly due to the following:

- Changes in the consolidated group, including the sale of FCI's Military Aerospace Industry (MAI) business unit (-1,200 people).
- Restructuring of the Connectors division, particularly in Europe (-711 people) and in North and South America (-91 people).
- Departures in the Nuclear Power business (1,350 in Europe, 300 in the United States).
- The growth of FCI subsidiaries in Hungary (+110 people), China (+747 people) and Malaysia (+96 people).
- New hires in the Nuclear Power business (863 in Europe, 435 in the United States).

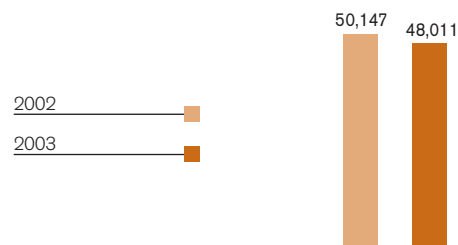
The working hours adjustments and group mobility and job retention measures we took in 2002 continued through 2003. By engaging in dialogue with our employees and their representatives early in the process, we are able to limit the labor consequences of a decline in employment.

In the Nuclear Power business, 285 employees left or changed jobs in 2003 under our employment retention plans. Of these, 31% were reclassified internally, 35% were reclassified externally and 29% left for early retirement.

Responding to its changing market, FCI continued to restructure in 2003. In Glasgow (Scotland), 90% of its 180 employees found other employment. Similarly, 80% of the 450 employees in Malines (Belgium) found jobs. In France, 57% of the affected employees took advantage of mobility opportunities within our group.

Wherever we are located, we lead economic development programs in concert with local players to facilitate change and adjustments in the labor markets (see p. 40).

## Change in workforce



## > FOCUS

**THE COGEMA-CADARACHE SITE CEASED MOX PRODUCTION on July 16, 2003. The site buildings, which were designed and built in the 1960s, could not meet the new seismic standards, making shutdown unavoidable. Working closely with plant personnel and the labor unions, COGEMA launched a job retention plan as early as 2001. The first stage of the plan was to create an employment mobility unit. From January 2001 to December 2003, 138 employees left the site, 93% of them for other jobs within AREVA and the French atomic energy commission (CEA) or for early retirement. The remaining 7% (10 people) left voluntarily to start new projects of their own.**

# Protecting employee health and safety

**We apply the necessary resources to ensure employee health and occupational safety,** whether those employees are our own or those of our subcontractors.

## **OCCUPATIONAL SAFETY**

**The Connectors division's performance improvement in this area is to be lauded:** its accident frequency rate dropped from 13.48 to 8.29, while its accident severity rate declined from 0.53 to 0.14 from 2002 to 2003.

We mourned the accidental deaths of three of our people in 2003. At the Jeumont site, a subcontractor died from a travelling crane accident. At UGINE, a temporary worker died when zirconium powder caught fire. We ordered a detailed investigation into the causes of these accidents, and the lessons learned were communicated to our other entities to prevent them from ever happening again.

The third accident involved a subcontractor in Niger, who died in a traffic accident while travelling on business from Arlit to Akokan.

The AREVA occupational safety policy issued in late 2003 is designed to strengthen and harmonize our occupational safety practices at every level of the group. "Zero accident" is our goal, and we have set our sights high to achieve it. In particular, we are aiming for an average accident frequency rate of 5 or less and an average accident severity rate of 0.2 or less by 2006.

## **> BEST PRACTICES**

**COGEMA CONDUCTED A SCREENING PROGRAM for anxiety, depression and stress at its Vélizy, La Hague and Melox sites in 2003. The tests provided an opportunity for dialogue between employees and group physicians on living and working conditions, leading in turn to useful help and advice.**

**COGEMA ALSO PREPARED A GUIDE FOR PREVENTING LEGIONNAIRE'S DISEASE in early 2003. The procedures it puts forward will be distributed throughout the AREVA group, and we will support their implementation. Working groups of the *Institut national de veille sanitaire* (the national health watch institute in France) also used the guide for its lessons learned from industry.**



Road safety awareness day (COGEMA-Vélizy, France)



## OBJECTIVES

**REDUCE** MAXIMUM DOSE LIMIT TO 20 MSV/MAN/YEAR IN ALL GROUP FACILITIES, INCLUDING COUNTRIES WITH LESS STRINGENT LIMITS

**ACHIEVE** AN AVERAGE ACCIDENT FREQUENCY RATE OF 5 OR LESS AND AN AVERAGE ACCIDENT SEVERITY RATE OF 0.2 OR LESS GROUP-WIDE BY 2006

**PERFORM** EXTERNAL OCCUPATIONAL SAFETY AUDITS ON ALL GROUP UNITS BY THE END OF 2006

**PERFORM** SIMPLIFIED HEALTH HAZARDS ASSESSMENTS TO SUPPLEMENT THE ENVIRONMENTAL ANALYSES FOR ENVIRONMENTALLY SIGNIFICANT SITES

## HEALTH

**We are in the process of finalizing our health policy**, which will standardize subsidiary monitoring and prevention practices in the realm of health hazards and public health. The health policy will include the subject of HIV AIDS.

We also have a prevention program for commuting accidents and high-risk behaviors (alcohol, drugs, etc.). Our road safety awareness activities for personnel, begun in 2002, continued throughout 2003 at several sites in France.

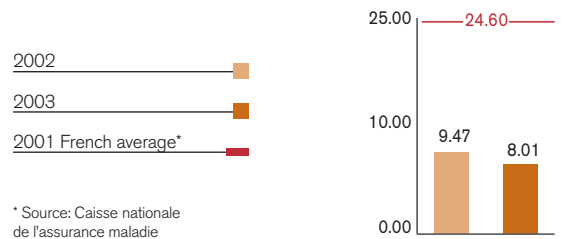
## RADIATION PROTECTION

**We are very concerned about exposing workers to ionizing radiation**, whether they are our own employees or those of other companies. Our goal is to minimize the number of people exposed to this hazard in our facilities, and to reduce the maximum dose limit to 20 mSv/man/year in accordance with ICRP recommendations, even in countries with less stringent regulations.

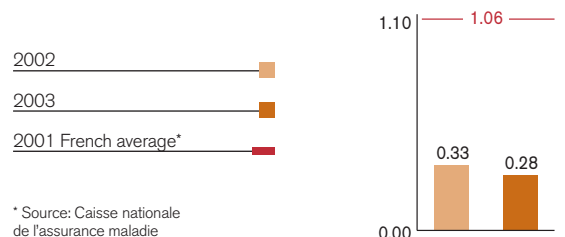
In the Niger mines, 78 people were exposed to doses of greater than 20 mSv in 2002, though they were below the regulatory limit of 50 mSv. We embarked on an action plan, with priorities being to improve mine ventilation and lower dust levels, optimize exposure time management, and raise worker awareness. These efforts helped us achieve our goal early, in November 2003.

Another of our goals is to remain below this limit when providing services in nuclear facilities operated by our clients, and we work with them to agree on this condition. During service operations in the United States, 27 employees were exposed to average doses of 20 to 30 mSv in 2003, though this is lower than the US regulatory limit of 50 mSv.

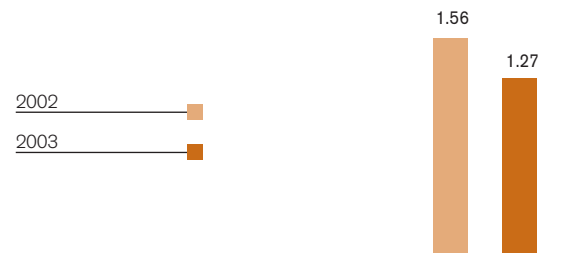
### Accident frequency rate with lost workdays



### Accident severity rate with lost workdays

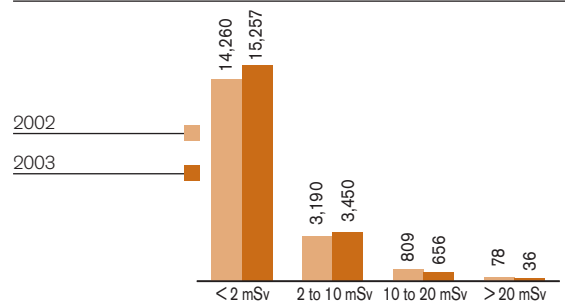


### Average employee exposure to ionizing radiation (in mSv)



### Breakdown of exposures

(in number of workers) – at end-June 2003



**3** mortal accidents in 2003

# Promoting dialogue and consensus-building

**We want to understand what our stakeholders expect**, to answer questions about our operations in a spirit of dialogue and consensus-building, and to make such exchanges of ideas a wellspring for improvement.

## ENGAGING IN DIALOGUE AT THE NATIONAL AND INTERNATIONAL LEVELS

Out of a concern for openness and transparency, AREVA actively participates in debates on subjects relevant to its operations, notably energy, environment and development. We put a lot of effort into France's national energy debate (see Focus, right).

We support the work of several national and international organizations:

- In France, AREVA has been a member since 2003 of Comité 21<sup>(1)</sup>, an association formed in 1994 to help implement French commitments made at the Earth Summit in Rio. We participate in the committee's "Entreprises 21" program, which deals with subjects such as employee training in sustainable development, sharing best practices among companies, and integration of the procurement function into sustainable development strategy.
- Internationally, our CEO, Anne Lauvergeon, is a member of the Commission on the Private Sector and Development of the United Nations Development Programme (UNDP)<sup>(2)</sup>. She also supports the work of the World Business Council for Sustainable Development (WBCSD)<sup>(3)</sup> as co-chair of the Energy and Climate program, where we have assigned one of our colleagues as program director.
- At the International Chamber of Commerce, AREVA works with the Energy and Environment task force on global warming issues and the Company and Society task force on practices of socially responsible companies.

To seek new avenues for dialogue and debate, AREVA is a partner to the Program of Science, the Environment and Society (Proses) of the Fondation nationale des sciences politiques. In April 2003, during the national energy debate, we participated in a symposium similar in approach to "citizen conferences". A panel of student judges listened to presentations by four experts – Bernard Laponche, consultant; Frédéric Marillier of Greenpeace France; Georges Charpak, Nobel Prize winner in physics; and Bertrand Barré, director of scientific communication at AREVA – on the theme of civilian nuclear power. The judges then conferred privately to come up with a consensus on energy choices to be made. The students stressed the priorities of energy conservation and the development of renewable energies, and questioned the need for renewal of the nuclear power program. Their opinion was then debated with the presenters and the public.

