Unión Eléctrica de Canarias
Generación, S.A

GRANADILLA
POWER STATION

ENVIRONMENTAL DECLARATION
2006

CONTENTS

Page

At Granadilla power station we have published a report on pour annual environmental activity every year since 1998, when our Environmental Management System was certified under the UNE EN ISO 14.001:2004 standard (CGM 98/002).

In 2001, the EMS was verified and our Environmental Declaration validated, thereby meeting one of the requirements included in the registration process for our new EMS under Regulation (CE) 761/2001 (19 March 2001), allowing organisations to voluntarily adopt a community environmental management and auditing system (EMAS).

On 14 May 2002, under a resolution issued by the Deputy Regional Environment Minister, the registration of Granadilla power station in the EMAS register was authorised, under registration number E.IC.0000009.

Ramón Rodríguez Tomás

Generation Director

Granadilla de Abona, June 2006.

1 INTRODUCTION

Granadilla power station is one of the production facilities operated by Unión Eléctrica de Canarias Generación, S.A., a member of the Endesa group of companies.

Endesa has more generating capacity than any other company in Spain. At year end 2005 its total consolidated capacity under standard arrangements stood at 21,409 MW (this figure does not include the capacity of Nuclenor, which does not consolidate in Endesa's overall total. Of this, 17,463 MW corresponds to the electrical system in mainland Spain and the remaining 3,496 MW to systems outside the Iberian Peninsula, i.e. those in the Balearics and Canary Islands, and the North African enclaves of Ceuta and Melilla.

Endesa operates the following types of power stations: 28.6% corresponds to coal-fired power stations, 25.1% to hydroelectric power stations, 15.9% to nuclear power stations, 24.8% to conventional oil/gas power stations and 5.6% to combined-cycle gas power stations.

2 DESCRIPTION OF THE FACILITIES

Granadilla power station is located next to the Punta del Camello, in sector AE-2 on the Granadilla industrial estate in the municipal district of Granadilla de Abona, in the south east of the island of Tenerife (Canary Islands), approximately 50 kilometres from Santa Cruz. The site has total area of approximately 491,400 m^2, of which 31,384 m^2 is covered. The perimeter of the power station is shown on the general plan on page 8. The closest towns are San Isidro and El Médano. The power station is staffed by a team of 89 workers.

The power station's main activity is the generation of electricity of thermal origin from liquid fuels (fuel oil and diesel oil), although the power station also manages used engine oil, fuel sludge, sludge resulting from the treatment of the treatment of oily waters and the dielectric oil generated inside the facilities and at other production sites operated by Unión Eléctrica de Canarias Generación, S.A.

The building of Granadilla power station called for an investment of 45 billion pesetas (co-financed by the European Development Fund), incorporating the latest technologies to reduce potential environmental impact. The power station was commissioned in 1996.

Granadilla power station has six electricity-generation units:

- **Two 80-MW steam turbines**. These turbines use a Rankine heat cycle with intermediate reheating. They are cooled by seawater in an open cycle and used for normal operations.
- **Two 24-MW diesel turbines.** Each of these turbines consists of a turbo-driven two-stroke engine, cooled by seawater via a separate intake from the steam turbines. They are used to cover both normal and semi-peak services.
- **Two gas turbines (37 and 42 MW)**, conceived as emergency units. The turbine body and alternator are cooled by exterior air. These turbines are used to cover peak and emergency services.
- **A 210-MW combined cycle** composed of two 70-MW gas turbines and one 70-MW steam turbine.

Each of the steam turbines is equipped with the following systems and facilities:

- An electrostatic precipitator
- Seawater-based sulphur removal
- A turbo-generator
- Nine dual-recording burners for low NO_x production
- A thermal-cycle unit
- Auxiliary cooling-water system
- Combustion and heat-recovery system

The turbines share the following systems and facilities:

- Fuel storage and supply
- Circulating-water systems
- Electrical and control system
- Freshwater system
- Demineralisation plant

- Compressed air
- Air-conditioning
- Fire-protection system

Each of the diesel turbines is composed of the following facilities and equipment:

- Fuel storage and supply.
- Motor.
- Electrical equipment.
- Fire protection.

Each of the gas-turbine units is equipped as follows:

- Gas turbine
- Fuel system
- Ignition system
- Electrical and control system
- Cooling-air system
- Exhaust system
- Water-injection system to reduce NOx
- Lubrication equipment
- Fire-protection system

The combined cycle is composed of the following items:

- Gas turbine (G3CC1) and 70,000-kW alternator
- Gas turbine (G4CC1) and 70,000-kW alternator
- Heat-recover boiler for G3CC1
- Heat-recovery boiler for G4CC1

- Steam turbine (V3CC1) and 70,000-kW alternator
- Seawater system and steam-turbine condenser
- High- and medium-voltage electrical system
- Combined-cycle instruments and control system

In 2005 the combined-cycle gas turbines were operational in an open cycle only. Closed-cycle tests are scheduled for the first quarter of 2006.

The liquid fuels used at Granadilla power station are fuel oil (for the steam and diesel turbines) and diesel oil (for the gas turbines and combined cycle).

