Cedre Information BULLETIN

SPECIAL FEATURE

Cedre turns 35 A look back

FOCUS

Our tools and *resources*

N° 32 - September 2014

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N° 32 - September 2014
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EDITORIAL

Just over thirty six years ago, disaster was striking the coasts of Northern Finistère, Brittany. The oil tanker *Amoco Cadiz* suffered major structural damage, causing it to sink during the night of 16th to 17th March 1978, and Brittany awoke to what remains today the biggest oil spill it has ever known. This event gave rise to much emotion and remains deeply ingrained in the memories of the region's inhabitants despite the many years which have since gone by. This disaster caused the authorities at the time to take drastic measures aimed at reducing the number of shipping accidents and at better managing the consequences of such events. Cedre, which celebrates its 35th anniversary this year, was founded a few months after the accident in January 1979.

The association is tasked with collecting, promoting and disseminating knowledge on accidental water pollution and with advising and assisting the authorities responsible for spill prevention and response. Cedre has been performing these tasks diligently and professionally ever since its creation. It has proven itself capable of adapting to changing contexts, has worked across the globe over the past three and a half decades and is now a recognised player in its field on the world-wide scene.

This association, of which I have now been President for 5 years, contributes to Brittany's maritime expertise and works alongside many other organisations and companies to form one of the world's principal clusters of expertise day after day. It is through such strong ambitions that we can develop and perpetuate a high-performance economy giving our region a promising future.

To mark its 35th anniversary, Cedre has chosen to devote part of its biannual bulletin to a look back over the major events having punctuated its existence. This is no nostalgic trip down memory lane, but rather solid evidence that, incident after incident, Cedre has consolidated and developed its expertise and resources to be permanently at the cutting edge in terms of spill management following major shipping disasters. In addition to this look back, the bulletin describes the unparalleled technical resources available at Cedre today to conduct its research activities, but also to support the authorities and emergency response leaders. These efficient, modern tools provide the association with outstanding technical and scientific capacities, as shown by the growing number of organisations and companies calling upon its services.

With its 50-strong team, Cedre has the knowledge and resources required to efficiently perform its duties and provide appropriate support to better manage accidental pollution which unfortunately remains possible.

François Cuillandre,
President of Cedre

Cedre turns 35

A look back

This year Cedre (Centre of Documentation, Research and Experimentation on Accidental Water Pollution) is celebrating its 35th anniversary. This gives us the opportunity to take a look back over our history. Through the following pages, this history is somewhat reminiscent of a very dark novel, with a succession of disasters near and far. However, for those involved, this is the story of a passionate adventure and of the certainty of having played an active part in the struggle to preserve the environment while integrating the necessities of economic development. This adventure is our story and we would like to share with you what has brought us where we are today, convinced that our mission remains vital in our perpetually evolving world.

1978

The triggering factor

The *Amoco Cadiz* off Portsall
An oiled Breton beach

The decision to create Cedre was made at the Cabinet meeting on 5th July 1978, based on the observation, during the *Amoco Cadiz* oil spill (16th March 1978), that the lessons learnt from the *Torrey Canyon* spill (1967) had been forgotten. Furthermore, the national marine pollution response system (Polmar) lacked an organisation dedicated to experimentation, capitalisation of acquired experience and operational advisory services.

1979

The outset... and our first mobilisation

Our first offices at the port of Brest

Shipwrecking of the *Gino*

The non-profit-making association Cedre was registered at the *Préfecture* on 25th January 1979. The Board of Governors held its first meeting on 24th April 1979, electing its President and appointing its first Director.
At Brest's port, in offices loaned by the Ministry of Equipment, Cedre managed in this first year a budget of 3.7 million Francs, including contributions in kind, with 18 staff on 31st December, of which 11 were seconded by the founding partners (Ifremer, IFP, French Navy, Ministry of Equipment, Maritime Affairs).
Cedre faced the accident of the Liberian oil tanker *Gino*, which sank on 28th April off Ushant Island (Brittany), with a cargo of 40,000 tonnes of carbon black oil.

1980

Heavy fuel oil spill

Spill from the *Tanio*
The ship's stern being towed to the port of Le Havre

On 7th March 1980, the oil tanker *Tanio*, loaded with 26,000 tonnes of heavy fuel oil n°6, broke in two in a heavy storm at the end of the Channel.
The fore part of the *Tanio* floated vertically before sinking off Batz Island. The rear part tilted and slowly drifted. It was later towed to the port of Le Havre. Six thousand tonnes of heavy fuel oil were spilt into the sea.
Cedre joined the Polmar-Sea (*Préfecture Maritime* for the Atlantic) and Polmar-Land (*Préfectures* for Finistère and Côtes-du-Nord) command centres. It took part in implementing a slick drift prediction model, contributed to an emergency behaviour study on the fuel spilt and helped to set up response techniques and the pumping of the fuel oil from the wreck.

1981

Moving to our new premises

... at the CNEXO site

On 23rd February 1981, Cedre entered its new 750 m² premises, built on the site of the *Centre océanologique de Bretagne of the Centre National pour l'Exploitation des Océans* (CNEXO). This represented a 5 million Franc investment.
In this building, Cedre had some twenty offices, a multipurpose room, a resource centre, an archive room, an operational response centre, an analysis laboratory, a workshop and a store. It accommodated a team of 27 people by the end of the year. In addition, technical trial facilities with a man-made beach were set up at the port of commerce, on the other side of the city.
Cedre was called upon 24 times that year in response to accidents and incidents.

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A look back

1982
Initial review

Oil trawling trial at sea

Cedre was called upon for some forty incidents, all minor. Behind this relatively calm front in terms of spills, the year was marked by several important events. The Board of Governors elected a new President, local councillor on the Breton shoreline, and appointed a new Director. The Minister for the Sea came to visit the new premises and meet the team. Cedre produced an initial review of its research and experimentation work carried out since its creation, sifting through all the products (dispersants, sinking agents, sorbents, gelling agents, demulsifiers) for use in oil spill response. A validation procedure for these response products was put forward.

1983
Cargo ship grounding

The wreck of the *Hydo*

In this fifth year of existence, Cedre handled a budget of 15.6 million Francs, including contributions in kind, with a staff of 27. It was called upon, like the year before, for some forty incidents, at sea and in fresh waters. It took part in a working group on the neutralisation of potentially polluting wrecks. It produced an inventory and a catalogue of response means for the European Commission as part of the Community Information System. After the Cypriot cargo ship *Hydo* hit the cliffs at the *Pointe de Pen-Hir* (Finistère) on 2nd September and broke up, Cedre took part in surveying the wreck and subsequently in the choice of techniques and companies for pumping out the bunker tanks.