(1) <http://www.comite21.org>

(2) <http://www.undp.org/>

(3) <http://www.wbcsd.org>

## > FOCUS

**AREVA IS ACTIVELY PARTICIPATING IN THE NATIONAL ENERGY DEBATE IN FRANCE. But beyond the official debates among experts, we have responded to all invitations to date and have supported meetings with local residents.**

**We organized numerous opportunities for dialogue with stakeholders who did not wish to attend official events, including:**

- **Two afternoon seminars on energy organized by AREVA University in partnership with the Palais de la Découverte.**
- **A conference on "nuclear power's role in sustainable development around the world" at Dieulefit (France) in partnership with the COGEMA-Pierrelatte site.**
- **Publication of the "Choosing our energy, choosing our future" supplement to *Zurban* magazine (circulation 80,000).**

## OBJECTIVES

**ANCHOR** THE STAKEHOLDER MAPPING INITIATIVE IN THE AREVA WAY PROCESS TO ENSURE GROWING DEPLOYMENT

**HOLD** A CONSENSUS-BUILDING SESSION WITH EXTERNAL STAKEHOLDERS IN 2004

### PERSEVERE IN OUR COMMUNICATIONS ON OUR ACTIVITIES AND OBJECTIVES

We have developed educational communication tools to help people gain a greater understanding of our operations and the challenges that go with them. In 2003, a group of experts led by Bertrand Barré, our director of scientific communication, published a book entitled "All about nuclear power, from Atom to Zirconium" (available in French and English). This 160-page book, also available on CD-ROM, was widely disseminated inside and outside the AREVA group.

In the same spirit, our "Alternatives" magazine (in French or in English) is offered free of charge to anyone who wishes to learn about the various sources of energy. Both of these publications may be ordered at our website, [www.aveva.com](http://www.aveva.com).

We also conduct public opinion surveys to understand and respond to society's expectations in the area of energy. And the AREVA website offers a venue for continued discussion via our forum and interactive tools.

### FACILITATING LOCAL DIALOGUE

Where AREVA has a site, it has a communication program. The goal is to inform the community about our operations, build relationships and be a good neighbour.

In Germany, the Lingen nuclear site distributes a monthly information report about its activities to the public. Most of our industrial sites in France, Niger and Canada publish an annual environmental report, and this practice is being extended to all of our environmentally significant sites.

Three pilot sites – COGEMA-La Hague and the former mine sites in the Limousin region of France, Lingen in Germany – mapped their stakeholder relations in 2003, fulfilling an objective we established in 2002. Stakeholder mapping involves listing our external stakeholders and defining the site's economic, labor and environmental issues. By comparing our employees' perceptions of these issues with those of our local partners, areas needing improvement and priority topics for dialogue can be identified.



*"We live in an extremely interdependent world in which the acts of any one citizen can affect the living conditions of other citizens, now and in the future. Obviously, this is even more true, more serious, when it comes to economic actors. Today, a well-founded decision is one that is accepted and received, and this is undoubtedly the secret to success. But it can only occur by providing information to and engaging in dialogue with stakeholders."*

**DOMINIQUE BOURG**  
DIRECTOR OF THE INTERDISCIPLINARY  
RESEARCH AND DEVELOPMENT CENTER  
ON SUSTAINABLE DEVELOPMENT AT  
THE UNIVERSITÉ DE TECHNOLOGIE  
OF TROYES, FRANCE\*



\*<http://www.utt.fr/labos/CREIDD>



# Showing solidarity

**At AREVA, we are conscious of our responsibilities towards the communities in which we are established, and we contribute to their economic and social development.** When market trends require us to cease certain operations, we support the community's industrial redevelopment. Our solidarity is expressed through a variety of support and partnership programs.

## **PARTICIPATING IN LOCAL ECONOMIC DEVELOPMENT**

We are fully aware of the special responsibilities towards local communities that the economic and social impact of our operations confers upon us. Our local economic development department helps the economic rehabilitation and development of regions in which we do business in France. AREVADELFI supports these efforts by financing local enterprise creation and development projects.

AREVADELFI reflected a decrease in the number of enterprise creation projects in a slow economy. Six projects were funded, for a total of €170,000, but with the prospect of creating 190 jobs. We have been conducting a nationwide search for sources of projects and working to attract them to these areas. Some 250 contacts were made, 15 of which resulted in a decision to set up a business or to expand in the area.

We continued our enterprise village projects in 2003 under an agreement signed in 2002 with the "Caisse des dépôts et consignations":

- Near Le Creusot, France, the first village is now completely occupied with the 2003 arrival of a German manufacturer of wind towers, which is expected to provide 120 jobs. A second village was established to respond to local requests and is already 50% occupied.
- A third village is planned in Pontarlier, where we had to cease operations due to the deterioration of the worldwide telecom market for connectors. The goal is to create 150 jobs. Six companies are already prepared to set up business there.

In Chalon-sur-Saône, we are providing support for a project to create a corporate real estate development firm at an abandoned industrial site. The firm will help finance picture and sound technology projects.

We also have a memorandum of understanding with the town of Pierrelatte and the Caisse des dépôts et consignations concerning economic development projects on land owned by the town and the Commissariat à l'énergie atomique (CEA). Preliminary studies will be kicked off in 2004.

## **> BEST PRACTICES**

- **ASSOCIATION PLANÈTE URGENCE<sup>(1)</sup> (formerly Congé Solidaire)** offers workers an opportunity to devote vacation time to humanitarian missions of two weeks to one month. In 2003, AREVA financed a mission for one of our young lawyers to Dakar (Senegal), where she taught classes on applied law to 20 representatives of national and international associations and institutions working to defend women's rights and improve their station in society. We renewed our partnership following this successful first mission, and 10 more of our employees will participate starting in 2004.
- **IN PARTNERSHIP WITH SUEZ,** AREVA is supporting actions to develop microfinancing in China and Brazil led by the NGO PlaNet Finance<sup>(2)</sup>. Efforts are aimed at expanding synergies among various microfinancing players, promoting the sharing of experience and best practices, and providing the necessary computer resources to ensure effective and sustainable local institutions.

(1) <http://www.planete-urgence.com>

(2) <http://www.planetfinance.org>

## OBJECTIVE

**FORMALIZE** THE GOALS OF OUR STRATEGY ON SOLIDARITY THROUGH SPONSORSHIP AND PARTNERSHIP

### WEAVING A STRONG WEB OF SPONSORSHIP AND PARTNERSHIP

In 2002, we set up a sponsorship and partnership committee to harmonize our efforts and allocate resources judiciously. The committee met four times in 2003 and examined 85 projects in detail, 20 of which were chosen for follow-up, particularly those involving aid to developing countries (see below). As we announced in 2002, AREVA reached out to employees in France and the United States for suggestions on the direction of our solidarity programs. The first phase of this initiative revealed that most employees are in favor of the group's commitment to solidarity and wish to get involved personally. We will expand the dialogue in 2004 to identify areas for employee involvement and ways of getting involved.



**SOS SAHEL**<sup>(3)</sup>, AN NGO, is working to improve daily living conditions in isolated villages in the Sahel, including access to drinking water, preventive health care, food security and environmental protection. We support one of the association's programs in Niger aimed at providing adequate food supplies to a population of 26,000.

(3) <http://www.sahel.org.uk>

# 151

(€M in 2003)

Amount of country and local income and other taxes paid



Building housing projects in Lynchburg, Virginia (United States)

*"The purpose of 'Habitat for Humanity'<sup>(4)</sup> is to build houses for underprivileged families. The company has made both a financial and a human commitment: almost 200 employees from the Lynchburg site devote a portion of their time to this program."*

**SUSAN HESS**

DIRECTOR OF STRATEGIC AND MARKETING COMMUNICATIONS, LYNCHBURG, UNITED STATES

(4) <http://www.habitat.org/>

# ENVIRONMENTAL RESPONSIBILITY



Environmental monitoring:  
taking water samples in Niger



## OUR COMMITMENT

**RESPECT FOR THE ENVIRONMENT:  
MINIMIZING OUR ENVIRONMENTAL  
IMPACTS BY REDUCING OUR  
CONSUMPTION OF NATURAL  
RESOURCES, CONTROLLING OUR  
RELEASES AND OPTIMIZING WASTE  
MANAGEMENT.**

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## 2003 HIGHLIGHTS

> **€2.2M INVESTED** to reduce atmospheric emissions of ammonia and uranium at the Comurhex-Malvési.

> **FEASIBILITY STUDIES** on reducing water consumption at COGEMA-Marcoule and power consumption at COGEMA-La Hague.

> **ISO 14001 CERTIFICATION** for the COGEMA-Pierrelatte, COGEMA-Marcoule and Jeumont sites in France, and for FCI sites in Markham (Canada) and Kyongju (South Korea), Cominak (Niger), COGEMA-Logistics.

> **ENVIRONMENTAL CONVENTION** held July 9, 2003 attended by 70 of the group's colleagues.

> **STUDY PERFORMED** on the La Hague plant's environmental impacts on the marine biotope.

*“We must make peace among ourselves to save the world and peace with the world to save ourselves.”*

**MICHEL SERRES,**  
SCIENCE HISTORIAN,  
MEMBER OF THE *ACADÉMIE FRANÇAISE*  
“LE CONTRAT NATUREL”



# Deploying our Environmental Management Systems

**Our Environmental Management Systems (EMS) aim to minimize** our sites' impacts while continually improving their environmental performance.

## **A CLEAR FRAMEWORK FOR ACTION BY ALL**

**Our written environmental policy is designed to harmonize practices among all of our entities.** Each of our subsidiaries is in the process of developing their action plans. In 2004, we will focus on extending this policy to AREVA T&D.

The environmental inventory we took in 2002 showed that AREVA's environmental impacts are minimal, partly because our sites use only small quantities of materials, but also because they are properly managed. Nevertheless, the sites have set very high goals for improving their environmental performance under our continuous improvement initiative. Performance and progress towards these goals will be measured through internal audits.

Employee training and awareness raising are important and integral to this process. In particular, we are holding targeted study days on AREVA's priority objectives, such as health hazards (including legionnaire's disease), eco-design and environmental management.