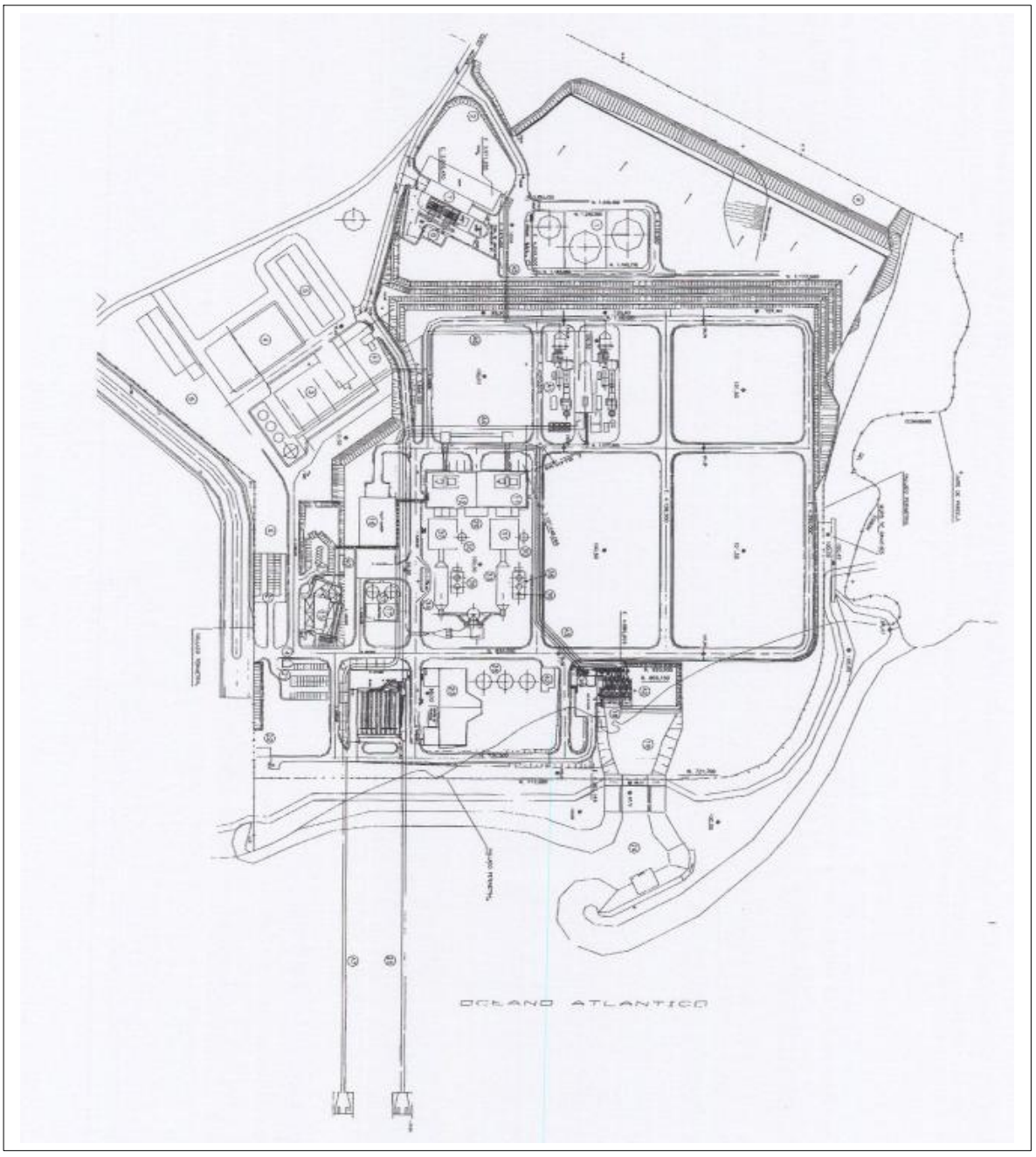
Liquid fuels for the steam turbines are stored in two separate areas, one consisting of two 13,000-m^3 tanks for fuel oil with 1% sulphur and one 7,000 m^3 tank for 0.3% sulphur, located in the western area of the site, and the other with four daily fuel-oil tanks, each with a capacity of 238 m^3, located in the 80-MW turbine area. The latter tanks (two per turbine) are located next to the electro-filters for each turbine. There is also a diesel-oil tank used to start up the steam turbines, located next to the two daily fuel-oil tanks for turbine 1 (80 MW).

In the area of the diesel turbines there is a 200-tonne fuel-oil tank that is supplied directly from the fuel-storage area for the steam turbines.

The fuel-storage area for the gas turbines consists of three 1,000-m^3 diesel-oil tanks.

The combined-cycle gas turbines are supplied from three 3,500-m^3 diesel oil tanks.

Fuel oil and diesel oil is supplied on tanker trucks, for which special unloading areas have been designated next to the storage tanks.



General plan of the facilities at Granadilla power station

3 ENVIRONMENT POLICY

With a view to unifying the EMSs implemented at the power stations of Unión Eléctrica de Canarias Generación S.A.U., the Environmental Manuals of the various power stations have been merged and replaced by an overall Corporate Environmental Manual.

ENVIRONMENT POLICY

ENDESA'S ENVIRONMENTAL COMMITMENT

ENDESA is aware that protecting nature and the natural environment must be taken into account in any business activity, since future generations depend on it, so contributing towards sustainable development.

This is why **ENDESA** has decided to carry out all its business activities in a way that is as environment-friendly as possible, making a commitment towards energy efficiency owing to the scarcity of natural, non-renewable resources.

To tackle this environmental challenge, **ENDESA** has undertaken to go beyond strict compliance with the relevant legislation by intensifying the necessary support and implementing the appropriate procedures to assure the rational use of resources and minimise waste, thereby contributing towards the sustainable development that society demands.

Consequently, as our Corporate Identity Charter sets out:

We are committed to energy efficiency and the environmental challenge. This commitment is always present in our business, technology and industrial policies and strategies.

CODE OF CONDUCT

The following principles will be applied to comply with this Commitment:

- **INTEGRATE** environmental management and the concept of sustainable development into the company's corporate strategy, using proven environmental criteria in planning and decision-making processes.
- **USE** resources rationally and reduce the production of waste, emission, dumping and environmental impact by applying programmes for constant improvement and setting environmental goals and targets, to ensure that ENDESA's facilities and activities are increasingly environment-friendly.
- **MAINTAIN** permanent monitoring of compliance with the applicable legislation at all sites, as well as other environment-related requirements that the organisation is subjected to, plus regular reviews of environmental behaviour and safety at the company's facilities, communicating the results obtained.
- **CONSERVE** the natural environment at facilities by taking measures to protect plant and animal species and their habitats.
- **STRENGTHEN** the use of renewable energy sources and R&D of cleaner, more efficient technologies.
- **PROMOTE** greater awareness of and sensitivity to protecting the environment through in-house and external training and working with authorities, institutions and citizens' associations.
- **DEMAND** that contractors and suppliers implement environment policies that are consistent with these principles.
- **FOSTER** rational energy use and energy savings among users and society at large.

This commitment and these basic environment-policy principles cover and unify the environment policies of the companies that make up **ENDESA**.

ENVIRONMENT POLICY OF THE GENERATION MANAGEMENT OF UNIÓN ELÉCTRICA DE CANARIAS GENERACION (SOCIEDAD ANÓNIMA UNIPERSONAL)

- The Generation Management accepts and takes on board the ENDESA Environmental Commitment and Code of Conduct.
- Furthermore, the Generation Management completes the definition of its Environment Policy by strengthening the above commitments with the following action principles:

- **IMPLEMENT** an Environmental Management System (EMS) that develops the Environment Policy and provides the necessary human, material and organisational resources to ensure compliance.
- **PREVENT** environmental impact caused by operations at facilities.
- **COMMUNICATE** the Environment Policy to personnel, together with the commitments it contains, and make it available to the public.
- **DISSEMINATE** the environment policy among personnel at the power station and implement appropriate environmental-training programmes to assure worker participation.
- **VERIFY** the effectiveness and suitability of the EMS on a regular basis and update any parts of it, as necessary, to assure continuous improvement.

4 DESCRIPTION OF THE ENVIRONMENTAL MANAGEMENT SYSTEM

Granadilla power station has implemented an AENOR-certified EMS under the UNE EN ISO 14001:2004 standard. The EMS is also perfectly integrated into other parts of the power's station's Management System, such as the Quality System, which is also certified by AENOR under UNE EN ISO 9001:2000.

The EMS assures the quality of the management of environmental issues, taking the form o fan undertaking to ensure that the organisation and technical monitoring carried out comply with the requirements at all times.