1984
Experimentation gains ground

Trial involving a sand washing station at Cedre

The experimentation component of Cedre's activity began to gain momentum: deflection boom deployment trials in strong currents, flexible storage tank trials, trials involving different skimmers and recovery barges, series of trials using pumps with high viscosity products, waste stabilisation tests using quicklime and fly ash. Several groundings of trawlers, unexplained mortality of over 10,000 sea birds and the sinking in Belgian waters of the cargo ship *Mont Louis*, transporting 450 tonnes of uranium hexafluorure, called for Cedre's technical advisory services on the chemical and packaging aspects.

1985
Inclusion of chemical risks

A grounded container

In 1985, a new Director, the third, arrived at Cedre, with instructions to continue in the footsteps of the line of action engaged by her predecessors, while emphasising research in the field of resources for responding to spills of hazardous substances. On 12th May, the loss of part of the cargo of the container ship *Anny Danielsen*, in particular including 78 drums of toluene and xylene, confirmed this choice of direction. Cedre was called on-site for an initial risk assessment. This by no means reduced the need for oil-related expertise: a pipe rupture at a pumping station on land and the grounding of another trawler clearly conveyed this message.

1986

Development of technical facilities

Practical training at Cedre's technical facilities

Since 1981, Cedre has had a storage facility in Brest's port area, developed during the *Amoco Cadiz* spill. These trial facilities were connected to the water supply, electricity grid and telephone network. Sanitary facilities were installed, a washing area created, the water-side area improved and an oil storage capacity and trial facility for pumping equipment built. Cedre was thus equipped with advanced facilities for conducting trials and practical training courses to match its experience. The pollution risk generated by the shipping of hazardous substances was assessed for each sea front. Among the drums washed up that year on the Breton shoreline were harmful products such as acetone, sulphuric acid and aniline oil.

1987

Guides and accidents

The *Kini Kersten* grounded

As requests for its practical guides were on the rise, Cedre published a guide on lightering vessels in difficulty and a shoreline response guide. A set of chemical response mini-guides and a response guide for chemical tankers in difficulty were launched, to be released in 1988.
On 1st January the German container ship *Kini Kersten* grounded on a beach in Normandy where she released part of her bunker fuel, followed by the explosion of the oil tanker *Vitoria* on the Seine on 23rd June. In both cases, Cedre immediately sent staff on site, where they surveyed the pollution, assessed the risks and proposed solutions. Finally, on 4th December, the cargo ship *Cason* grounded on the coast of Cape Finisterre (Spain) with 1,000 tonnes of Hazardous and Noxious Substances on board.

1988

A chemical spill... and fuel oil in the Channel

The *Cason* on fire

The Spanish authorities were unable to prevent a fire and several explosions on board the *Cason*. In February, the European Commission mobilised Cedre, through the European Task Force, to advise the authorities on the dangers and recovery of the products still on board.
On 22nd January, the container ship *Brea* was struggling in adverse weather conditions off Ushant Island when she lost 700 drums of hazardous substances. Four Polmar plans were activated and Cedre, immediately mobilised, provided recommendations on the risks if the drums were to be discovered by the public on the shoreline and took part in assessing the possible consequences for humans and the environment.
During the night of 30th January, the oil tanker *Amazzone*, with 32,000 tonnes of paraffinic crude oil on board, lost a number of bunker covers in a storm off the coast of Finistère. The ship then travelled through the Ushant traffic separation scheme without alerting the French authorities, leaving a trail of 2,100 tonnes of pollutant in her wake.

1989

International horizons

Exxon Valdez: clean-up by cold water flooding

In the tenth year of its existence, Cedre had a budget of only 10.6 million Francs, including contributions in kind. Personnel secondment agreements, contributions in kind and subsidies had diminished.
It became heavily involved in French support for response to the *Exxon Valdez* spill, after the oil tanker grounded on 24th March on Bligh Reef, in Prince William Sound (Alaska - US), spilling 40,000 tonnes of light crude oil. It accompanied the Secretary of State in charge of the Environment on site, provided operational advisory services to Exxon and contributed to the dispatch of 8 recovery barges and 200 pressure washers.

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A look back

1990

The Eurocedre project

Clean-up operations following the *Aragon* spill in Porto Santo

The alarm bell which sounded upon Cedre's 10th anniversary as well as the warning bells for the *Exxon Valdez* and *Khark V* spills were heard: on 5th July 1990, the meeting of the Interministerial Committee for the Sea approved an ambitious development project, "Eurocedre". Involvement in preparatory studies by no means prevented a strong commitment towards feedback from the *Exxon Valdez* spill, experimentation and the production of practical guides. Thus the series of 61 chemical response miniguides, launched in 1987, was completed and a guide for local councillors was published. Cedre also took part in response operations in Morocco following the collision of the oil tanker *Sea Spirit* with the Norwegian gas tanker *Hesperus* in the Strait of Gibraltar, on 6th August. Later, a structural failure on board the oil tanker *Aragon*, on 29th December off Madeira, foretold of a busy year in 1991.

1991

A sharp rise in contracts

The *Haven* on fire

The services provided through the European Task Force and for other clients were on the rise: an assignment in Porto Santo (Madeira) due to the spill from the *Aragon*, the sinking of chemical tanker *Alessandro Primo* in the Adriatic Sea, with 8,000 tonnes of dichloroethane and acrylonitrile on board, the explosion of the oil tanker *Haven*, while waiting outside the port of Genoa and advice to the Saudi authorities on the major oil pollution caused by the Gulf War. Furthermore, Cedre was selected for three audit and contingency planning contracts for overseas. This nearly 80% increase in revenue from services increased Cedre's overall annual budget by 28 %.

1992

Growth through... service provision

Training on Cedre's man-made beach

Service provision continued to boost the budget by nearly 10%, while demand for training (661 participant-days) and emergency response (188 calls) services grew and diversified (sea, inland waters, oil, chemicals, foodstuffs...).
In terms of emergency response, we note the loss of 15 containers of chemicals on 11th February off Sein Island by the vessel *Azilal* and the grounding of the oil tanker *Aegean Sea* at La Coruña (Galicia, Spain) on 3rd December, which resulted in numerous assignments for Cedre over a 4-year period concerning damages to aquaculture activities.

1993

A development project

Containers broken loose on the deck of the *Sherbro*

Four million Francs, from an exceptional subsidy and the association's own funds, were dedicated to transforming the trial facilities into multipurpose technical facilities, with complete restoration of the beach, creation of a deep-water basin and construction of a training building. An audit resulted in the abandonment of Eurocedre in favour of an 18 million Franc development project, through the State-Region plan.

At the end of the year, accident-related requests took off. After the loss of 1,500 tonnes of crude oil from the tanker *Lyria* following a collision in the Mediterranean on 1st August, the team was called out again on 8th, 9th and 19th December, following the loss of 88 containers by the *Sherbro*, the sinking of the chemical tanker *Grape One* in the Channel with 3,000 tonnes of styrene on board and the landings of thousands of detonators in plastic bags on the Atlantic shoreline.