**Radiological measurement and analysis laboratory, COGEMA-Marcoule, Bagnols-sur-Cèze (France)**

## **> BEST PRACTICES**

### **OUR ENVIRONMENT DEPARTMENT HELD**

**a convention on July 9, 2003 attended by 70 of our colleagues. Attendees discussed the objectives of AREVA's environmental policy, and a representative of the regional department of industry, research and environment (DRIRE) came to talk about risk as defined by the Seveso European Directive. Workshops were organized on themes such as the eco-attitude, conventional waste and energy conservation.**

**SONY AWARDED THE FCI DONGGUAN SITE (CHINA) its "Green Partner" certificate in recognition of the quality of its environmental management system.**



## OBJECTIVES

**SECURE ISO 14001 CERTIFICATION OR THE EQUIVALENT FOR THE ENVIRONMENTAL MANAGEMENT SYSTEMS OF ENVIRONMENTALLY SIGNIFICANT SITES NO LATER THAN THE END OF 2004**

**ESTABLISH SIMPLIFIED ENVIRONMENTAL MANAGEMENT SYSTEMS FOR SERVICE SECTOR SITES AND OTHER SITES WITH LOW ENVIRONMENTAL RISK**

**PREPARE TO IMPLEMENT THE ENVIRONMENTAL POLICY THROUGHOUT THE GROUP, INCLUDING NEWLY CONSOLIDATED AREVA T&D**

## DEPLOYING ENVIRONMENTAL MANAGEMENT SYSTEMS

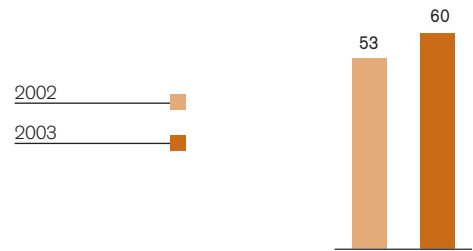
**Our main industrial sites continued to work towards ISO 14001 certification.** The seven new certifications granted in 2003 bring the percentage of certified sites to 67% for nuclear and 58% for other sites with significant environmental aspects.

We are also considering using simplified EMS at service sector sites and industrial sites with minimal environmental impact.

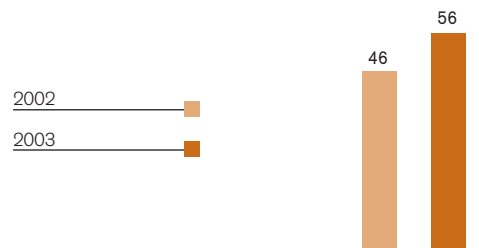


Waste sorting at the Melox plant in France

### ISO 14001 certification of nuclear sites (in %)



### ISO 14001 certification of sites with significant environmental aspects (in %)



## > SITES AWARDED ISO 14001 CERTIFICATION IN 2003

- Mining business unit: Cominak, Niger
- Chemistry business unit: COGEMA-Pierrelatte, France
- Treatment business unit: COGEMA-Marcoule, France
- Logistics business unit: COGEMA-Logistics (transportation subsidiary)
- Equipment business unit: Jeumont, France
- Automotive business unit: Markham, Canada
- Automotive business unit: Kyongju, South Korea

# AREVA's industrial operations and main environmental impacts

## FRONT END DIVISION

### URANIUM MINING



### URANIUM CONVERSION



### URANIUM ENRICHMENT



### FUEL FABRICATION

#### Environmentally significant sites

3 uranium mine sites  
3 gold mine sites

4 sites,  
including 1 Seveso and  
2 nuclear and Seveso

2 nuclear sites

13 sites,  
including 5 nuclear and  
5 Seveso



#### Air emissions

- GHG\* (CO<sub>2</sub>)
- VOC\*
- Radon
- Radioactive dust

- GHG\* (CO<sub>2</sub>, SF<sub>6</sub>)
- Radioactive gas, NH<sub>3</sub>, nitrogen oxides

- Radioactive gases

- Radioactive gases

#### Resource consumption<sup>(1)</sup>

- Water
- Fossil energy

- Nitric acid and hydrofluoric acid

- Electricity (about 90% of total group consumption)
- Cooling water

- Zirconium

#### Waste

- Mill tailings
- Process waste

- VLL\* and LL\* radioactive waste
- Ammonium nitrates and fluorines

- VLL\* and LL\* radioactive waste

- VLL\* and LL\* radioactive waste
- Fluorines

#### Releases to water

- Radioactive effluent (uranium, radium): about 90% of total releases for the group
- Non-radioactive effluent (sulfates, chlorides)

- Radioactive effluent (uranium)
- Non-radioactive effluent (nitrates, fluorides)

- Radioactive effluent (uranium)
- Non-radioactive effluent (zinc)

- Radioactive effluent (uranium)
- Non-radioactive effluent (chromium)

(1) The most significant consumption of resources.

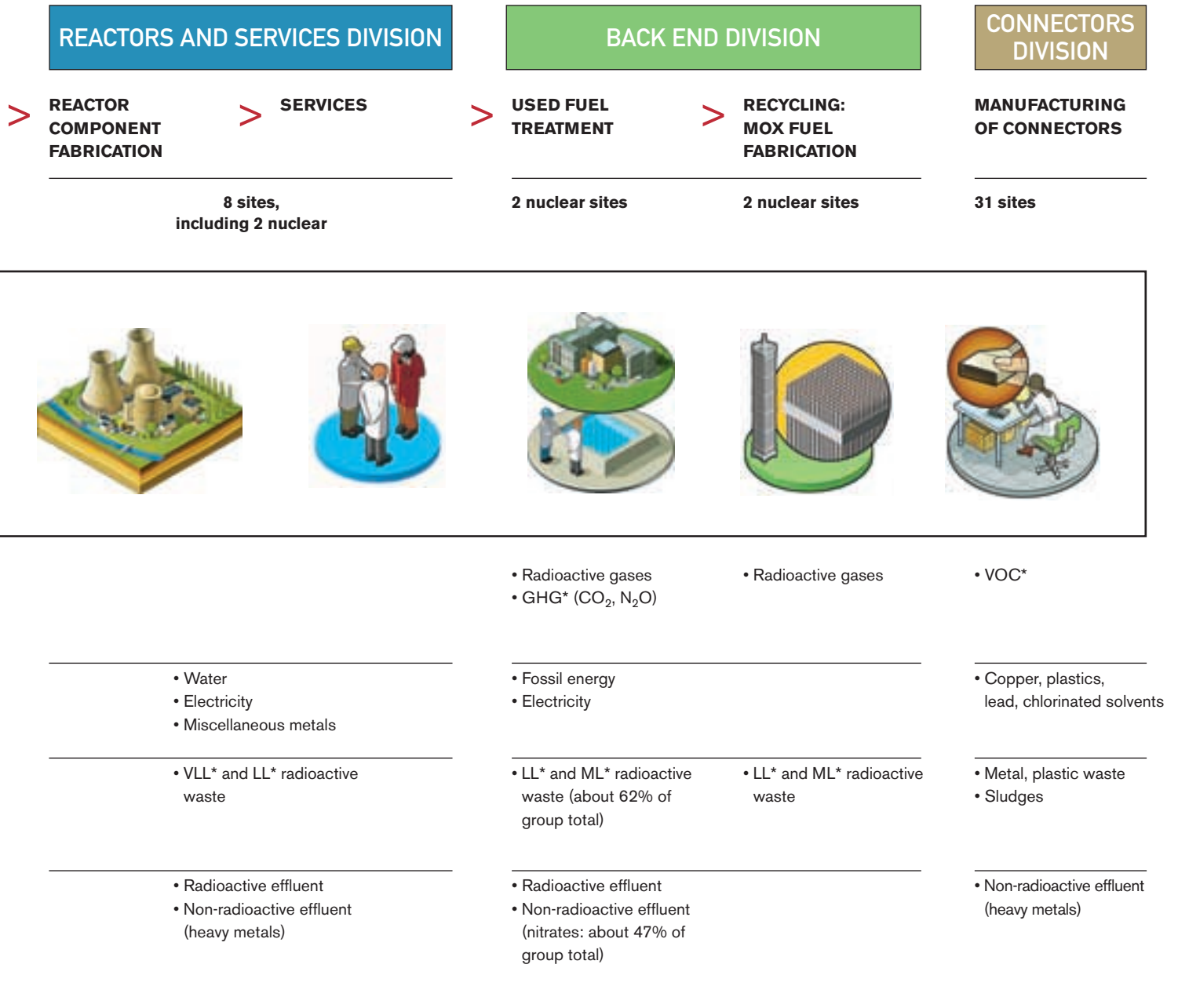
\*VLL: very low level

\*LL: low level

\*ML: medium level

\*VOC: volatile organic contaminant

\*GHG: greenhouse gases



# Reducing our radiological impacts

**Our efforts to control radioactive releases have resulted in very low impact levels.** Following the ALARA principle – “as low as reasonably achievable” – we are pursuing these efforts to reduce our radiological impacts on neighbouring populations and on the environment.

**Radiological impact analyses are performed for each of our sites** to measure the effect of radioactive releases on the most exposed members of the public, or reference groups. This impact is expressed in milliSievert per year (mSv/yr). COGEMA-La Hague's radiological impact assessment model was the focus of collaborative efforts by French and international experts and associations under the umbrella of the Nord-Cotentin radio-ecological group. The modeling method factors in impacts from radioactive liquid and gaseous releases for the different types of radiation (alpha, beta/gamma, neutrons) based on three potential exposure paths (external, ingestion and inhalation) as well as on the specific behavior of each radionuclide in the human body. Outside experts are conducting additional epidemiological studies to assess the health effects of radioactive releases on exposed populations directly. All of the studies carried out in the last twenty years have reached the same conclusion: impacts from the La Hague site are very low.

AREVA provides regular updates on its radioactive releases and the results of environmental sampling and analysis, which are overseen by the nuclear safety authorities, via monthly publications, and on our various websites. In France, the Local Information Commissions set up by the government near nuclear sites facilitate our direct interaction with the local community.

**Through concerted effort, radioactive releases have dropped sharply in the last thirty years.** COGEMA-La Hague's radiological impact was divided by five over the last decade, even though total tons of treated fuel increased during the same period.

**In doing so, we correctly anticipated that regulatory standards in the European Union would be strengthened. Those standards now set the maximum allowable impact on a member of the public from a nuclear facility at 1 mSv per year. This is lower than the average background radiation for all of France (2.4 mSv/yr). In 1999, the group committed to limiting the radioactive impact of the COGEMA-La Hague site to 0.03 mSv. In 2003, the radiological impact for the COGEMA-La Hague site remained below 0.01 mSv, which is less than 1% of the European regulatory limit. This figure roughly corresponds to one day of exposure to background radiation in the region around the site. Pleased though we are with this performance, we are nonetheless continuing research on the feasibility of reducing radioactive releases from La Hague even further.**

(1) "Framework of Assessment of Environmental Impact".

(2) Institute for Radiation Protection and Nuclear Safety.