The EMS at Granadilla power station consists of:

- The organisational structure, defining environmental responsibilities and duties.
- Documents, including the Environment Manual, procedures and technical instructions and the associated records.
- Activities, processes and practices, in accordance with the relevant documents.
- The necessary resources to determine the environment policy and put it into practice.
- Environmental audits to verify the effectiveness and degree of compliance with the requirements stipulated in the documents of the EMS implemented.
- Review of the system, carried out annually by Management, with a view to constantly improving environmental issues and the effectiveness of the EMS.

The diagram on the next page shows the structure of the EMS and the documents of which it is composed.

ENVIRONMENT MANUAL

GENERAL PROCEDURES
PG-01 Drafting documents
PG-04 Document control
PG-05 Treating non-conformance and A/C/P management
PG-07 Records control
PG-08 In-house quality and environmental audits
PG-09 Training
PG-10 Control of measuring and testing equipment
PG-13 Drafting and control of Technical Specifications
PG-14 Management reviews of management systems
PG-15 Fixing targets
PG-16 Handling, storage and conservation of materials
PG-19 Buying materials and receiving products
PG-20 Product inspections: quality control
PG-22 Suggestions for improvement
PG-25 Management of complaints and communications
PG-27 Analysis of the degree of customer satisfaction

ENVIRONMENT-SPECIFIC PROCEDURES
PEM-01 Assessment and recording of environmental emergencies
PEM-02 Identification and assessment of environmental issues
PEM-03 Composition, duties and functioning of the Environment Group
PEM-04 Control and verification of process activities and characteristics
PEM-05 Management of the maintenance of environmentally critical equipment
PEM-06 Control and verification of environmental issues and related impact
PEM-07 Diagnosing the operational effectiveness of the EMS
PEM-08 Preparing the Environmental Report
PEM-09 Monitoring environmental legislation

TECHNICAL INSTRUCTIONS
ITM-CTG-01 Control and verification of emissions
ITM-CTG-02 Control and verification of air quality
ITM-CTG-03 Control and verification of effluents
ITM-CTG-04 Control and verification of the quality of the marine environment
ITM-CTG-05 Control and verification of the management of fuel sludge and used oil
ITM-CTG-06 Control and verification of soil pollution
ITM-CTG-07 Control and verification of external noise
ITM-CTG-08 Control and verification of visual impact
ITM-CTG-09 Control of the use of resources
ITM-CTG-10 Determining atmospheric sulphur dioxide: Thorin method.
ITM-CTG-11 Sample-taking and manual analysis of immission of particles in suspension
ITM-CTG-13 Measuring temperature
ITM-CTG-15 Measuring DQO
ITM-CTG-16 Measuring DBO_5
ITM-CTG-17 Measuring pH with portable equipment
ITM-CTG-18 Measuring salinity and conductivity in water
ITM-CTG-19 Determination of oil and fat in water
ITM-CTG-20 Measuring solids in suspension in waters
ITM-CTG-21 Measuring vanadium in waters
ITM-CTG-22 Measuring metal ions in waters
ITM-CTG-24 Collection, handling, packaging, storage and internal management of waste at Granadilla power station
ITM-CTG-28 Measuring total organic carbon in waters
ITM-CTG-29 Measuring phosphates in waters
ITM-CTG-30 Measuring elementary analysis in fuels
ITM-CTG-31 Measuring upper calorific potential
ITM-CTG-32 Measuring sulphur in fuels
ITM-CTG-33 Measuring water and sediments in fuels
ITM-CTG-34 Measuring water by distillation
ITM-CTG-35 Determination of oxygen in gases
ITM-CTG-37 Measuring vanadium in fuels
ITM-CTG-38 Control and verification of internal noise
ITM-CTG-39 Determination of turbidity in water
ITM-CTG-40 Calibrating analysis scales
ITM-CTG-43 Control and verification of CO2 emissions

CIFIC ENVIRONMENTAL PROCEDURES
RN-CTG-01 Emissions via chimneys
RN-CTG-02 Air quality
RN-CTG-03 Dumping water into the sea
RN-CTG-04 Seawater quality
RN-CTG-05 Waste management
RN-CTG-06 Management of fuel sludge and us oil
RN-CTG-07 Management of PCB/PCT
RN-CTG-08 External noise
RN-CTG-09 Visual impact
RN-CTG-10 CO2 emissions
RN-CTG-12 Official environment permits

OTHERS
PEC-03 Maintenance management at power stations
PEI-CTT In-house emergency plan

5 ENVIRONMENTAL INFRASTRUCTURE

During normal operations at Granadilla power station certain emissions, dumping and waste generation occurs, which is controlled and treated appropriately in order to minimise as far as possible the impact on the environment of an industrial facility of this type. The main arrangements and systems implemented are explained below.

5.1 ATMOSPHERIC-EMISSION TREATMENT SYSTEMS

5.1.1 Steam-turbine emissions

1. Electric filters. To capture the ash in suspension container in combustion gases each of the 80-MW steam turbines has been fitted with an electrostatic precipitator (ESP) or electric filter, located between the boiler and the seawater-based sulphur-removal system, enabling maximum particle emissions (according to the manufacturer's guarantee) of 11.2 mg/Nm^3 (dry base, corrected to 3% excess oxygen in fumes measured at the ESP outlet) to be obtained, when all the fields (3) are in operation. When operating with one of the fields out of service, a maximum particle concentration (again, according to the manufacturer's guarantee) of 33.6 mg/Nm^3, measured under the same conditions, is obtained.

2. Seawater-based sulphur-removal plant (FLAKT HYDRO-FGD process). Each steam turbine is fitted with a sulphur-removal unit that allows 90,87% of the SO_2 to be removed from the combustion gases by absorption in seawater, stabilising all the SO_2 absorbed before the effluent is released into the sea.

3. Dual-recording burners for low NO_x production. Provide the capacity to operate with a low air excess as a whole, combining the individual secondary-air flows with the percentage of fuel in each pulveriser. The furnace is maintained in oxidising conditions since all the combustion air enters via the burners, thereby avoiding the potential secondary effects of a reducing atmosphere in the furnace and substantially reducing NO_x emissions of thermal origin.

5.1.2 Gas-turbine emissions

1. Water-injection system to reduce the NO_x in gas turbines. In order to reduce nitrogen-oxide emissions the gas turbines (both open cycle and

combined cycle) are equipped with a water-injection system that considerable reduces the formation and emission of NO_x of thermal origin.

5.1.3 Evacuating gases into the atmosphere

1. Common chimney, 118 m high, with separate ducts 2.4 m in diameter, to evacuate combustion gases from the 80-MW steam turbines.
2. Chimney, 47.7 m high and 2 m in diameter, to evacuate the pollutant gases produced in each of the diesel turbines.
3. Rectangular exhaust pipe, 10.5 m high (3.8 x 5 m^2), to evacuate the combustion gases from the 37-MW gas turbine, and a 25-m chimney to evacuate the combustion gases from the 42-MW turbine.
4. Chimney, 25 m high, for each of the combined-cycle gas turbines, and two 65-m chimneys, one for each recovery boiler.