1994

Varied response efforts

In situ bioremediation experimentation: taking water samples

Response efforts following the *Aegean Sea* disaster and the events of December 1993 stretched throughout most of the year, with drift predictions, toxic plume modelling and impact assessments. In addition, the emergency response team was mobilised on 14th May in response to the loss of 8 containers of chemicals by the *Ming Fortune* and on 2nd June due to a fire on board the cargo ship *Karaganda*, loaded with cassava and kapok, in the port of Lorient. This did not prevent the production of a much awaited guide on oil spill waste treatment, nor a major experimentation programme in the natural environment on bioremediation in the intertidal zone.

1995

A flurry of changes... ... and booming activity

Chung Mu: shellfish market

1995 opened the door to major new prospects. A fourth Director took up his position, with the support of a brand new strategic committee composed of external personalities, which held its first meeting on 16th May. The signature of the State-Region Plan on 9th May enabled a first package of 3.3 million Francs of work to begin. For the first time, the global budget, including contributions in kind, exceeded 20 million Francs, enabling notably the creation of a Mediterranean delegation. Two other incidents overseas led to on-site advisory missions: the collision involving the chemical tanker *N°1 Chung Mu* in China, resulting in a spill of styrene, and the grounding of the oil tanker *Sea Prince*, due to a typhoon, in Korea.

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1996

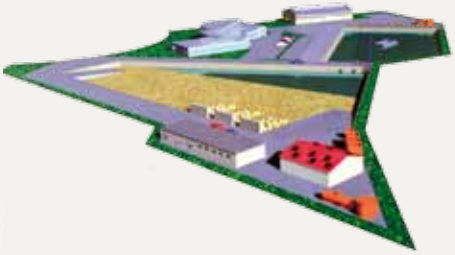
Wheat and oil at sea

Wheat from the *Fénès*
The *Sea Empress* spill

While carrying forward its development project and continuing response efforts following the *Aegean Sea* spill in La Coruña, Cedre provided remote and on-site assistance for two accidents which required careful handling. First, another major accident involving an oil tanker loaded in Europe, after 3 years of respite: the grounding of the *Sea Empress*, at the entrance to Milford Haven (Wales) ripping open its hull. Secondly, the sinking and dismantling of the cargo vessel *Fénès*, loaded with 2,600 tonnes of wheat for a humanitarian cause, in the Lavezzi Islands marine reserve (Southern Corsica).

1997

Implementing the plan contract



Projected site layout

With a 8.5 million Franc investment subsidy under the State-Region plan contract, the overall budget, including contributions in kind, came close to 27 million Francs. The trial hall was built and plans for the main building to be built on the port of commerce site were approved.
International courses as well as studies and applied research made headway, with European funding. No new major response effort was necessary, like that of the *Sea Empress* spill in 1996, but an assortment of small-scale response efforts were implemented in France for the oil tanker *Katja* in the port of Le Havre, as well as in New Caledonia, Turkey, Uruguay and Japan.

1998

20th anniversary of the *Amoco Cadiz*

Recovering fuel oil from the wreck of the *Peter Sif*

The year of the 20th anniversary of the *Amoco Cadiz* disaster was calm in terms of spill response, the main mobilisations being for a spill in a canal in the North of France, tank containers of toxic products drifting in the Channel and recurrent seepage from the bunkers of the cargo ship *Peter Sif* which sank in 1979 off Ushant. It was therefore possible to implement a technical programme with a 40 % increase, produce a learning guide for a young audience entitled "*Mieux comprendre les marées noires*" and to heavily involve the team in the International Scientific Meetings "20 years after the *Amoco Cadiz*".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1999

A move to new premises... and the *Erika*


© Cedre


© Marine nationale

Inauguration of the new premises
Sinking of the *Erika*

On 28th June, Cedre took front stage for its 20th anniversary: the President of the Board of Governors and the representatives of the State-Region plan contract funding bodies cut the ribbon to inaugurate the new facilities, marking the end of a 3-year work programme, costing a total of 19.5 million Francs. It was a team of 38 which moved into the new premises.

On 12th December, the oil tanker *Erika*, loaded with 30,000 tonnes of heavy fuel oil (n° 6), broke in two in a storm off Penmarc'h (Finistère, Brittany), releasing 20,000 tonnes of fuel oil and carrying the rest to the sea floor. The first slicks reached Finistère on 23rd December and the majority of the pollution submerged the Loire-Atlantique shoreline. Cedre fought with all its strength, alongside the terrestrial and maritime authorities.

2000

From a focus on the *Erika* to the *Ievoli Sun* spill


© Marine nationale


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Sinking of the *Ievoli Sun*
The *Erika* spill

Faced with requests far in excess of its means, Cedre called upon its former staff and interns, to reinforce its personnel, sparing neither time nor expense. It was a risky bet. The association's operational activity went through the roof (+ 130 %). Its costs shot up in consequence. However, the announcement by the CIADT (Interministerial committee for land planning and development) on 28th February that the association's means would be reinforced in 2001 reassured the management in its decision.

On 31st October, when the pressure from the *Erika* spill was beginning to subside, the chemical tanker *Ievoli Sun* sank in the Channel with a cargo of 6,000 tonnes of styrene, methyl ethyl ketone and isopropyl alcohol. Cedre was mobilised to assess the risks and to provide advice on the measures to take, for which experiments were conducted between Christmas and New Year.

2001

From the consequences of the *Erika*... to the *Melbridge Bilbao*


© Cedre

Botanical follow-up after the *Erika* spill

With a 10.2 million Franc (1.3 million Euro) State subsidy decided by the CIADT in February 2000, in addition to the 5 million Franc (0.64 million Euro) annual subsidy, the year was overshadowed by the implementation of CIADT decisions and the expansion of Cedre's duties.

With these new means, the staff was increased to 50 agents, a Caribbean delegate appointed, an experimentation programme on the behaviour at sea of the cargo of the *Ievoli Sun* conducted and its evolution monitored.

On 12th November, the grounding of the container ship *Melbridge Bilbao* on a beach of Molène Island (Finistère) reminded us of the ever-present risk of chemical spills.

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A look back

2002

From the *Lykes Liberator* to the *Prestige*

Sinking of the *Prestige*
Tank container from the *Lykes Liberator*

This year the 2001 exceptional subsidy became a long-term source of funding through a multi-year objective convention and new freshly launched programmes also became lasting activities. The whole of Cedre reinforced its actions and its emergency response capacity, in collaboration with the new maritime research and technological innovation network Ritmer, under the ministry in charge of Research. This effort came just in time as, after the loss of tanks of toxic chemicals by the container ship *Lykes Liberator* off Ushant Island on 22nd February, followed by an attack on the oil tanker *Limburg* in Yemen on 6th October, the oil tanker *Prestige*, transporting 77,000 tonnes of heavy fuel oil, issued a Mayday on 13th November, off Galicia (Spain), before breaking in two and sinking six days later.