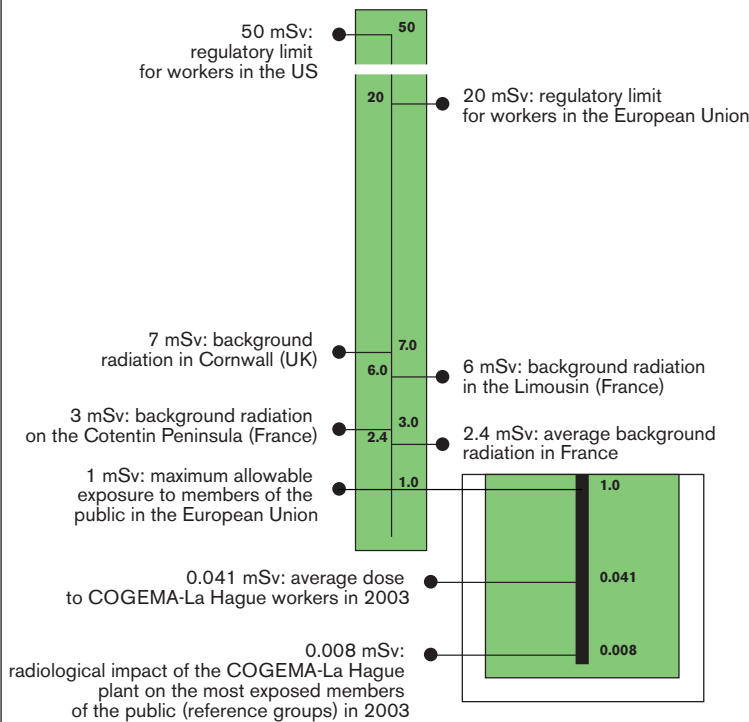
## > FOCUS

**COGEMA-LA HAGUE BIOTOPE STUDY:** In 2003, to gain more knowledge of how the COGEMA-La Hague plant affects biodiversity, we commissioned the Canadian firm SENES Consultants to do a study on the impacts of radioactive sea releases from the plant on local flora and fauna. Their report was examined in April 2003 by a council of French and international experts from the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the International Atomic Energy Agency (IAEA), the European FASSET<sup>(1)</sup> research program, the *Institut de Radioprotection et de Sûreté Nucléaire* (IRSN)<sup>(2)</sup> and other European research institutes. Their deliberations concluded that “the estimated dose rates to marine flora and fauna attributable to sea releases of radioactivity from the COGEMA-La Hague plant are low and, generally speaking, much lower than the guidelines above which, based on current knowledge, harmful and measurable effects on marine flora and fauna populations would be expected”.

## OBJECTIVE

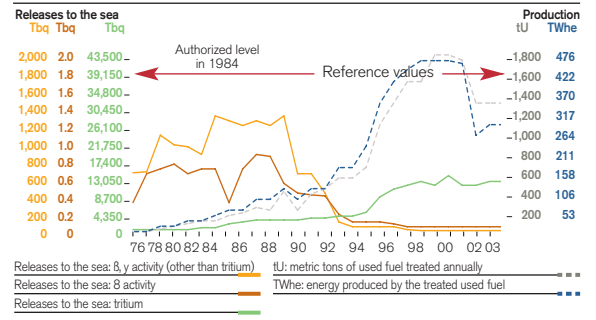
STANDARDIZE RADIOLOGICAL IMPACT ASSESSMENT MODELS AT THE MAIN NUCLEAR SITES BY 2005

### > COMPARISON OF EXPOSURE LEVELS

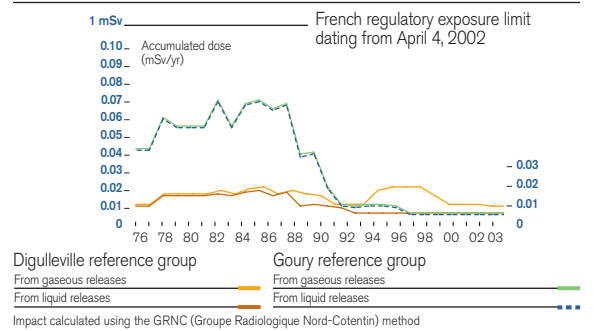


**AREVA has also set an external exposure limit at the site boundary of 1 mSv/year**, even under the most extreme, unrealistic scenarios. Work to reconfigure storage areas and site fences to comply with this limit was accordingly undertaken in 2003 and will continue as necessary in 2004 at COGEMA-Pierrelatte, COGEMA-Miramas, Eurodif and Comurhex-Malvési. At COGEMA-Marcoule, we will move and repackage waste stored in the north area of the site to comply with this new exposure limit.

### Radioactive releases from COGEMA-La Hague



### Radiological impacts COGEMA-La Hague



Environmental monitoring: grass sampling near the COGEMA-La Hague used fuel treatment plant (Cherbourg, France)

# Conserving natural resources

**Water and energy are limited resources and must be conserved.** AREVA is doing its part to conserve resources through our eco-efficiency programs aimed at continuously improving how we manage our consumption.

**We conducted studies in 2002 and 2003 to pinpoint our primary sources of water and power consumption** and identify the most important opportunities for potential savings. Our biggest consumers – COGEMA-Marcoule for water (24% of the group total, excluding cooling water) and COGEMA-La Hague for energy (28% of the group total, excluding Eurodif) – carried out feasibility studies on ways of reducing their consumption.

We are seeking improvements in three areas: process optimization, behaviour modification, and alternative technologies and equipment.

## WATER CONSUMPTION

Almost 70% of our water usage is used to cool the Célestin reactors at the Marcoule site – that's more than 100 million m<sup>3</sup> per year. The heatwave of the summer of 2003 raised cooling water usage by more than 20%.

Excluding cooling water, we used 28 million m<sup>3</sup> in 2003, a decrease of 6% in relation to 2002.

**Our analysis of water consumption patterns at the COGEMA-Marcoule site** found very significant opportunities for improvement and served to validate the methodology, which has potential for application to the Tricastin site. As a result, the COGEMA-Marcoule site was able to reduce non-cooling water consumption by 16% in 2003.

Other potential sources of savings are leak detection and water system differentiation by use (industrial process, cooling, domestic use). We are studying their feasibility.



Aerial view of COGEMA-Marcoule, Bagnols-sur-Cèze (France)

*“Water is needed to supply the city that sprang up with the mine, which now counts close to 90,000 inhabitants. Our plant uses a total of 510,000 m<sup>3</sup> of water a year. Three years ago, we used 25% more than that. Our goal is to reduce consumption even further – by 20% between now and 2006.”*

**IBRAHIM COURMO**  
DIRECTOR OF THE SOMAÏR MINE SITE  
IN NIGER

## > BEST PRACTICES

**AT THE FRAMATOME ANP SITE IN LINGEN, GERMANY,** two fuel pellet sintering furnaces were replaced with an “elongated” furnace that reduced hydrogen and nitrogen consumption by 64% and power consumption by 34%.

**FCI'S HUNTINGDON SITE IN THE US** reduced its power consumption by 1.1 GWh per year by optimizing its compressed air supply system.

## OBJECTIVES

**REDUCE WATER USAGE BY 20% BY THE END OF 2006** (EXCLUDING EURODIF AND THE COGEMA-MARCOULE CÉLESTIN REACTORS)

**DEVELOP AN ASSESSMENT METHOD FOR BUILDING ENERGY EFFICIENCY AND APPLY IT TO ALL SERVICE SECTOR FACILITIES OF GREATER THAN 1,000 M<sup>2</sup> BEFORE THE END OF 2005**

**REDUCE POWER CONSUMPTION BY 15% BY THE END OF 2006** (EXCLUDING EURODIF)

**IDENTIFY AREVA T&D CONTRIBUTIONS TO GROUP OBJECTIVES IN 2004**

## ENERGY CONSUMPTION

**The Eurodif plant accounts for about 90% of our total consumption of energy as a group.** This uranium enrichment plant uses the gaseous diffusion process. For our new Georges Besse II plant, which will eventually replace it, we have chosen a process that consumes 20 times less electricity: centrifugation. The first units of this plant are scheduled to start up in 2007. We refined and widened our energy inventory methods to capture all consumption, resulting in a certain amount of variation in the figures for other energy consumption from 2002 to 2003.

After Eurodif, the biggest consumer of energy is the COGEMA-La Hague plant. There, the goal is to reduce power consumption by 10% from 2002 to 2006, generating energy savings of 40 GWh over the four-year period. The related feasibility study pointed to two major areas for improvement:

1. behavioral change by raising awareness (posting instructions such as "Switch off lights when exiting", best practices guide, etc.);
2. optimizing industrial consumption by mapping energy consumption and the unit cost per type used so as to plan for more effective technologies.

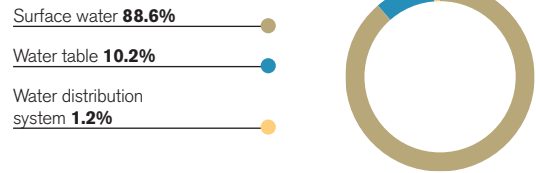
The experience acquired through this study will also benefit our other sites.

## CONTINUING OUR REVIEW OF ECO-DESIGN

**Rationalizing our water and energy consumption is part of a wider review** of eco-designs for products and services that manage material flows and products more efficiently. We organized a day of training on this subject in 2003 with the Université de technologie in Troyes, France, and the Center for Interdisciplinary Research and Study on Sustainable Development (Centre de recherches et d'études interdisciplinaires sur le développement durable). This event launched our eco-design network, whose foundations were laid by the 35 people in attendance.

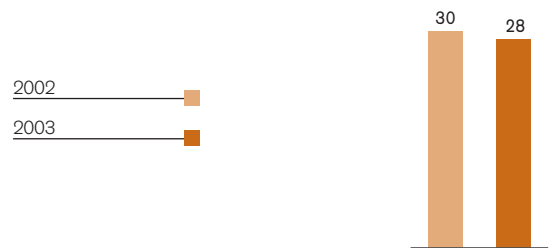
### Water usage by source

(in %)



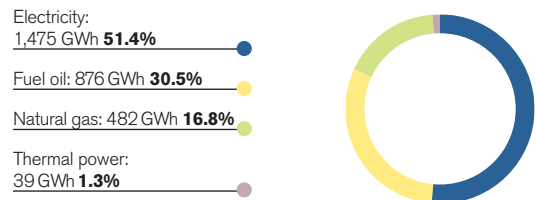
### Change in water usage

(excluding cooling water – in millions of m<sup>3</sup>)



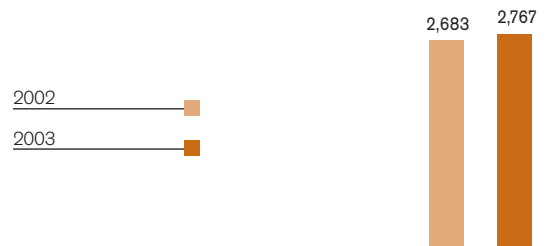
### Energy consumption by source

(in %)



### Change in total energy consumption

(excluding Eurodif – in GWh)



# Controlling our releases

We are committed to reducing our main non-radioactive releases in air and water and continue to implement action plans in these areas.