5.2 LIQUID-EFFLUENT TREATMENT

La Granadilla power station treats the effluents produced at the facility before releasing them into the sea.

The various types of effluent are described below, classified according to the drainage network into which they are released and how they are treated.

1. EFFLUENT RELEASED TO OUTLET 1
   - Steam- and diesel-turbine circulation water
   - Desalinisation plant
   - Sulphur-removal water
2. EFFLUENT RELEASED TO OUTLET 2
   - Combined-cycle circulation water
3. EQUIPMENT-CLEANING EFFLUENT
   - Water-side boiler washing
   - Gas-side boiler washing

- Air/gas pre-heater washing
- Sulphur-remover washing
- Battery room

4. POTENTIALLY OILY EFFLUENT

- Turbine-building drainage
- Boiler-area drainage
- Transformer drainage
- Heater-bottom condensate/fuel-oil storage tank suction.
- Fuel-oil feeder tank bottom purges.
- Preparation equipment and fuel-oil piping condensate
- Fuel-oil preparation equipment drainage.
- Runoff from daily fuel-oil tank sump.

5. RUNOFF FROM THE POWER STATION

- Boiler and gas area runoff.
- Condensate accompanying fuel-oil piping
- Runoff from ground in steam-turbine area
- Runoff from ground and gas turbines. First passes through holding pool.

6. EFFLUENT FROM THE MINERAL REMOVER

7. WASTEWATER EFFLUENT

All effluents are treated appropriately at Granadilla power station, using the following facilities:

- **Neutralisation pond**

- Inlets: Resin regeneration waters from the demineralisation plant.
- Operations: Chemical neutralisation of water to pH 7.
- Outlet: Control of the effluent.

- **Oil separation**

- Inlets: Drainage waters from the turbine building and boiler area, transformers, day-tank and storage areas.
- Operations: Physical separation of the oil and water.
- Outlet: The oil goes to oil tanks for subsequent collection and delivery to the fuel-oil storage tanks. The water is released into the main runoff-water network.

- **Biological treatment**

- Inlet: Wastewaters.
- Operations: Aerobic treatment.
- Outlet: Effluent control

- **Washing-water pond**

- Inlets: Waters from collection drains and the battery room.
- Operations: Air-assisted chemical neutralisation with soda.
- Outlets: Solids decanter.

- **Settling pond**

- Inlets: Water from the main runoff network, holding pond and sludge-floating drain.
- Operations: Mixing of all waters to obtain water of virtually constant characteristics.
- Outlets: To the solids decanter, in normal operations. To the reagents mixer when the oil content is high. To the by-pass of the recovered-waters pond. To effluents control, via the pond overflow.

- **Recovered-water pond**

- Inlets: Mainly from the pH control of the sludge-floating drain, the settling pond and the holding pond.
- Operations: No operations are carried out since it is only used for the washing of equipment.
- Outlets: Independent from the equipment-washing lines it has an overflow for the control of effluent.

5.3 WASTE-MANAGEMENT FACILITIES

La Granadilla power station is an officially recognised producer of the hazardous waste produced at the power station. This waste is stored temporarily in a special area for no longer than six months before being handed over to specialised external waste managers.

It is also officially recognised as a manager of hazardous waste for the waste inherent to its activities and generated by Unión Eléctrica de Canarias Generación S.A.U. in the province of Santa Cruz, Tenerife:

- Declassification treatment into toxic and hazardous waste and final elimination with energy recovery by incineration of used engine oil, fuel sludge, oily-water treatment waters and dielectric oil.

- Collection, transport and storage of: Ni-Cd accumulators; containers containing remains of hazardous substances; absorbent and filter materials, cleaning rags and protective clothing contaminated by hazardous substances; earth containing hazardous substances; sludge from washing boilers and heat exchangers.

The treatment process is based on a process of valuation by combustion. These facilities consist of:

- Storage tank.
- Fuel-injection system.
- Steam-turbine boilers.

6 SIGNIFICANT ENVIRONMENTAL ISSUES

The design of the power station features the latest technologies to reduce the potential impact on the environment of production activity there

Granadilla power station has proceeded to identify both direct and indirect environmental issues and assess which of them are to be considered as significant. The identification of each aspect is based on the following criteria:

1. All issues are identified related to actions at the facilities to which one of the following circumstances applies:

   A. An official obligation for the production units of Unión Eléctrica de Canarias Generación, S.A.U. to take measurements to determine magnitude or perform other kinds of control or monitoring.

   B. To be taken into account in order to comply with the commitments of each production unit of Unión Eléctrica de Canarias Generación, S.A.U., as defined in its environment policy.

   C. Social concern about the related impact, as demonstrated by complaints made to the production units of Unión Eléctrica de Canarias Generación, S.A.U., recorded in accordance with the relevant procedure.

2. Also identified are those issues for which it is compulsory for the production centres of Unión Eléctrica de Canarias Generación, S.A.U to take measurements in order to determine their magnitude or perform other kinds of control or monitoring, derived from the records of official resolutions on the related impact

Once the various direct and indirect environmental issues have been identified, they are assessed by applying the following criteria:

1. The environment is affected:

   considered significant if an increase of 20% is exceeded of the average value of the data for the last five years in the case of the control of impact related to the issue in question.

2. A legal or voluntary limit exists:

   considered significant if 75% of the legal or voluntary limit is exceeded; this criterion is to be applied to annual average values obtained from valid measurements taken over the year.

3. Hazardous waste (hazard-assessment criterion):

   considered significant if managed externally and representing over 10% of the total waste production of each production unit of Unión Eléctrica de Canarias Generación managed.

4. Relative growth is monitored:

   considered significant if an increase of 20% is exceeded of the average value of the available data from the last five years for the issue in question.

5. Probability criterion:

   According to the assessment of issues stemming from accidents and incidents, derived from the PEM-01 or the application of the PEI, the significance is to be recorded on the assessment sheets.

6. Controlled by the environment group:

   If none of the above criteria can be applied, the assessment of issues is left to the reasoned discretion of the environment group, using a methodology of such characteristics that it enables the justification of the significance of the issues to be quantified/valued.

7. Visual impact.

   This issue is to be assessed in accordance with the following criteria:

   - Degree of conservation of landscaped areas and vegetation screens

- Degree of conservation of the decoration of the power station: paintwork on buildings and tanks, signs of corrosion on metal structures, etc.
- Degree of cleanliness and tidiness of: main store, chemical-products store, inflammable-products store, waste store, exterior perimeter and adjoining areas.

- Degree of impact of plumes, considering their visibility from the exterior and the opacity value of the fumes released from each source.

"Significant" in this context refers to those environmental issues that have or could have significant environmental impact. These issues are taken into account when fixing the goals and targets to be met by Granadilla power station

The following categories of environmental impact have been considered when identifying and assessing the various issues:

- Impact on air quality
- Impact on the aquatic environment
- Impact of soil pollution
- Impact of noise and vibrations
- Visual impact
- Impact of waste management
- Impact caused by past activities.