2003

Emergency response

The *Adamandas* on fire

In 2003, nearly 40 % of Cedre's means were dedicated to providing emergency response, first and foremost to the *Prestige* spill, but also to the *Tricolor* and, in September to the *Adamandas*, an ore carrier whose cargo of deoxidised iron ore had begun to oxidise, requiring assistance off Reunion Island. For the *Prestige*, Cedre's involvement included, in particular, the management of a national slick drift prediction committee, a strong commitment for the pilot response and training team on polluted coastlines, a high level of cooperation with Spanish counterparts, updating of information on the *Prestige* spill on Cedre's website and the analysis of over 300 samples.

In 2003 Cedre obtained ISO 9001 "Quality management systems" certification

2004

Post-crisis contracts

The experimentation column

The *Prestige* crisis was over. It had reinforced the growing conviction of European authorities after the *Erika* oil spill that there was a lot to be done before the next disaster. Various programmes included accidental marine pollution in their calls for proposals. Already engaged in several post-*Erika* research and development projects funded by Ritmer, Cedre collaborated with partners in different countries to participate in similar projects on a European scale. Drawing on feedback from the sinking of the *Ievoli Sun*, the experimentation column was set up in our trial hall. Finally, based on the experience of the *Prestige* slick drift prediction committee, Cedre released a new version of its guide on "Aerial observation of oil pollution at sea".

2005

A record-breaking year

The new emergency response centre
The new wing

With few pollution incidents and no major spills, and with national Ritmer post-*Erika* contracts in full swing and European post-*Prestige* contracts beginning, the year reached a new record-breaking budget (5.27 million Euros, including contributions in kind). This included 783,000 Euros of exceptional investments of the association's own funds, in new facilities which the response to the *Prestige* spill had proved necessary: a new response centre, offices for the Contingency Planning Department and alteration of the experimentation hall.

2006

Reinforced financial control

Response in Lebanon

Following the post-*Erika* and post-*Prestige* growth phases, the stabilisation of staff numbers and costs was prioritised, with reinforced financial control and integration of Cedre in the circle of French "State operators". This did not stop the centre from working on nine Ritmer and European projects, while ensuring an operational consultancy capacity following the collision of a gas tanker in the Loire estuary in 5th January, the sinking of the chemical tanker *Ece* in the Channel on 30th January, with 10,000 tonnes of phosphoric acid on board, the grounding of the container ship *Rokia Delmas* off Ré Island on 24th October, and above all the oil spill caused by the bombing of Jiyeh power station (Lebanon) in mid-July.

In 2006 Cedre obtained ISO 14001 "Environmental management systems" certification.

2007

Many call-outs

Response to the *Hebei Spirit* spill on a beach in South Korea

The contract portfolio exceeded the available capacities, in a year when the number of call-outs for spills was high, with:

- the rupture of an oil storage tank in Gironde, France
- the sinking of several vessels, including an oil tanker and a ship carrying a cargo of sulphur, in Kerch Strait (Black Sea) in a violent storm
- the loss of containers from the container ship MSC *Napoli*, in difficulty in the Channel
- the collision of the oil tanker *Hebei Spirit* in Korean waters.

In late 2007, the Board of Governors confirmed the choice of a new Director, the fifth, who was to take up post on 1st March 2008.

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2008

A year of transition

The overturned bow of the *Princess of the Stars*

In the face of tightened funding, budgetary management and contract progress monitoring were reinforced, while Cedre's partners and clients were reassured of the continuation of the usual services. The Ritmer contracts came to a close, the French national research agency contracts were in full swing, the European contracts became increasingly diversified. Call-outs for spills kept on coming, in France (oil spill at Donges terminal) and abroad (oil leak in Angola, chemical risk following the sinking of the ferry *Princess of the Stars* in the Philippines).

2009

Cedre's 30th anniversary year: a dedicated team at work

Fire in Cedre's laboratory
The *Gülser Ana* grounded

This year marked Cedre's 30th anniversary. The key event this year was undoubtedly the fire which broke out in the laboratory on 26th April, affecting the organisation and its activity for all of the second half of the year.
Mr François Cuillandre, Mayor of Brest and President of Brest Métropole Océane, took over from Mr Pierre Maille who had been Cedre's President for the past 12 years.
A major prospective study highlighted the growing rate of HNS spills as well as the importance of implementing actions relating to inland waters.
An assignment was conducted in Madagascar at the end of the year to assist the local authorities in the assessment of the consequences of the *Gülser Ana* sinking.

2010

From the reconstruction of the laboratory... to *Deepwater Horizon*

Deepwater Horizon rig on fire

Cedre's laboratory devoted to physico-chemical testing, a vital organ in the fulfilment of its duties, was operational once again in April.
An assistance assignment was conducted for the authorities in Madagascar at the end of shoreline clean-up operations following the sinking of the *Gülser Ana*.
The *Deepwater Horizon* rig blow-out in the Gulf of Mexico resulted in the release of an estimated 800,000 m^3 of crude oil over a 3-month period, making it one of the worst disasters of all time. Cedre was in great demand by the French and foreign media to provide technical elements on the spill response operations and took part in several on-site observation and cooperation assignments.

2011

A new flume tank

Replacing the flume tank

This year Cedre made major investments in specialised equipment, with the replacement of the flume tank, thanks to funding from the region of Brittany, and the installation of a new toxicity test bench for chemicals.
Cedre was called out in response to several small spills (Martinique, Seine, Finistère) and was involved in December in dealing with the consequences of the *TK Bremen* grounding in Erdeven. These operations continued into 2012. An observation assignment was also conducted in New Zealand following the *MSC Rena* grounding.

2012

Communication and information dissemination

Cedre's stand: *Tonnerres de Brest* 2012

2012 was a busy year for communication and information dissemination, with a strong involvement in Interspill 2012 held in London in March and the maritime festival "Tonnerres de Brest" in July.
Cedre was involved in the response to several small spills in France and continued to contribute to response operations following the grounding of the *TK Bremen* in Erdeven. The centre was also mobilised through the Mar-ICE network, as part of the service offered by EMSA (European Maritime Safety Agency), in relation to the assessment of the risks generated by the container ship *MSC Flaminia* following the fire it suffered at sea in mid-July.
The learning guide "Understanding Chemical Pollution at Sea" was published in collaboration with Transport Canada.

2013

On-site assignments

Clean-up operations in the Philippines

In addition to being called upon in response to spills of varying scales by public and private operators in France and abroad, Cedre conducted an assignment for the Sultanate of Oman following the sinking of the *Nesa 3*, loaded with 800 tonnes of bitumen. Assignments were also conducted in the Philippines upon request by the European Commission's Humanitarian Aid and Civil Protection department (ECHO) and the United Nations Environment Programme (UNEP) on the grounding of a power barge releasing hundreds of tonnes of fuel oil on Panay Island during Typhoon Haiyan (Yolanda).
The sharp rise in activities for French and foreign private clients observed over the past few years, the result of prospecting and tender bidding efforts, was confirmed and consolidated in 2013.