## AIR EMISSIONS

We refined and made progress on our inventory of gaseous emissions from our operations. When we could not measure the releases directly, particularly in the case of freon coolant and volatile organic contaminants (VOC), we estimated them. These improvements to our reporting system account for the differences in direct emissions of greenhouse gases and VOC from 2002 to 2003. In every instance, the atmospheric releases are minimal and relate primarily to:

- Direct emissions of greenhouse gases (GHG) linked to the burning of fossil fuels and certain gaseous emissions ( $SF_6$ ) from chemical operations. As a group, we released 583 thousand metric tons of  $CO_2$  equivalent in 2003. The difference, compared with reported figures for 2002 (430 thousand metric tons of  $CO_2$  equivalent), may be explained by improvements to our reporting process, which is now more exhaustive (e.g. inclusion of emissions relating to freon coolant emissions).
- Indirect emissions linked to power consumption. In 2003, we released 393,103 metric tons of  $CO_2$  equivalent, a slight increase of 7% compared to 2002.
- Emissions of volatile organic contaminants, largely relating to uranium ore processing and the Connectors division's use of chlorinated solvents. As a group, we released 247 metric tons in 2003. The difference, compared with reported figures for 2002 (37 metric tons), is primarily due to the larger reporting area, which now includes Somaïr and Cominak in Niger. The Connectors division continues to reduce its use of chlorinated solvents. In 2002, the Mantes-la-Jolie site completely eliminated methylene chloride by using less harmful substitute solvents, and the Ishioka site in Japan has followed suit.

Comurhex-Malvési spent €2.2 million to reduce atmospheric emissions of ammonia and uranium at its site in 2003. Ammonia emissions were cut back from 6 g/m<sup>3</sup> to 0.03 g/m<sup>3</sup> – a better than 99% reduction that went well beyond the stated goal of 0.05 g/m<sup>3</sup>. Uranium trioxide emissions were reduced by more than 85%, from 5 mg/Nm<sup>3</sup> to 0.6 mg/Nm<sup>3</sup>.

### > REDUCING $SF_6$ EMISSIONS AT THE COMURHEX-PIERRELATTE SITE

Comurhex-Pierrelatte produces fluorine used in the manufacturing process for various finished products. When process lines are cleaned out, traces of fluorine may end up in gaseous emissions and are neutralized as  $SF_6$  in a system containing liquid sulfur (sulfur pots).

The release of  $SF_6$  – 5 to 6 metric tons of it each year, or the equivalent of 130,000 metric tons of  $CO_2$  – accounts for almost a third of our direct emissions of greenhouse gases.

We are exploring three avenues to completely eliminate these releases by the end of 2006. Atmospheric releases can be avoided by replacing the sulfur pots with a system that uses a hydrolysable product, or by destroying fluorinated off-gas with potash. Another option is to recycle lost fluorine into a marketable fluorinated compound.

### > BEST PRACTICES

BY IMPROVING THE TREATMENT OF AQUEOUS RELEASES, the FCI site in Dongguan, China, reduced release volumes by 58% and galvanization sludges by 34%.



Fluorine production, Comurhex-Pierrelatte



THE FCI SITE IN SCARBOROUGH, ONTARIO, CANADA, reduced its ammonium bifluoride, nitric acid and sulfuric acid releases by 75% by eliminating aluminum acid etching.



## OBJECTIVES

**REDUCE** DIRECT EMISSIONS OF GREENHOUSE GASES BY 20% BY THE END OF 2006

**REDUCE** ATMOSPHERIC RELEASES OF CHLORINATED SOLVENTS IN THE CONNECTORS DIVISION BY 80% BY THE END OF 2006

**REDUCE** LEAD RELEASES IN WATER IN THE CONNECTORS DIVISION BY 80% BY THE END OF 2006

## RELEASES IN WATER

**Heavy metals are the principal contaminant in aqueous releases from the group's operations** especially uranium, zinc and lead, along with nitrogenated releases from the use of chemical reagents. The quantities involved are low.

We monitor these releases closely at all of our industrial sites, and they are treated before they enter the natural environment.

Some of our sites have invested heavily to improve their treatment of aqueous releases:

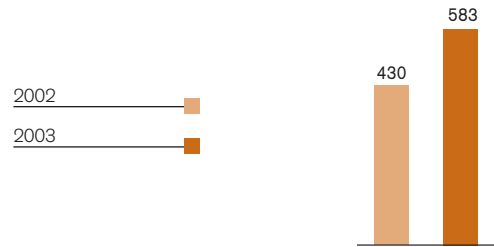
- The Cézus-Jarrie site in France built two purification stations, to the tune of €2 million, to reduce liquid releases to one-tenth their current volumes within three years.
- The Cézus-Paimbœuf site installed a recycling station for spent fluoronitric acid, and further investment in "clean" technologies is already in the budget. Combined, these measures will cost €1.25 million over three years, and will pay off with 70% acid recovery.

The Connectors division has also launched a major program to eliminate the use of lead.

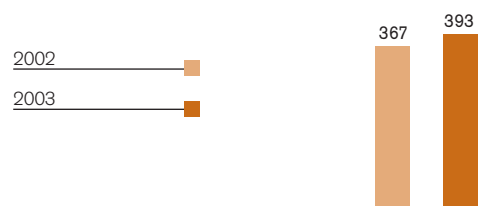


Effluent treatment station, decanting tank, Cézus plant in Paimbœuf (France)

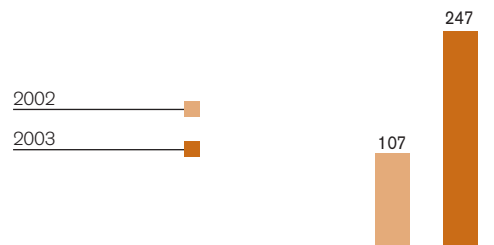
### Direct emissions of greenhouse gases (GHS) (in thousands of metric tons of CO<sub>2</sub> equivalent)



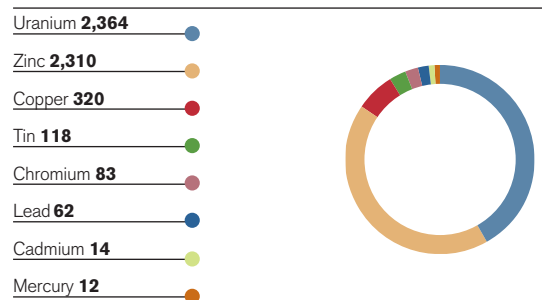
### Indirect emissions of greenhouse gases (GHS) (in thousands of metric tons of CO<sub>2</sub> equivalent)



### Emissions of volatile organic contaminants (VOC) (in tons)



### Aqueous releases of heavy metals (in kilograms)



# Optimizing waste management and protecting ecosystems

**At AREVA, we try hard to limit the amount of waste that goes into disposal** by minimizing waste generation and promoting sorting and recycling. After site closure, we reduce the environmental impacts of our former operations through rehabilitation and reclamation programs, and by long-term environmental monitoring.

## CONVENTIONAL WASTE

**We stepped up our efforts to share best practices** and raise employee awareness in this area in 2003. Special attention was given to source reduction, sorting and recycling, which together reduced hazardous waste quantities by more than 20% from 2002 to 2003. We improved and expanded our reporting initiative, which explains the apparent rise in common industrial waste quantities. The Melox site created a waste sorting area and continued its source reduction efforts, resulting in a 19% drop in the total quantity of waste sent to disposal from 2002 to 2003.

## RADIOACTIVE WASTE FROM OPERATIONS

**Our nuclear operations generate limited quantities of low- and very low-level radioactive waste.** We minimize waste generation through zoning and operating procedures. In 2003, AREVA sent 7,669 m<sup>3</sup> of radioactive waste to licensed disposal facilities, compared with 4,520 m<sup>3</sup> in 2002. This resulted in a decrease of waste quantities in temporary storage at our nuclear sites and mines in 2003. We are planning to revise this indicator in the near future to improve our reporting in this area. We are also working to improve waste forecasts for dismantling waste at the Pierrelatte and Marcoule sites and to optimize their future disposal.



**Lead kiln in the materials decontamination facility at COGEMA-Marcoule**

## > BEST PRACTICES

**FCI'S ISHIOKA SITE IN JAPAN increased the industrial waste recycling rate from 87% to 93% from 2002 to 2003 by significantly improving its recovery of manufacturing scrap, and specifically by identifying opportunities to reuse plastic waste.**

**COGEMA-MARCOULE previously stored contaminated lead from cleanup and dismantling operations on site. Now a partner company is decontaminating and converting the lead into ingots. Some 2,500 metric tons will gradually be reused.**

**COGEMA has provided support to a group studying cetaceans of the Cotentin Peninsula for more than five years. The group has a network of regional observers of these marine mammals and leads activities to inform and raise awareness among professionals and the general public.**

## OBJECTIVES

**REDUCE** TONS OF FINAL CONVENTIONAL WASTE SENT TO DISPOSAL BY 30% BY THE END OF 2006

**REDUCE** VOLUME OF PACKAGED RADIOACTIVE OPERATING WASTE SHIPPED TO LICENSED DISPOSAL FACILITIES BY 10%

**REDEFINE** RADIOACTIVE WASTE REDUCTION OBJECTIVE BASED ON DISPOSAL METHOD

## REHABILITATING SITES

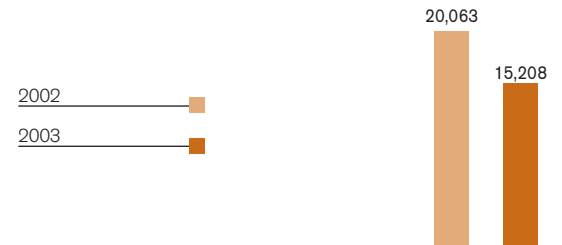
**Site rehabilitation at the end of the operating life cycle mainly concerns nuclear and mining operations.**

We pursued several mine rehabilitation projects throughout 2003, completing rehabilitation of the Jouac mine and nearing completion of the Bourneix gold mine in France during the year. Projects are also under way in Canada, the United States and Gabon.