The following table shows the direct and indirect environmental issues that have been assessed as being significant:

Direct environmental issues	Indirect environmental issues
SO_2 emissions from diesel turbines 1 and 2 NOx emissions from GV1 (steam turbine 1) and GV2 (steam turbine 2) NOx emissions from diesel turbines 1 and 2 CO_2 emissions from diesel turbines 1 and 2	- Transport of hazardous waste. - Transport of fuel.
CO_2 emissions from GV1 (steam turbine 1) and GV2 (steam turbine 2) CO_2 emissions from gas turbines 1 and 2 CO_2 emissions from combined-cycle gas turbines 3 and 4.	
- Total organic carbon dumped - Sludge from effluent-treatment plant. - Hydrocarbon sludge - Slag and ash - Used mineral oil - Fluorescent tubes - Soil polluted with fuel oil - Empty cans and drums - Visual impact. - Consumption of diesel oil	

SO_2 and NO_x emissions

The main atmospheric pollutants present to a greater or lesser extent in any combustion process are sulphur dioxide, nitrogen oxides and particles.

Sulphur dioxide, together with other compounds, is one of the atmospheric pollutants responsible for acid rain. Also, the acid compounds produced when it is deposited wet or dry are harmful for vegetation cover and soils.

Sulphur dioxide emissions from Granadilla power station are minimal, since the fuels used have negligible sulphur content. Also, before the gases issued by the steam turbines are released into the atmosphere they pass through a modern seawater-based sulphur-removal system.

The emission of nitrogen oxides has an effect on global warming, increases acidification, generates superficial ozone, reduces the atmospheric ozone layer and causes an increase in eutrophication.

The formation of nitrogen oxides is affected not only by the nitrogen content of the fuel in question but also by the combustion conditions. Therefore, in order to reduce this effect, the steam turbines have been equipped with specially designed burners to reduce the formation of nitrogen oxides, while the gas turbines operate with a water-injection system that also reduces their formation.

Although valued as significant, both the SO_2 and NO_x levels fall within the limits permitted under the applicable legislation.

CO_2 emissions

New environmental issues compared with 2004 include carbon-dioxide emissions, which are assessed as being significant at all the power station's turbines. These emissions exceed the rights fixed under the National Assignation Plan (except for steam turbines 1 and 2), owing partly to a higher increase in demand than forecast and partly to the delay in commissioning the combined-cycle steam turbine and the gas turbine at Guía de Isora power station.

Carbon dioxide (produced by the combustion of fossil fuels), together with other gases, is responsible for the "greenhouse effect", the process whereby the overall temperature of the planet rises as a result o fan increase of the concentration of such gases in the atmosphere, producing undesirable effects on climate.

Waste generation

The waste generated at a power station is classified into inert waste and hazardous waste.

Inert waste is waste of similar characteristics to domestic waste, such as paper, cardboard, plastics, glass and scrap metal. All of these (except for scrap metal) are removed by the local authority's urban-solid-waste collection service.

Hazardous waste, such as ash and slag, presents certain special characteristics that call for appropriate handling in order to avoid polluting the environment. Hazardous waste is collected selectively, packaged and stored temporarily before being handed over to authorised waste-management firms

Hazardous waste is collected selectively, packaged and stored temporarily before being handed over to authorised waste-management firms for appropriate treatment

The power station is legally authorised to manage and treat used oil and fuel sludge, to be used together with fuel as energy sources, for which an advanced dispenser system is used.

All activities related to the production and management of hazardous waste are subject to strict legal controls, including the requirement to keep up-to-date records to assure appropriate treatment and the filing of annual declarations of all hazardous waste generated

Compared with last year's Declaration (2004) several new types of waste have been assessed as significant: used mineral oil, fluorescent tubes, soil polluted with fuel oil and empty cans and drums. It should also be pointed out that the waste classified as slag and ash, and sludge from the effluent-treatment plant, are the result of corrective measures implemented at the power station, without which the pollutants would have been released into the atmosphere, in case of ash and slag, or into the sea, in the case of the sludge from the effluent-

treatment plant. Reducing the generation of these types of waste would therefore increase the pollutant load of emissions into the atmosphere and liquid effluents.

Significant effluents include total organic carbon, although the parameters for dissolved oxygen and biological oxygen demand were not significant.

The site of Granadilla Power Station is subject to strong winds, high relative humidity, high sunshine levels and the presence of sea spray. These climatic characteristics result in a highly corrosive atmosphere, which attacks metal surfaces and so degrades the appearance of the facilities. The heading "visual impact" heading therefore is once again assessed as a significant environmental issue. The power station continues to consider targets to improve this issue.

Another new significant issue this year was the consumption of diesel oil, owing to the functioning of turbines 3 and 4 in combined cycle 1, which have been using this fuel to generate power in an open cycle.

The transport of both fuel and waste is considered to be significant because of its effects on the environment, including:

Gas emissions

Noise generation

Impact on road traffic

Since the power station has no direct control over this activity, such transport is considered to be an indirect environmental issue. However, checks are made to ensure that the vehicles used by the firms involved are covered by the documents required under the relevant legislation:

Technical Vehicle Inspection

Hazardous Goods Transport Permit (ADR)

Licensed as a hauler of hazardous waste

Cargo documents

Signage on the vehicle

7 ENVIRONMENTAL MANAGEMENT

The Environmental Management Programme is a documented description of the resources applied in pursuit of environmental goals and targets.

In the context of the Environmental Management System (EMS) at Granadilla power station, the general environmental goals are where the power station strives to reach. Environmental goals must be scheduled chronologically and quantified as far as possible.

Environmental goals stem directly from the action principles defined in the environment policy, of which they constitute the first level of specification in the form of short- or medium-term targets to be reached.

Specific environmental goals are detailed requirements for each action, quantified whenever possible, that are applicable to the power station as a whole or specific areas at the facility. They have their origin in the general environmental targets and must be fixed and met in order for these targets to be reached.

The programme takes the form of a number of actions to be undertaken in order for each of the specific environmental targets to be reached. The following information is defined for each action included in the programme:

the scope of the action;

the specific target being aimed for;

the schedule for execution or implementation;

the budget allocation and human and material resources assigned;

the unit(s) responsible for implementation and monitoring at different levels within the organisation.

7.1 ENVIRONMENTAL TARGETS

2005

In 2005 Granadilla power station fixed certain environmental targets, within the framework of the EMS and to develop the Environment Policy, which can be broken down into a number of actions.

TARGET 1
Achieve an oil and fat content of the inlet water at the effluent treatment plant (ETP) of under 30 ppm.

Build a new oily-waters network for the diesel plant.

Owing to problems with the restructuring of the Technical Services Department it has only been possible to award the contract for these Works. The target has therefore not been reached and has been postponed until 2006.