This review draws upon the publication "Cedre 1979 - 2009: 30 years of response to accidental water pollution".

2014…Our new structure

Management

- Mediterranean Correspondent
- Oil Industry Correspondent
- Caribbean Representative
- HSE Officer

Three officers coordinate Cedre's partner relations in terms of service offers and the integration of their expectations. One officer is in charge of HSE aspects and investments.

Administration, Finance & IT Department

This department provides support for all Cedre's activities in terms of the aspects for which it is responsible (accounting, social issues, tax, cash flow, budget, IT, office equipment and insurance).

Scientific and Technical Division

This division is responsible for implementing the association's main projects, covering R&D, contingency planning (development of or contribution to public and private plans) and training actions. It is also in charge of all new engineering projects in which Cedre could be involved as part of the development of its activities.

Research Department

This department is in charge of running exploratory and innovative projects. This covers actions carried out with support from the French national research agency (ANR) and European R&D programmes, but also includes projects conducted for members of the association and for oil companies.
This department coordinates all technological progress monitoring activities conducted across Cedre. It can provide the authorities with its scientific expertise in the event of an incident.

Studies & Training Department

This department is tasked with managing the engineering projects conducted by Cedre, including off-the-shelf and tailor-made training courses and public and private contingency plans. These projects may involve ongoing or one-off actions, or may be conducted as part of service provision contracts for public or private, French or foreign clients.
This department can be called upon in emergency situations to contribute to Cedre's actions, either remotely from Brest or on site.

Operational Division

This division provides the support required by the Scientific and Technical Division to ensure projects are carried out correctly, by providing technical resources, which it is responsible for maintaining and managing. The Operational Division conducts a number of projects itself and also manages information collection and dissemination.

Analysis & Resources Department

This department deploys Cedre's full range of facilities and equipment (technical facilities, laboratory, trial equipment). It plans the use of these resources and ensures they are available and in proper working condition. The department is also in charge of a certain number of actions (analysis contracts, response equipment assessments, response product approvals, etc.).
Its skills and resources can be used in the event of incidents to contribute to the support provided by Cedre to the authorities and partners.

Information Department

This department is responsible for collecting and providing knowledge on accidental water pollution to support the projects conducted at Cedre and to inform its members, administrations, industry and the public. It manages documentary and multimedia libraries and specialised databases. It produces periodical and operational publications, and manages the organisation's websites. It is also in charge of IT tools devoted to emergency response. It helps to gather data and distribute information in the event of a spill.

Our new organisation from 1st January 2014

Our Staff chart

Our permanent team in 2014

Updated communication materials

Driven by the momentum created by the internal reorganisation, Cedre's different communication tools (logo, brochure, film, website) have been revised, updated and modernised to convey a more dynamic image reflecting its ambitions for the future.

A new logo

Cedre's logo had represented the structure for over 25 years and, like all things, had naturally grown old.
Our anniversary and our reorganisation, giving front stage to younger leaders, a change of course offering the organisation a stronger presence in new markets, warranted a new image for Cedre, and we thus set about the tricky business of changing our logo.

The new presentation brochure

Cedre

Cedre's vocation is to provide advice and expertise to spill response decision-makers. This mission covers both marine and inland waters, and involves all types of pollutants (oil, HNS, etc.).

Cedre is constantly building on its knowledge and developing new tools to accomplish its various missions.

Cedre's services and expertise can be provided to French or foreign authorities as well as to private organisations■

Cedre has an annual budget of approximately €4.5 million and a 50-strong staff.

Funding is provided by public bodies and private organisations via various agreements and contracts.

Cedre is a not-for-profit association founded on the 25th of January 1979 as part of the measures taken in the wake of the *Amoco Cadiz* oil spill■

Assistance 24/7

In the event of an incident, Cedre provides information on the pollutant and on appropriate response techniques. In an emergency, we can conduct laboratory testing and study the pollutant's behaviour and weathering, the efficiency of response techniques and the impact of the pollution on the environment, using our experimental tools.

We provide **advice** on the most appropriate response strategies, techniques and equipment. Our experts can be sent on-site to assist the operational command in conducting surveys, contribute to incident management meetings, recommend actions to be taken and define the resources required, provide advice on clean-up site set-up and train responders.

Cedre does not supersede response managers, but rather assists them by providing decision support■

Research

In order to further develop response strategies, Cedre conducts its own research projects and is involved in national and European research programmes. The aim of these initiatives is to gain a better understanding of the fate and impacts of oil and chemical spills in the marine environment.

Further to this experimental approach, Cedre carries out reviews of incidents, which have occurred both in France and worldwide, and of their environmental consequences in a bid to gain technical insight■

Analysis and Testing

Cedre's analytical equipment can be used to perform a very broad array of qualitative and quantitative measurements on oil and chemicals in water, sediment and biological tissue.

We study the behaviour of oil products and assess the efficiency of response techniques (recovery, dispersion, burning, etc.), enabling operational recommendations to be made for contingency planning purposes.

Cedre assesses the performance of mechanical equipment for response at sea and on land. We are also tasked with determining the performance of response products (dispersants, sorbents, etc.). These tests are conducted according to standardised methods■

A new presentation video

In 2014, we took the plunge and replaced Cedre's presentation film, dating back to 2006, with a new, more dynamic video, presenting the organisation through its different activities and giving a broader vision of the array of tools we can offer to our clients and partners. This video has a long (13'30'') and short (6'45") French version as well as an English language version.

A new website

Cedre's institutional website www.cedre.fr is currently being revamped. The project began in early 2013 with the web development work. Data migration to a new content management system began in early April 2014. In addition to the website's technological overhaul, the content structure will be different to that of the current site. For this new version, the emphasis has been placed on promoting Cedre's different activities. The website will be divided into 2 main parts: "Our online resources" and "Our services on demand". The website will also be optimised for smartphones, tablets, etc.

our activities

Training

More than 1000 people are trained by Cedre every year. We offer an annual training programme of around ten courses and receive some 400 trainees each year at our unparalleled facilities.

Furthermore, experts from Cedre travel across the globe to run tailor-made sessions in French English or Spanish■

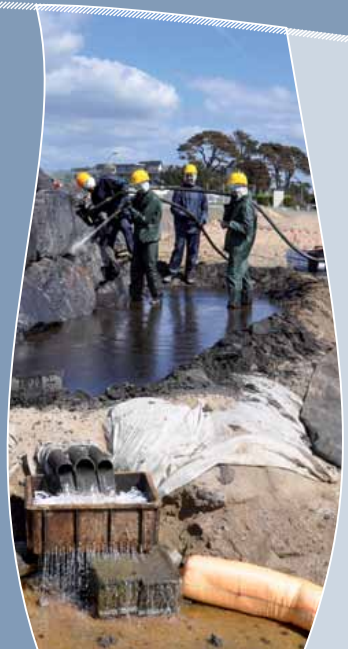
Contingency Planning

Cedre assists public and private sector leaders in the drafting and revision of contingency plans.