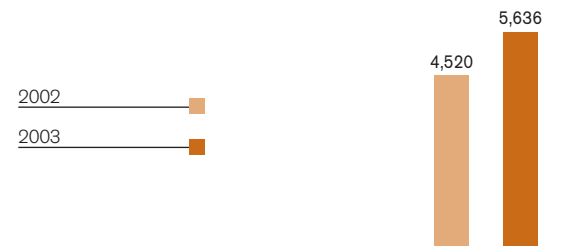
## PRESERVING BIODIVERSITY

**At AREVA, monitoring and preserving biodiversity is a special concern for us.** Our study of site plant and animal life begins with the design phase and continues throughout facility operations and into site rehabilitation. Special attention is given to the compatibility of species introduced during the rehabilitation phase with the local biotope, with preference given to native species whenever possible. At the Lodève site in France, for example, we did a detailed analysis of local flora and studied various options for landscape rehabilitation. We developed an exhaustive herbarium and distributed the information on CD-ROM to local stakeholders, including elected representatives and schools. At the COGEMA-La Hague site, a study commissioned in 2003 assessed the effects of radioactive liquid effluent on the marine biotope. The study results, which were validated by a panel of international experts, showed that there were no harmful effects on plant and animal life in the marine environment (see p. 48).

### Tons of hazardous industrial waste



### Volume of radioactive waste shipped to licensed disposal facilities



**REHABILITATION OF THE MOUNANA SITE IN GABON.** The Gabon mines ceased operations in 1999. A sturdy cap was placed over the main quarry, where mill tailings were deposited, to meet requirements for erosion resistance, radiological protection and landscape integration. The ore processing mill was dismantled. Work will be finished off in 2004. Radiological and chemical sampling and analysis of air and water indicate a return to the site's original condition. An environmental verification system will be put in place to make sure this remains the case.



# Reporting methodology

## The indicators published in this report reflect the main impacts and sustainable development challenges associated with our operations.

These indicators were developed by a group of experts representative of our different businesses and operations. They reflect, in particular, GRI<sup>(1)</sup> and WBCSD<sup>(2)</sup> recommendations as well as applicable legislation, such as the French law on New Economic Regulations.

The AREVA group was formed in September 2001 and began instituting performance indicators in 2002, its first full year of operation. The indicators presented in this report therefore concern 2002 and 2003.

Our reporting period is the calendar year (January 1 to December 31).

### SCOPE OF REPORT

All of the group's worldwide operations are covered in this report. By "group", we mean AREVA, its subsidiaries and all of the operational or functional entities of the group as of December 31, 2003 in the financial consolidation sense. We use the full consolidation principle.

The indicators and objectives presented in this report do not cover Transmission and Distribution (AREVA T&D) operations, which we acquired from Alstom on January 9, 2004.

### Exceptions

- Units whose sale was in progress and irreversible at the end of 2003 were excluded from this report (see changes in consolidation).
- An additional criterion was used for mining operations, i.e. the group's operational involvement. As a result, we included data from Cominak (Niger) and AMC (Sudan) in the environmental, health and safety indicators although due to our level of participation in these subsidiaries, they are not consolidated for accounting purposes.
- For environmental indicators, only the industrial sites were taken into account, as data on our offices is still too incomplete.

### CHANGES IN CONSOLIDATION

The main changes in the consolidated group in 2003 were:

- The sale of FCI's MAI division.
- The October 2003 sale of the Cable & Assembly business, which was part of FCI's Communication Data Consumer business unit.

Our next Sustainable Development Report will include the operations of AREVA T&D. This may result in adaptations to our sustainable development and continuous improvement objectives.

## METHODOLOGY

The measurement methods used for environmental and social indicators and the related reporting procedures are documented in an AREVA sustainable development and continuous improvement measurement and reporting protocol. This document is provided to anyone involved in developing and reporting data, at every level, and will be available on our website. It was revised in 2003 to incorporate lessons learned and to reflect geographic context more fully in the definitions. These modifications do not affect comparability with measurement methods used in the previous report. Previously reported data was corrected as necessary for errors.

## COVERAGE RATE

The coverage rates for each indicator, in percentage of total employees, are provided in the summary table of data on pages 58-61 of this report. For environmental indicators, the coverage rate is calculated in relation to the combined workforce of the industrial sites and not in relation to AREVA's total workforce.

## EXTERNAL VERIFICATION

The firm of Ernst & Young provided external verification of adherence to the reporting procedures for selected environmental and social indicators and key achievements in 2003. The verified indicators are identified with an asterisk (\*) in the tables. The type of verifications performed and the results thereof are presented on page 57 of this report.

## COMPLETENESS

The purpose of this report is to provide an overall picture of AREVA's major economic, labor, social and environmental objectives. Accordingly, it does not enter into detail on the local impacts of the various sites, which are addressed in specific reports that are gradually being published by environmentally significant sites. The Annual Report Summary and the Annual Report of AREVA are also a source of additional information.

(1) Global Reporting Initiative.

(2) World Business Council for Sustainable Development.

# Independent verification statement



At the request of the AREVA group, we have reviewed the implementation of social and environmental reporting procedures as well as the 2003 major achievements presented in the Sustainable Development Report on pages 10-11.

AREVA's executive management is responsible for the information presented in this Sustainable Development Report. Our responsibility is to report our findings concerning the two above-mentioned subjects in accordance with the terms agreed.

## NATURE AND SCOPE OF WORK

As agreed in our engagement letter dated January 8, 2004:

- We reviewed the main documents pertaining to the implementation of the sustainable development program and, in particular, reporting procedures for environmental and social data.
- For nine indicators\*, we verified the implementation of the reporting procedures by conducting interviews with the group's reporting managers for the four main subsidiaries and six plant sites (FCI-Mattighofen, Comurhex-Pierrelatte, COGEMA-Marcoule, COGEMA-La Hague, Framatome ANP-Romans and FCI-La Ferté Bernard), and by conducting tests and consistency checks (comparing data with supporting documents and verifying calculation methods).
- For achievements identified with a check mark  in the table on pages 10-11, we looked for evidence that the activities were performed in 2003, as presented in that table; our work included interviews with persons involved in these achievements and the review of documents attesting to their existence, such as meeting reports, attendance sheets and internal reports.

Work of this kind does not include all of the verifications specific to an audit providing a high or moderate level of assurance in accordance with the International Standards on Assurance Engagements, but still allows us to report our findings and observations.

## FINDINGS AND OBSERVATIONS

- We did not observe any significant anomaly relating to implementation of the group's procedures in any of the selected entities.

- A better definition of responsibilities together with training programs and internal controls contributed to increase the reliability of 2003 reporting. Additional improvement might be provided on rules for estimating the consumption of cooling fluids (calculation of greenhouse gases direct emissions), on the method for estimating hours worked (calculation of the accident frequency rate and of the accident severity rate), and on the relevance of the indicator to track the volume of operations-related radioactive waste.
- With respect to 2003 achievements identified with a check mark , our observations are consistent with the information presented in the progress chart relating to the sustainable development action plan on pages 10-11 of this report.

April 22, 2004

Ernst & Young et Associés  
Environnement et Développement Durable  
Eric Duvaud

(\*) ISO 14001 certifications, water consumption, energy consumption, greenhouse gases direct emissions, frequency rate of work-related accidents that result in lost work time among AREVA group employees, severity rate of work-related accidents that result in lost work time among AREVA group employees, number of work-related accidents resulting in lost work time among external company employees working on AREVA group sites, average dose of ionizing radiation to which AREVA group employees are exposed during their professional activities, and radiological impact of the COGEMA-La Hague site.

# Environmental indicators

DATA	Unit	2002
		AREVA consolidated
Percentage of sites with ISO 14001 certification	%	53%
Percentage of other sites with significant environmental aspects with ISO 14001 certification	%	46%
Volume of water taken from the water table	m <sup>3</sup>	15,442,031 <sup>(2)</sup>
Volume of water taken from the surface (cooling water)	m <sup>3</sup>	108,667,000
Volume of water taken from the surface (non-cooling water)	m <sup>3</sup>	12,379,472
Volume of water taken from the water distribution system	m <sup>3</sup>	1,890,887 <sup>(2)</sup>
Total volume of water used (excluding cooling water)	m <sup>3</sup>	29,712,390
Total volume of water used (with cooling water)	m <sup>3</sup>	137,529,349
Electricity purchases excluding Eurodif	MWh	1,517,602
Thermal energy purchases	MWh	2,186 <sup>(2)</sup>
Exported energy	MWh	ND
Natural gas consumption	MWh	436,736 <sup>(2)</sup>
Fuel oil consumption (heavy and light, engine fuel)	MWh	726,702 <sup>(2)</sup>
Total energy consumption (excluding Eurodif)	MWh	2,683,226 <sup>(2)</sup>
Direct GHG emissions	metric tons of CO <sub>2</sub> eq.	430,421
Indirect GHG emissions	metric tons of CO <sub>2</sub> eq.	367,450 <sup>(2)</sup>
Consumption of copper and copper alloys	t	8,954
Consumption of plastics	t	16,401
Consumption of lead	t	7 <sup>(2)</sup>
Consumption of nitric acid	t	15,790 <sup>(2)</sup>
Consumption of sulfuric acid	t	81,415
Consumption of pure tributyl phosphate (TBP)	t	82
Consumption of pure hydrofluoric acid (HF)	t	6,816 <sup>(2)</sup>
Consumption of pure ammonia (NH <sub>3</sub> )	t	4,217
Consumption of gaseous chlorine	t	7,886
Consumption of pure chlorinated solvents	t	85
Emission of volatile organic contaminants (including chlorinated solvents, fluorinated solvents, benzene solvents)	kg	106,663 <sup>(2)</sup>
Air emissions of SO <sub>2</sub>	t	1,262
Air emissions of NH <sub>3</sub>	t	354
Air emissions of HF	t	0.7
Air emissions of HCl	t	0.8
Air emissions of NO <sub>2</sub>	t	265
Total nitrogen releases (NO <sub>3</sub> , NO <sub>2</sub> , NH <sub>4</sub> OH, hydrazine) to aquatic environments	t	854
Releases of copper (Cu) to aquatic environments	kg	561
Releases of zinc (Zn) to aquatic environments	kg	2,518
Releases of tin (Sn) to aquatic environments	kg	20
Releases of chromium (Cr) to aquatic environments	kg	398
Releases of lead (Pb) to aquatic environments	kg	102
Releases of cadmium (Cd) to aquatic environments	kg	6
Releases of mercury (Hg) to aquatic environments	kg	26
Releases of uranium (U) to aquatic environments	kg	2,262
Quantity of hazardous industrial waste	t	20,063 <sup>(2)</sup>
Quantity of common industrial waste	t	23,775 <sup>(2)</sup>
Volume of radioactive waste shipped to licensed disposal facilities	m <sup>3</sup>	4,520

(1) In % of the workforce at AREVA group industrial sites.