Fit sack stand to press filter.

The stand has been built and installed at the ETP.

The target cannot be considered to have been reached because the quantities of oil and fat contained by the inlet water at the ETP have not been reduced.

TARGET 2
Reduce water consumption at the power station by 1%, by storing irrigation water.

Goal

Install irrigation-water tank.

The tank was installed and became operational in October. The water consumption has indeed been reduced but not as a result of this action. As the

data table on page 49 of this document shows, the water-consumption value for 2004 was high because of various tests carried out in June, July and August. The measurement of the indicator for this objective will be carried out in 2006.

TARGET 3
Reduce visual impact in waste-storage areas.

Goal

Build a concrete floor and install collection containers in the scrap-metal storage area.

The planned actions have been carried out in the area where scrap metal and other ordinary waste is stored. A concrete floor was laid, upon which collection containers now rest. The exterior fencing has also been remodelled and fitted with a gate.

TARGET 4
Reduce the generation of material waste polluted with fuel oil by 2%.

Goal

Install self-cleaning filter in the sludge-injection system.

The filter and materials necessary for its installation were delivered to the power station in 2005 but the available budget has to allow the assembly work to be done before 2006.

TARGET 5

Reduce visual impact.

Goal

Paint these areas: Steam turbine 1 recess, pipe rack and gas/gas exchangers.

All the planned actions have been carried out. This target has therefore been reached.

For 2004 Granadilla power station fixed the following target:

TARGET 2
Reduce the quantity of hydrocarbon sludge generated at the power station by 10%.

Goal

Reduce the generation of hazardous waste.

The action consisted of installing new fuel-filtering equipment to the diesel turbines, which generate less hydrocarbon sludge. The installation of these filters was not completed until December 2004, so the proposed indicator could not be achieved.

In 2005, with the new filters now operational, 1,385 tonnes of sludge has been managed, compared with 1,685 tonnes in 2003 — a reduction of 18%. This target has therefore been reached.

2006

The following environmental targets have been fixed at Granadilla power station for 2006.

TARGET 1
Achieve an oil and fat content of the water arriving at the ETP of under 30 ppm.

Goal

Build a new oily-waters network at the diesel plant.

Build and oil and fat separator in the fuel-storage-tank area.

TARGET 2
Improve visual impact.

Goal

Paint the following areas at the power station:

Steam turbine 2 pipe racks, fuel storage tank A, daily fuel tank for steam turbine 1, and untreated water tank B.

TARGET 3
Reduce water consumption by the steam turbines by 5%.

Goal

Operate the steam turbines with continuous closed purging.

7.2 SUMMARY OF QUANTITATIVE DATA

A summary of data on parameters that allow compliance with legal limits to be verified is given below. The data shown allows the data compiled in 2000, 2001, 2002, 2003, 2004 and 2005 to be compared, except in cases where the monitoring period is longer (gas turbines and noise).

7.2.1 Atmospheric emissions

The following graphs show the values obtained for the various parameters monitored for emissions at the power station. It should be noted that the NO_x, SO_2 and particle levels recorded were all below the legally established limits.

MONTHLY AVERAGE NOx EMISSIONS (2005)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Steam turbine 1	374	371	349	334	379	363	364	*	346	365	384	366
Steam turbine 2	406	403	368	366	378	402	416	428	403	391	408	373

MONTHLY AVERAGE SO_2 EMISSIONS (2005)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Steam turbine 1	132	163	167	159	133	136	135	*	139	157	139	134
Steam turbine 2	128	152	156	146	119	127	137	136	148	150	161	156

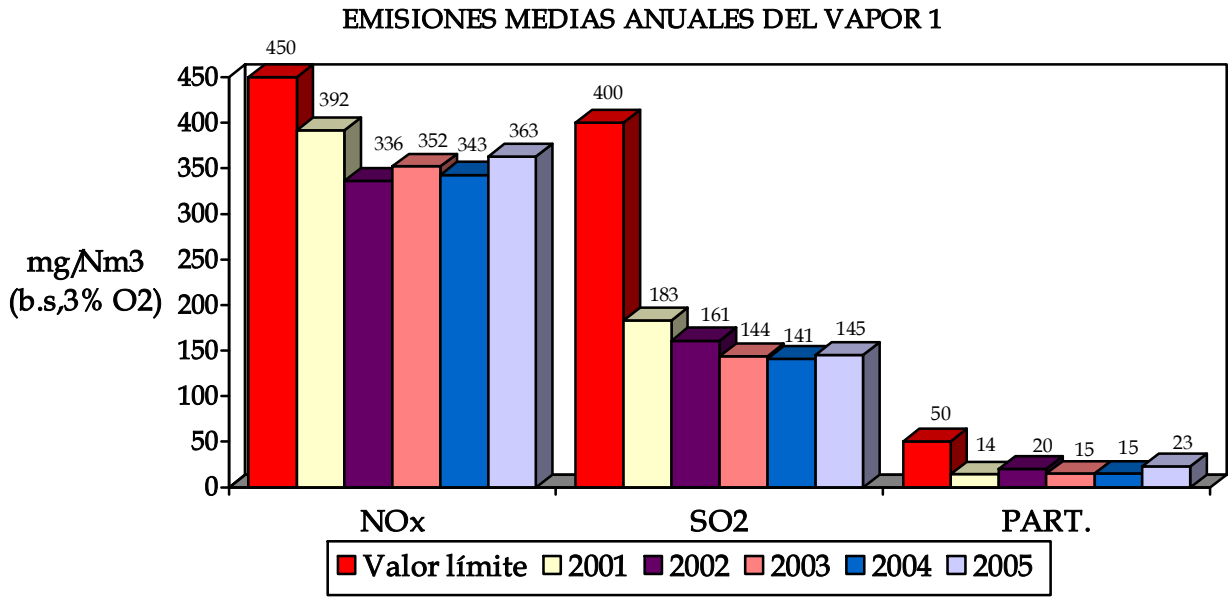
MONTHLY AVERAGE PARTICLE EMISSIONS (2005)