To do so, we develop sensitivity atlases, conduct on-site audits and visits, build incident scenarios, define response strategies and provide support in the selection of appropriate equipment. Finally, to facilitate implementation of the contingency plan and to train response personnel, we run courses and exercises■

Information

At Cedre we ascribe particular importance to the collection of information and sharing of knowledge. We manage an institutional website as well as two educational sites. Our presence on social media nurtures permanent interaction with the public. We publish a bilingual monthly newsletter, a half-yearly information bulletin, operational guides and technical and scientific works■



our tools

Unique Technical Facilities

- Within a confined 3-hectare site, our facilities include a 6,000 m² man-made beach and a 1,800 m², 2.5-metre deep water basin where pollutants can be released in order to carry out training and trials without putting the environment at risk.
- Our trial hall houses a flume tank, known as the polludrome, and a 5-metre high experimentation column, which are used to study the fate of substances in water. A burn test bench and a chemistry test bench are also available.
- Our facilities include a greenhouse for experimentation on living organisms, which contains stock and exposure tanks. Furthermore, Cedre has installed a test bench to assess acute ecotoxicity as well as equipment used to perform OSPAR tests.
- The laboratory is fitted with advanced analytical equipment (GC/MS, GC/MS/MS, multifunction autosamplers, GC/FID, HPLC, automated sample preparation systems, etc.). Specialised test systems are available to study the behaviour of oil products and assess the performance and impact of response products (IFP, WSL and MNS dispersant tests, sorbent tests, etc.)■

FOCUS

Our tools and resources

Beach

The first thing that will catch your attention at Cedre's technical facilities is a large beach with its water body.
As Cedre's first facility in the port area in Brest, the beach underwent major underlay work in 1994 to prevent leakage. Our current premises, built on a 2.7 hectare area, are built around this beach. It constitutes a unique tool for large-scale simulation of pollution on varying types of shores during experiments and training courses. It is a trapezoidal concrete-lined structure with a surface area of 6,000 m^2. The upper part is covered with a 60 cm deep layer of sand, forming a 2,500 m^2 man-made beach. The lower end of the structure is filled with seawater. The beach has two slipways, one at each end, and features two cement-covered walls, riprap made up of boulders and a bed of stones recreating different shoreline types. In addition, three pipes with different diameters, simulating different types of outflow pipes similar to those present along the coastline, can be used to practice deploying plugs or makeshift barriers. The beach is connected to the neighbouring deep-water basin by gravitational flow in the direction of the beach and by pumping in the opposite direction. This allows the water level to be adjusted, thus simulating the effect of tides.

Basin

Cedre regularly needs to deploy oil recovery means on the water surface, whether during practical training courses or specialised equipment testing procedures. In order to do so, Cedre's facilities include a concrete-lined seawater basin, since 1995, where oil can be released. This basin is 59 m long, 35 m wide and 2.5 m deep. Three of its sides are sloping and the fourth is vertical, simulating a quay. It features modular floating pontoons. The basin is used for practical containment and recovery exercises as part of our training courses and for assessing response equipment and techniques.

Flume tank

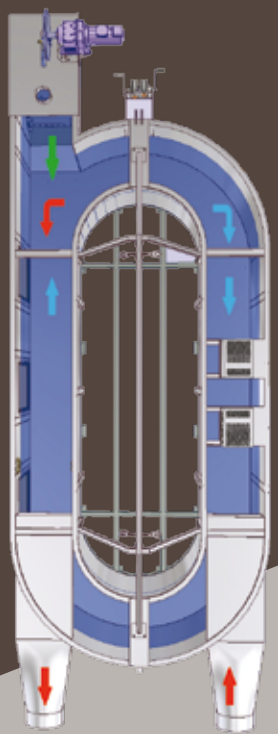
Cedre's first flume tank, or "Polludrome", initially came into service in 1997. It was replaced in 2011 by the current model. It is designed to simulate offshore and river conditions on a pilot scale. One of a kind in size, this experimental tool is used to recreate the various phenomena influencing pollutant behaviour liable to occur in the natural environment. These simulations are mainly designed to study the behaviour of oil and chemicals during the first few hours following a spill. The flume tank also enables the efficiency of response strategies such as dispersant use to be assessed.

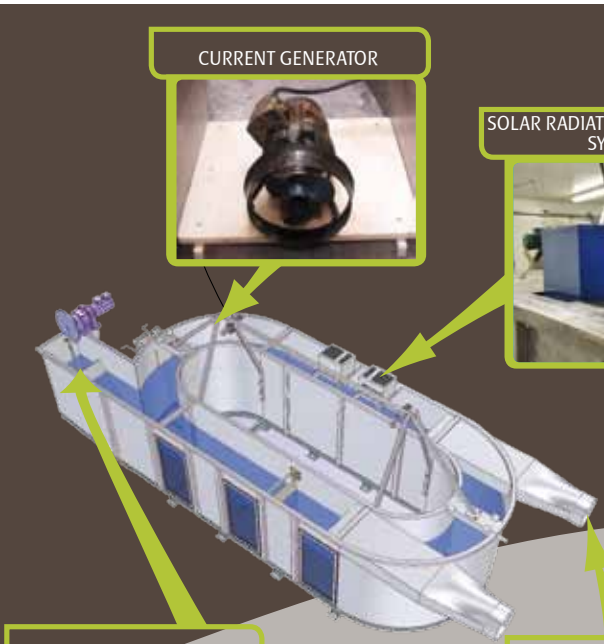
Usage

For both routine and emergency use, the flume tank can be used to determine the behaviour of a given oil released in the environment, using a range of parameters, in the short to medium term (a few hours to a few days). The proportion of the substance which has dispersed, evaporated, spread at the surface and emulsified (water content and viscosity) can thus be determined. All these parameters are determining factors in the choice of appropriate response strategies and equipment.

Characteristics

- Made of 4 mm stainless steel
- Length: 12 m
  Height: 1.4 m
  Width: 0.6 m
- Air conditioned room (1 to 30°C)
- Water volume: 7 m³ for a water depth of 90 cm
- Wave generator with adjustable wave height, amplitude and frequency
- Simulation of solar radiation by two 2000 W units which recreate the spectrum of natural light
- Air flow at the water surface simulated by a wind generator
- Removable covers and vapour extraction
- Variable speed current generation





Experimentation column

Past shipping accidents (*Ievoli Sun*, *Ece*, *Bow Eagle*) involving chemicals have highlighted the lack of reliable data on the behaviour of these products in water. In 2003, Cedre designed and commissioned the construction of an experimental system intended to simulate the solubilisation kinetics of a product as it rises up through the water column from tanks of a sunken vessel. The aim is to assess the threat for responders and the environment, as well as the value and the possibilities of response actions. By extension, it can also be used to study the trajectory of bubbles or an object rising to the surface or sinking to the bottom of the water column.