(2) 2002 figures in bold face are corrected figures.

2003					
AREVA consolidated	Front End division	Reactors and Services division	Back End division	Connectors division	Coverage rate <sup>(1)</sup>
67%				NA	100%
56%					100%
16,512,286	14,122,686	175,030	2,069,178	145,392	100%
133,043,190					100%
9,596,476	4,432,428	13	5,118,410	45,625	100%
1,905,525	616,823	419,018	185,225	684,459	100%
28,014,287	19,171,937	594,061	7,372,813	875,476	100%
161,057,477					100%
1,474,684	593,532	89,459	608,117	183,577	100%
38,534	23,768	10,696	300	3,770	100%
105,649	283	107	105,259	0	100%
481,848	206,920	83,518	155,655	35,756	100%
876,037	447,301	3,927	405,176	19,632	100%
2,766,551	1,272,335	187,493	1,063,989	242,735	100%
582,828	356,469	31,238	182,465	12,656	100%
393,103	249,743	18,486	45,188	79,685	100%
16,581	11	211	0	16,359	100%
15,766	0	0	0	15,766	100%
6	0	0	0	6	100%
17,012	12,895	12	4,065	40	100%
78,364	77,119	0	6	1,239	100%
49	19	0	30	0	98%
7,407	7,405	2	0	0	100%
4,852	4,850	0	0	2	100%
7,533	7,532	0	0	2	100%
4,087	3	1	4,007	76	99%
246,898	184,933	29,901	6,971	25,092	100%
666	156	0	506	3	100%
558	558	0	0	0	100%
3.1	2.5	0	0	0.6	100%
1.1	0.2	0	0	0.9	100%
531	244	13	241	33	100%
1,163	420	3	544	196	98%
320	9	27	12	272	100%
2,310	2,101	31	167	12	100%
118	6	0	2	110	100%
83	23	21	29	9	100%
62	3	2	31	25	100%
14	3	2	9	0	100%
12	0	0	12	0	100%
2,364	2,284	0	80	0	100%
15,208	10,232	648	901	3,427	100%
28,065	11,352	2,617	2,735	11,361	100%
5,636	1,751	369	3,515	0	100%

# Social indicators

DATA	Unit	2002
		AREVA consolidated
Total workforce	Nb.	50,147
Temporary workers	Nb.	ND
Average individual dose from exposure to ionizing radiation to employees	mSv	1.56
Number of employees receiving a cumulative effective dose of less than 2 mSv	Nb.	14,260
Number of employees receiving a cumulative effective dose of 2 to 6 mSv	Nb.	2,111
Number of employees receiving a cumulative effective dose of 6 to 10 mSv	Nb.	1,079
Number of employees receiving a cumulative effective dose of 10 to 14 mSv	Nb.	486
Number of employees receiving a cumulative effective dose of 14 to 20 mSv	Nb.	323
Number of employees receiving a cumulative effective dose of greater than 20 mSv	Nb.	78
Average dose from exposure to ionizing radiation to subcontractor personnel	mSv	0.44
Absenteeism rate	Number of days absent/ number of theoretical work days	0.01
Accident frequency rate with lost work days for employees of the AREVA group	Number of accidents with lost work days/ million work hours	9.47 <sup>(2)</sup>
Number of work-related accidents with lost work days for personnel of outside companies working at an AREVA site	Nb.	ND
Number of mortal work-related accidents for personnel of outside companies working at an AREVA site	Nb.	ND
Number of mortal work-related accidents for employees of the AREVA group	Nb.	ND
Number of commuting accidents with lost work days for employees of the AREVA group (excluding the US)	Nb.	ND
Number of mortal commuting accidents for employees of the AREVA group (excluding the US)	Nb.	ND
Severity rate of work-related accidents with lost work days for employees of the AREVA group	Number of lost work days/ thousand work hours	0.33
Number of INES level 0 incidents in nuclear facilities (France)	Nb.	57
Number of INES level 1 incidents in nuclear facilities (France)	Nb.	18
Number of incidents greater than INES level 1 in nuclear facilities (France)	Nb.	0
Percentage of employees having received training during the year	%	53%
Percentage of women executives	%	8%
Percentage of women managers	%	15%
Percentage of women in personnel grades: skilled/unskilled workers, administrative/clerical, technicians, supervisors	%	21%
Percentage of handicapped employees	%	1%

(1) In % of the workforce at AREVA group industrial sites.

(2) 2002 figures in bold face are corrected figures.



2003						
AREVA consolidated	Front End division	Reactors and Services division	Back End division	Connectors division	Corporate	Coverage rate <sup>(1)</sup>
48,011	9,719	13,052	10,542	11,960	2,738	100%
1,603	322	323	256	661	41	96%
1.27	1.56	1.46	0.96	0	0	99%
15,257	5,101	2,703	7,453	0	0	99%
2,594	1,070	857	667	0	0	99%
855	288	274	293	0	0	99%
380	104	131	145	0	0	99%
276	119	112	45	0	0	99%
36	9	27	0	0	0	99%
0.45	0.61	0.19	0.34	0	0	90%
0.04	0.04	0.04	0.05	0.03	0.03	96%
8.01	8.25	7.38	9.07	8.29	2.35	98%
136	59	8	60	9	0	85%
3	2	1	0	0	0	91%
0	0	0	0	0	0	98%
114	13	46	28	23	4	100%
0	0	0	0	0	0	98%
0.28	0.38	0.24	0.39	0.14	0.07	98%
51	30	1	20	0	0	98%
17	8	1	8	0	0	98%
1	1	0	0	0	0	98%
67%	64%	61%	71%	74%	57%	98%
4%						100%
18%						98%
22%	13%	23%	17%	37%	55%	98%
2%	2%	2%	3%	1%	1%	97%

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(1) <http://www.unglobalcompact.org> – (2) <http://www.globalreporting.org>

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(3) Available at [www.aveva.com](http://www.aveva.com)

# Glossary

## A

### **ALARA** ("As Low As Reasonably Achievable")

Release or pollution level not to be exceeded by balancing technical caution with cost-effectiveness.

## B

### **BECQUEREL (Bq)** (see also Radioactivity)

Unit of measure for radioactivity (1Bq = 1 atomic particle disintegration per second).

### **BIODIVERSITY**

Biological diversity within a given area based, in particular, on the relative number of animal and plant species present in that area, on their distinctiveness or specificity, and on the relationships they have with the environments in which they live.

### **BIOTOPE**

Area characterized by climatic, geographic, chemical, physical, morphological and geological factors in constant or cyclical equilibrium, and occupied by organisms living there in ecological community (biocenosis).

## C

### **CO<sub>2</sub>**

Carbon dioxide, the leading greenhouse gas\*, produced primarily by burning fossil fuels (coal, oil, natural gas, etc.).

### **CONNECTORS**

Component at the end of an electrical or optical conductor used to connect or disconnect them from another compatible component.

## D

### **DECOMMISSIONING**

Term covering all stages following the shut-down of a nuclear facility, from final closure through the removal of radioactivity\* from the site, including physical dismantling and decontamination of all non-reusable facilities and equipment.

### **DGSNR** (Direction générale de la sûreté nucléaire et de la radioprotection – France)

The DGSNR is the national-level safety body of the French Autorité de Sûreté Nucléaire (ASN). It reports to the French Ministries of Industry, the Environment and Health, and is charged with recommending, drafting and implementing government policy in matters of radiation protection and nuclear safety, not including those pertaining to French nuclear defense facilities and operations.

### **DIRECT EMISSIONS OF GREENHOUSE GASES**

Greenhouse gases emitted by processes and/or equipment owned or controlled by a company, such as company vehicles, raw materials stockpiles, industrial manufacturing processes, emissions stacks, etc.

### **DOSE**

Measure used to characterize human exposure to radiation\*. The term "dose" is often erroneously used to replace "dose equivalent".

**Dose equivalent:** the same absorbed dose may have different effects on a living organism, depending on the type of radiation involved. A dose multiplier, or "quality factor", is used to take these differences into account in calculating the dose, giving a "dose equivalent".

**Effective dose:** the sum of equivalent doses delivered to various human organs and tissues, weighted using a factor specific to each organ or tissue. The effective dose unit is the Sievert. It is used to measure the biological effects of radiation\*.

### **DOSIMETRY**

An assessment or measurement method used to determine the radiation dose\* absorbed by a substance or a person.

## E

### **ECO-DESIGN**

Designates integration of the environment into the design of goods and services. All products impact the environment at one point or another in their life cycle. The goal of eco-design is to reduce those impacts while preserving, or indeed improving, product utility. In the eco-design process, environmental parameters are added to other design parameters, such as technical feasibility, cost effectiveness, and customer requirements.

### **ECO-EFFICIENCY**

When a company wants to reduce its environmental impacts as well as its costs, it initiates an eco-efficiency process. This process involves an analysis of the environmental impacts of its products, processes and services.

### **EFQM** (European Foundation for Quality Management)

Non-profit association formed in 1988 under the patronage of the European Commission whose mission is to promote the use of total quality management initiatives by European companies.

\* Defined in this glossary.

**ENRICHMENT, URANIUM\* ENRICHMENT**

Process by which the fissile content of uranium is increased. Natural uranium consists of 0.7% U<sup>235</sup> (fissile isotope) and 99.3% U<sup>238</sup> (non-fissile isotope), as well as very small quantities of U<sup>234</sup>. The proportion of U<sup>235</sup> is increased to 3-4% to make it usable in a pressurized water reactor\*.

**ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)**

An Environmental Management System is a systematic process for identifying and improving environmental performance that may culminate in certification.

**ENVIRONMENTALLY SIGNIFICANT SITES**

In AREVA's frame of reference, environmentally significant sites include our nuclear sites, sites with facilities representing major technological risk per Seveso\* regulations, mining sites, plants with facilities undergoing a public inquiry, and industrial or service sites whose consumption, releases and pollution carry significant weight in the group's environmental accounting.

**EURATOM**

The European Atomic Energy Community, which was established by the Rome Treaty of March 25, 1957 and the treaty establishing the European Economic Community. Its mission is to create "the conditions necessary for the speedy establishment and growth of nuclear industries."

**F****FINAL RADIOACTIVE WASTE**

Material containing radionuclides (radioactive elements) in such quantities that their release or spread to the environment is prohibited, but which cannot be economically reused or recycled in the current state of the art, and which the owner elects to dispose of. Waste is classified into one of four classes based on activity level:

- very low-level waste (VLLW);
- low-level waste (LLW) from industrial production and maintenance operations, such as gloves, shoe covers, face masks, etc.;
- medium-level waste (MLW), such as dismantled production equipment, measurement instrumentation, etc.;
- high-level waste (HLW), primarily fission products that have been separated during used fuel treatment/recycling operations.