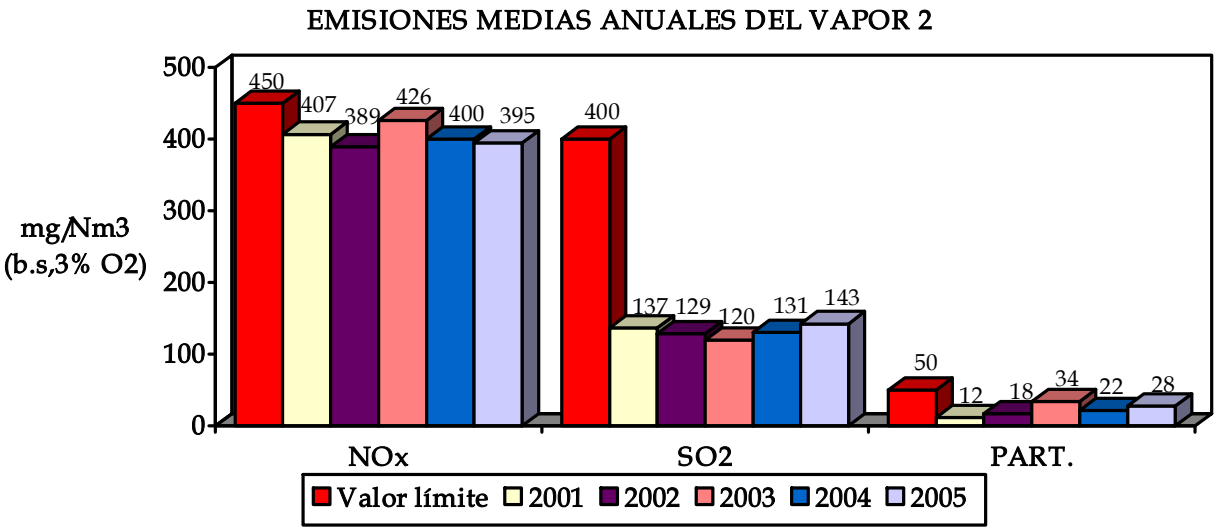
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Steam turbine 1	18	12	20	23	24	26	33	*	33	23	15	20
Steam turbine 2	19	24	16	22	16	26	22	34	49	40	26	34

Note 1: data expressed in mg/Nm^3, b.s., 3% O_2

Note 2: Annual summary of PAI values (continuous measurement)

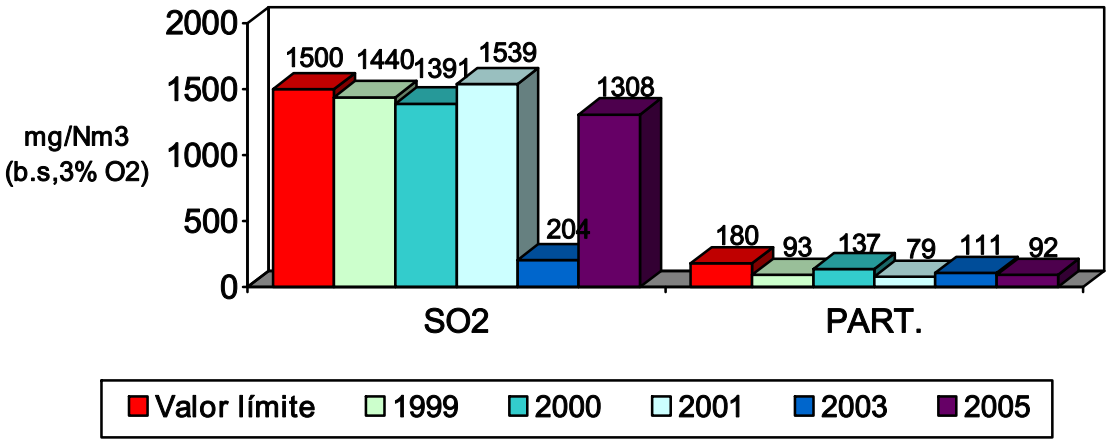
* Unit not operational



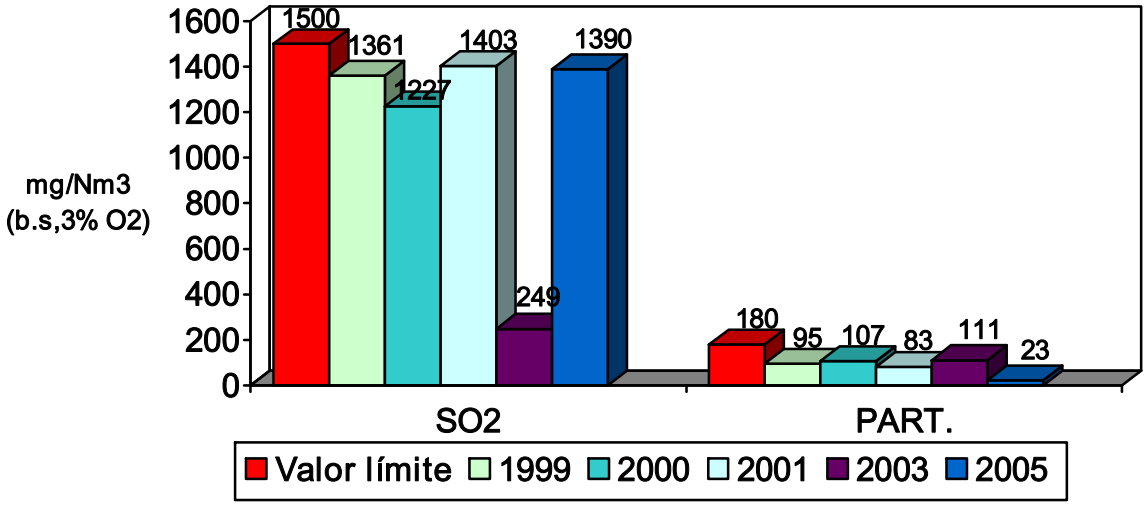


Note: Continuous measurements

EMISIONES MEDIAS ANUALES DEL GRUPO DIESEL 1



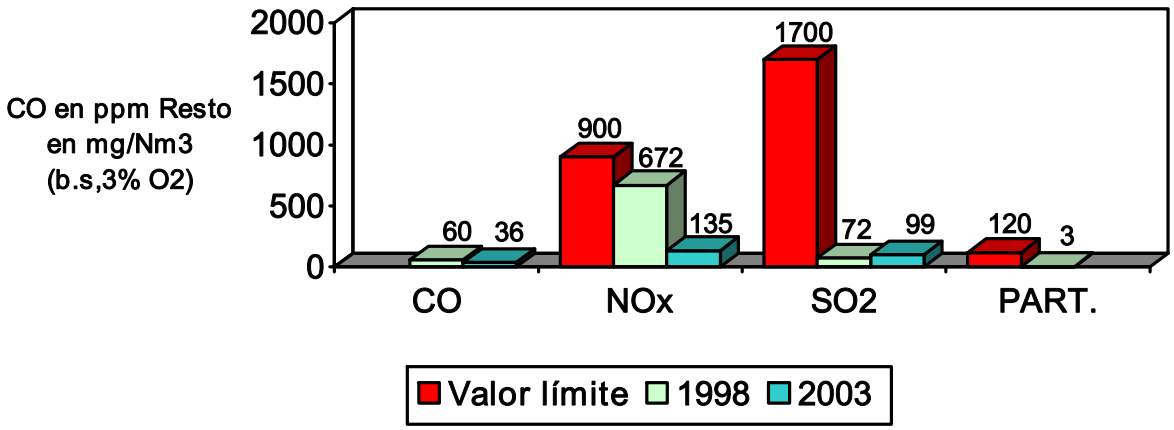
EMISIONES MEDIAS ANUALES DEL GRUPO DIESEL 2