Usage

The column is designed to study the evolution of a substance in the water column by shadowscopy. This measurement technique is used to view transparent substances in a transparent environment. The droplets are recorded using high speed video cameras placed at different heights. Each video is then analysed using specialised software. Based on the evolution of the droplets' size and shape, the proportion of the substance which is liable to dissolve or reach the surface can be estimated.

Characteristics

- Height: 5 metres
- Materials: stainless steel
- Hexagonal shape, 4 of the 6 sides are glass-pannelled.
- Total volume: 3,500 litres
- Continuous injection system, using a gear pump and an injection rod with variable nozzles, which can be placed at different heights
- 5 sampling valves up the side of the column
- Air sampling system at the top of the column
- ATEX extractor fan in the roof of the column.


© Cedre

Greenhouse

Once again, as for physical and chemical behaviour, we lack reliable data on the impact of chemicals on marine organisms. In 2003, Cedre acquired an experimental tool to expose marine organisms to different types of pollutants. This facility gives us a practical understanding of the environmental risks generated by various chemicals spilt at sea or in fresh water in an operational emergency situation.

Usage

The greenhouse was designed to conduct work in association with biology, ecology and ecotoxicology laboratories. Cedre sets up and carries out experiments according to a protocol defined by scientific partners and participates within its field of competence in processing the results.
From 2002-2004, in collaboration with the University of Western Brittany, applied physiological studies were carried out to determine the impact of the dissolved fraction of a heavy fuel oil, similar to that of the Erika, on turbot.
When the *Ievoli Sun* accident occurred, the olfactory thresholds had to be rapidly established for the detection of marine organisms (crabs, oysters and mussels) contaminated by styrene in relation to acceptable contamination levels.
In addition to ecotoxicology tests, the greenhouse hosts various experiments on living organisms: long-distance swimmer salmon, coral in "dispersant sauce"...

Characteristics

This facility for the exposure of aquatic organisms was installed in a temperature-controlled greenhouse with a surface area of 160 m^2.
The greenhouse in fact shelters two independent experimental systems which can continually be supplied with water (seawater and fresh water), and are equipped with an effluent water treatment system. The first is made up of four 1500 litre breeding tanks for the acclimation of marine organisms. The second is made up of twelve autonomous units each comprising a pollutant/water mixture tank (120 l) connected to a tank for exposure of organisms to dissolved pollutant (310 l). In this tank, the reactivity of the product in relation to the aqueous environment and its impact on organisms with a high economic value can be studied.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Ecotoxicology test bench

The ecotoxicology test bench is an original tool developed at Cedre in 2011 to assess the toxicity of chemicals, whether pure substances or mixtures, on aquatic organisms. The development of this tool comes, firstly, under Cedre's work in terms of the assessment of dispersant toxicity according to French standard AFNOR NF T 90-349 (determination of the acute toxicity of a substance on marine shrimp *Palaemonetes varians*) and secondly under the latest evolutions in national and international regulations in terms of the characterisation of chemicals placed on the market, and in particular, the entry into force of the REACH regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. This European directive makes industry responsible for assessing the risks posed by the chemicals they manufacture and sell. Cedre therefore decided to redesign its experimental system in order to provide a wider range of tests and to offer new experimental possibilities for its Research team and those of its partners.

Usage

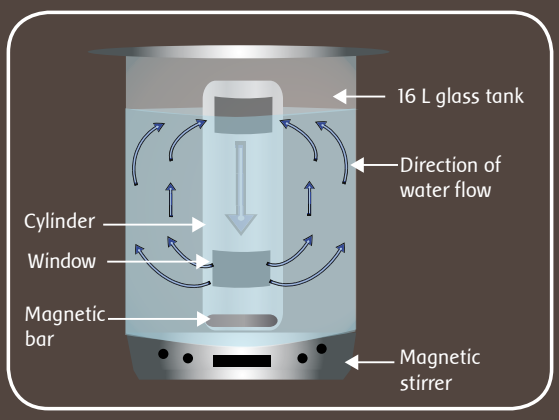
- The substance tested can be a liquid or gas as long as it is soluble in water.
- The studies can be conducted in sea, brackish or fresh water.
- Controlled temperature from 1 to 30°C.
- Different animal species tested: teleostian fish (sea bass, turbot, trout) or invertebrates (shrimp, oysters, mussels).
- GC/MS concentration analysis.

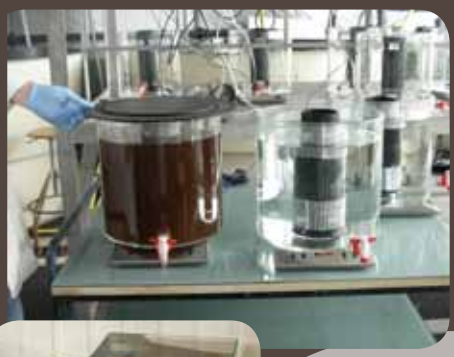
Characteristics

The ecotoxicology test bench is an original system developed in 2011 especially for Cedre. It is made up of two units comprising:

- **12 glass 16-litre exposure tanks** placed on magnetic stirrers to ensure an even distribution of the product to be tested throughout the volume of water. The tests can be conducted statically or in dilution (i.e. with or without added water).

- **12 decontamination tanks** (or recovery tanks) in which the water is continuously renewed.





Floating cells

The floating "cells" are designed to conduct pilot-scale experiments at sea. These floating enclosures, set up in inshore waters or in ports, isolate areas of the sea surface which are subject to external environmental conditions and can be used to conduct various weathering trials on oil or chemicals, as well as response product evaluation trials (dispersants, sorbents, etc.).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Burn test bench

The in situ burning technique used on oil spills has been discussed since the 1960s. This technique was widely used during the *Deepwater Horizon* disaster in April 2010 in the Gulf of Mexico. However many questions remain unanswered on its use and notably on the chemical characterisation of unburnt residues according to the type of oil, the evolution of the toxicity of these residues on the environment and the use of heat-resistant sorbents. With this as a backdrop, Cedre recently designed a burn test bench to examine these questions. These studies can be combined with weathering experiments.

Chemical test bench

This tool was developed in order to study the behaviour of chemicals when spilt in the marine environment, either for research purposes or in response to an operational demand in an emergency following an incident. It is particularly important to be able to identify the different compartments affected (air, water surface, water column or sediment) and the distribution of the pollutant among each of these compartments. Until now, due to a lack of experimental data, these transfers between compartments which characterise the fate of a substance have been assessed using theoretical classifications, based on physical and chemical properties but without including their interactions or the influence of environmental parameters.