**G****GASEOUS DIFFUSION** (see also Enrichment)

Separation process for molecular species in gaseous form based on the different speeds at which these molecules pass through a semi-permeable membrane, due to differences in weights and sizes. The U<sup>235</sup> molecules of uranium hexafluoride in gaseous form are separated from its U<sup>238</sup> molecules in this manner, causing enrichment\* of the uranium in U<sup>235</sup> for nuclear fuel purposes.

**GOVERNANCE**

Designates the organization of authority within a company (corporate governance) and seeks the right mix of management bodies, oversight bodies and shareholders. In terms of sustainable development, good governance presupposes transparency, dialogue with stakeholders, and addressing stakeholder expectations. It involves corporate commitment to guiding principles, which give rise to internal charters.

**GREENHOUSE EFFECT**

See Greenhouse gases\*.

**GREENHOUSE GASES**

Gases present in the atmosphere that may be produced naturally or by human activity. They create a greenhouse effect, helping to warm the earth and make it livable. But beyond a certain threshold, their build-up in the atmosphere causes global warming, which interferes with the climate. The main greenhouse gases are carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), hydrofluorocarbons (HFC), sulfur hexafluoride (SF<sub>6</sub>) and perfluorocarbons (PFC). The relative impact of these gases varies as a function of their heat capacity. To compare impacts, their heat capacities are expressed in terms of the heat capacity of carbon dioxide, the reference gas by convention. Hence emissions are expressed in metric tons of CO<sub>2</sub> equivalent (MTCO<sub>2e</sub>).

**GRI** (Global Reporting Initiative)

Launched in late 1997 by the Coalition for Environmentally Responsible Economies (CERES)<sup>(1)</sup>, an NGO, in partnership with the United Nations Environment Programme, the Global Reporting Initiative is actively supported by member companies, NGOs, accounting organizations, labor associations and other interested parties around the world. The GRI developed and disseminated guidelines that provide a framework and a standard format for reporting quantitatively and qualitatively on corporate performance in the three areas of sustainable development.

**GTOE** (1 Gtoe = 106 metric tons of oil equivalent)

The Toe (tons of oil equivalent) is a unit of measure used to determine energy equivalencies among various types of fossil fuels. It designates the thermal power equivalent of the energy supplied by one ton of oil. By definition, 1 Toe equals 11.6 kilowatthours (kWh).

**H****HHA**

Health Hazards Assessment.

**I****IAEA** (International Atomic Energy Agency)

International organization of the United Nations whose mission is to promote the peaceful use of nuclear power and to verify that nuclear materials and facilities in users' possession are not diverted to defense uses.

(1)<http://www.ceres.org>

## **INDIRECT EMISSIONS OF GREENHOUSE GASES**

Greenhouse gases relating to a company's business, but that are emitted by sites or operations owned or controlled by a different company. Example: emissions resulting from the generation of purchased power or heat.

## **INES** (International Nuclear Event Scale)

International scale used to define the seriousness of an event at a nuclear facility. It was designed by a group of experts formed by the IAEA\* and the Nuclear Energy Agency of the OECD and became effective internationally in 1991. The INES is an information tool for the media and the general public used to classify events by increasing levels of seriousness, from level 0 to level 7.

## **ISO** (International Standards Organization)

The ISO 14000 standards set requirements for environmental management organizations and systems designed to prevent pollution and reduce the environmental effects of an activity. ISO 9000 standards pertain to the quality of goods and services.

## **ISOTOPE**

An element whose atoms have the same number of electrons and protons, but a different number of neutrons. A given chemical element may therefore have several different isotopes with different numbers of neutrons. For example, uranium has three natural isotopes ( $U^{234}$ ,  $U^{235}$  and  $U^{238}$ ). All isotopes of an element have the same chemical properties, but different physical properties, particularly weight.

## **M**

### **MOX** (Mixed OXides)

A mixture of uranium and plutonium oxides used to fabricate certain types of nuclear fuel.

## **N**

### **NGO** (Non-governmental Organization)

Non-profit association or group that is unaffiliated with States and whose purpose is to promote or defend collective interests.

## **O**

### **OECD** (Organization for Economic Cooperation and Development)

Organization of 30 member nations that offers governments a framework for examining, developing and refining economic and social policy. The OECD also provides non-binding instruments such as the OECD guidelines for multinational companies.

### **OHSAS 18001**

International management criteria for occupational health and safety systems.

## **P**

### **PACKAGING OF NUCLEAR WASTE**

Operation consisting of converting waste into a form suitable for transport and/or storage and/or final disposal.

### **PLUTONIUM**

Element with atomic number 94 and atomic symbol Pu. Plutonium 239, a fissile isotope\*, is produced in nuclear reactors from uranium 238.

## **R**

### **RADIATION, IONIZING RADIATION** (see also Radioactivity)

Flux of electromagnetic waves (radio waves, light waves, ultraviolet or X rays, cosmic rays, etc.), of particles of matter (electrons, protons, neutrons), or of a group of such particles. The flux carries energy in proportion to the wave frequency or to the particle speed. Their effect on irradiated objects is often to strip electrons from their atoms, leaving ionized atoms in their wake, which carry electrical charges, hence the generic name of "ionizing" radiation.

### **RADIATION PROTECTION** (see also Radioactivity)

Term commonly used to designate a branch of nuclear physics pertaining to the protection of individuals from ionizing radiation\* (also referred to as "health physics"). By extension, the term covers all of the health measures taken to protect members of the public and workers from such radiation and to comply with laws and regulations.

### **RADIOACTIVE HALF-LIFE**

Period of time during which half of the atoms\* contained in a given amount of radioactive material naturally disintegrate, thus reducing the material's radioactivity\* by half. The radioactive half-life of each radioelement is constant:

- 110 minutes for argon 41;
- 8 days for iodine 131;
- 4.5 billion years for uranium 238.

### **RADIOACTIVITY** (see also Dose, Becquerel, Radiation)

The emission of electromagnetic waves and/or particles by a chemical element resulting from a change in the arrangement of its nucleus. The emission may be spontaneous (naturally occurring radioactivity from some unstable atoms) or induced (artificial radioactivity).

### **RADIOELEMENT** (or radionuclide)

Any radioactive material. Only a small number of radioelements are found in nature: a few heavy elements (thorium, uranium, radium, etc.) and a few light elements (carbon 14, potassium 40). The others – more than 1,500 in number – are created artificially in the laboratory for medical applications or in nuclear reactors\* as fission products.

**REACTOR, NUCLEAR REACTOR**

System in which controlled nuclear reactions are conducted, producing heat that is used to make steam. The steam activates a turbine, which drives an electric generator. Different reactor types use different fuel, moderators (to slow neutrons) and coolants (to remove heat used to generate power).

**REPROCESSING**

Used fuel is treated to separate fissile and fertile materials (uranium and plutonium) for recycling, and final waste (fission products and structural materials) for packaging into a form suitable for safe storage pending final disposal.

**S****SEVESO, SEVESO REGULATIONS**

European directive aimed at preventing major accidents involving hazardous materials and requiring in particular the development of emergency response/management plans, public information and urban zoning near high-risk industrial sites.

**SIEVERT**

Official unit of measure for dose equivalent, i.e. the fraction of energy from radioactive radiation received by 1 kilogram of living matter. The dose is calculated by taking into account the type of radiation and the organ in question. The Sievert measures the biological effects of radioactivity.

**SPENT FUEL**

Nuclear fuel that has been used in a reactor\*.

**SRA** (Simplified Risk Assessment)

Method used to rank sites according to three categories of human health and environmental risks:

**Class 1:** sites whose risks are such that in-depth investigations and detailed risk assessment are required;

**Class 2:** sites with limited impacts or risk that require monitoring (periodic sampling and analysis, piezometers, etc.) and may require urban zoning measures;

**Class 3:** sites that do not require additional special investigations or studies as long as their environment and usage does not differ from those covered by the SRA.

**STAKEHOLDERS**

Stakeholders are individuals or groups of individuals concerned by the company's business, for a variety of reasons: shareholders, employees, suppliers, customers, the government, the neighboring community, environmental associations, NGOs, etc. Their interests impact or are impacted by those of the company in the various areas that concern them.

**U****URANIUM**

Chemical element with atomic number 92 and atomic symbol U, which has three natural isotopes\*: U<sup>234</sup>, U<sup>235</sup> and U<sup>238</sup>. The only naturally occurring fissile nuclide is U<sup>235</sup>, a quality that is exploited as a source of energy. Natural uranium contains 0.7% of this isotope.

**V****VOC** (volatile organic contaminant)

Chemical compound, such as gasoline or acetone, that evaporates at ambient temperature. When exposed to sunlight, VOC reacts with other gases in the atmosphere to form ozone and other photo-oxidants.

**W****WBCSD** (World Business Council for Sustainable Development)

Formed in 1995 at the initiative of the International Chamber of Commerce, the World Business Council for Sustainable Development has some 170 international corporate members in 35 countries and 20 business sectors. It is international industry's key opinion leader in matters pertaining to sustainable development.

# Continuing the dialogue

This second Sustainable Development Report is an expression of our commitment to open and frank dialogue with all of our stakeholders. But it is only a partial view of our commitments in this matter.

To learn more about AREVA and sustainable development, our website offers up-to-the-minute information: [www.aveva.com](http://www.aveva.com)  
In particular, you may view and download our annual report from our website.



The site also provides links to our main subsidiaries, where you will find additional information:

[www.cogema.fr](http://www.cogema.fr)

[www.framatome-anp.com](http://www.framatome-anp.com)

[www.fciconnect.com](http://www.fciconnect.com)

[www.technicatome.com](http://www.technicatome.com)

We value your opinions. Sharing them with us will help us to address your concerns.

Please take the time to send us your comments via the **Dialogue** box on the AREVA website, or contact us by mail:

**AREVA**  
**SUSTAINABLE DEVELOPMENT AND CONTINUOUS IMPROVEMENT DEPARTMENT**  
**27-29, RUE LE PELETIER**  
**75433 PARIS CEDEX 09**  
**FRANCE**





French corporation with an Executive Board and a Supervisory Board and capital of 1,346,822,638 euros  
Registered office: 27-29, rue Le Peletier – 75009 Paris – France  
Tel.: 33 (0)1 44 83 71 00 – Fax: 33 (0)1 44 83 25 00 – [www.areva.com](http://www.areva.com)