The chemical test bench, created on a pilot scale, mid-way between the laboratory scale and that of the natural environment, was designed to meet these needs and recreate the effects of the different environmental parameters (water temperature, wind speed, sunshine, etc.). The transfer kinetics of the substances studied are monitored by taking samples from the water column and analysing them in the laboratory and by taking continual measurements in the atmosphere.

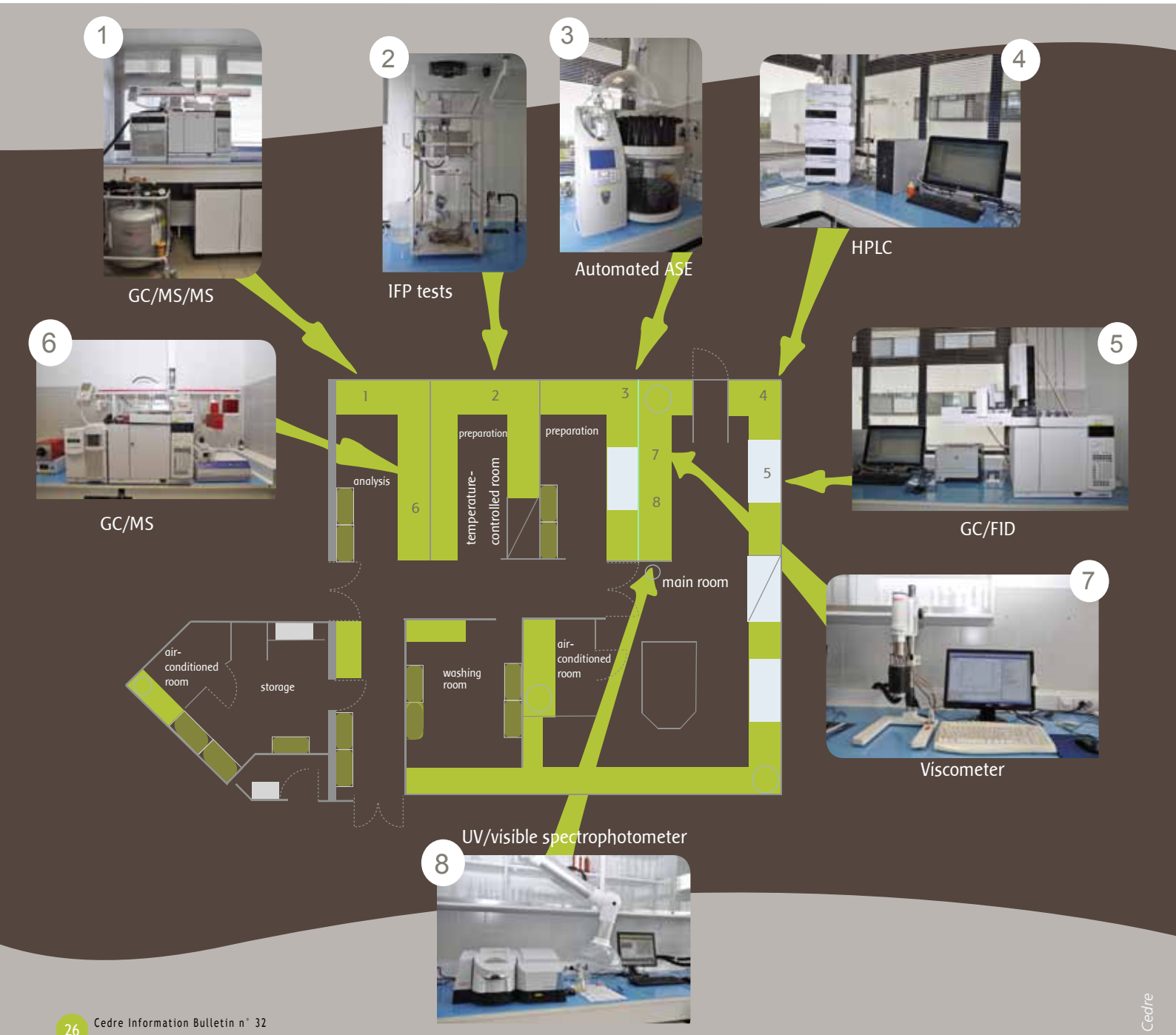

© Cedre

Laboratory

This analytical facility, indispensable for all our experiments, was entirely destroyed in a fire in April 2009. It was subsequently redesigned and re-equipped with modern, high-performance equipment. It includes:

- a gas chromatography system (GC/FID) (5) notably used at high temperature
- an automated Accelerated Solvent Extractor (ASE) (3)
- two gas chromatography systems with detection by mass spectrometry (GC/MS/MS) (1) and (GC/MS) (6), each equipped with a multifunction injection system (one with SBSE and dynamic headspace, the other with liquid injection and static headspace)
- a viscometer (7)
- a UV/visible spectrophotometer (8)
- a High Performance Liquid Chromatography (HPLC) system (4) (refractive index detectors and diode array).

Two air-conditioned rooms and a thermostatically-controlled room are available to conduct tests at a controlled temperature, in particular dispersant testing (2). Furthermore, the laboratory is also equipped with field-based equipment to continuously take measurements of the water and air (SF-UV and PID).



Operational guides

Management of Volunteers in Coastal Pollution Response (2012), 52 p.

Involvement of Sea Professionals in Spill Response (2012), 100 p.

Local Authorities' Guide: What to do in the event of a spill (2012), 76 p.

Custom-Made Spill Response Barriers (2012), 88 p.

Manufactured Spill Response Booms (2012), 96 p.

Guidance on Waste Management during a shoreline pollution incident (2011), 81 p.

Use of Sorbents for Spill Response (2009), 52 p.

Response to Small-Scale Pollution in Ports and Harbours (2007), 49 p.

Surveying Sites Polluted by Oil (2006), 41 p.

Using dispersant to treat oil slicks at sea (Airborne and shipborne treatment) (2005), 54 p.

Aerial Observation of Oil Pollution at Sea (2004), 60 p.

Vegetable Oil Spills at Sea (2004), 34 p.

Containers and packages lost at sea (2001), 82 p.

Cedre publishers

Understanding Chemical Pollution at Sea
Learning guide - 2012

Understanding Black Tides
Learning guide - 2007

Chemical response guides

Ammonia, 68 p.
Benzene, 56 p.
Chloroform, 44 p.
1,2-Dichloroethane, 60 p.
Dimethyl disulphide, 54 p.
Ethyl acrylate, 57 p.
Gasoline, 56 p.
Methyl Ethyl Ketone, 60 p.
Methyl Methacrylate, 72 p.
Phosphoric acid, 76 p.
Sodium hydroxide 50% solution, 56 p.
Styrene, 62 p.
Sulphuric acid, 64 p.
Vinyl chloride, 50 p.
Xylene, 69 p.

All Cedre's guides exist in English (PDF) and French (PDF and printed)

MORE INFORMATION

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