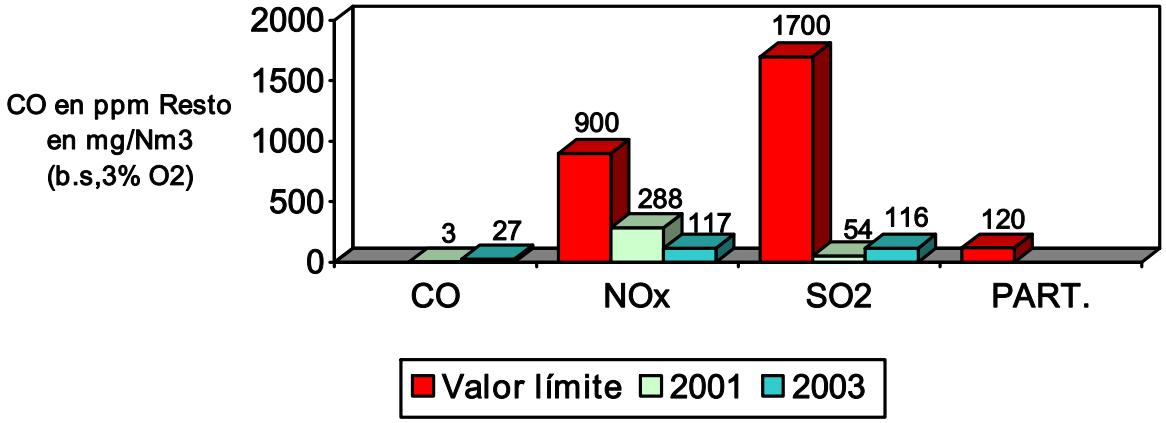
It is compulsory to measure diesel-turbine pollutants every two years. The next measurements will be made in 2006.

Note: Measurements made by OCA

EMISIONES DE LA TURBINA DE GAS 1



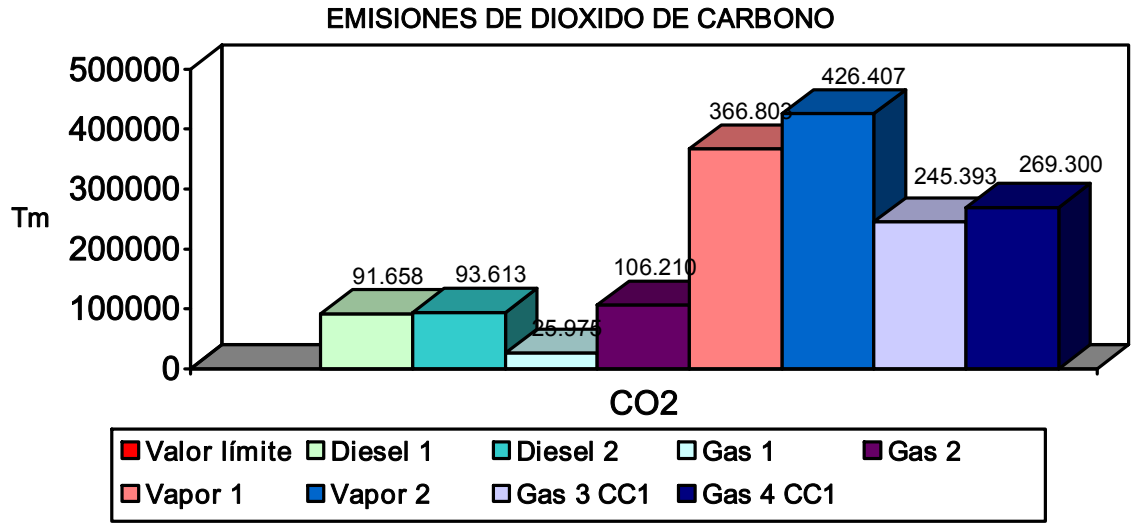
EMISIONES DE LA TURBINA DE GAS 2



Note: Measurements made by OCA

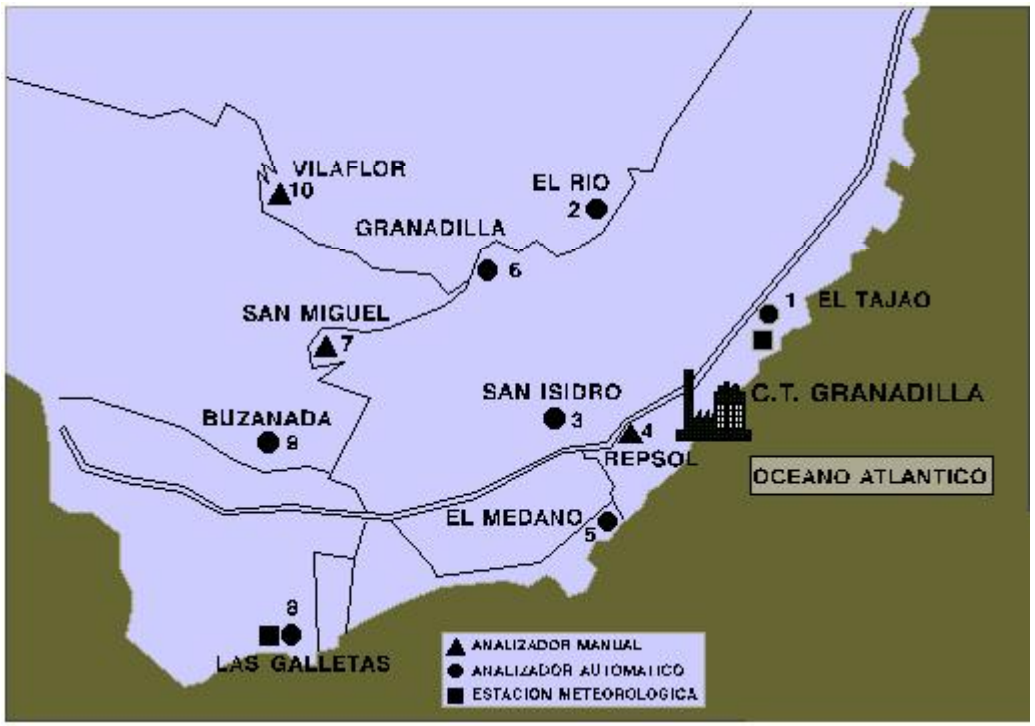
The data for emissions from gas turbine 2 for 2001 corresponded to measurements made during commissioning (25 January 2002).

No particle measurements were made for gas turbine 2, but the value is usually under 1 mg/Nm^3. The SO_2 measurement was obtained by stoechiometric calculation, considering a sulphur content in the fuel of 0.03% by weight.


EMISIONES DE DIOXIDO DE CARBONO
500000
400000
300000
200000
100000
0
Tm
91.658
93.613
25.975
106.210
366.803
426.407
245.393
269.300
CO2
Valor límite
Diesel 1
Diesel 2
Gas 1
Gas 2
Vapor 1
Vapor 2
Gas 3 CC1
Gas 4 CC1

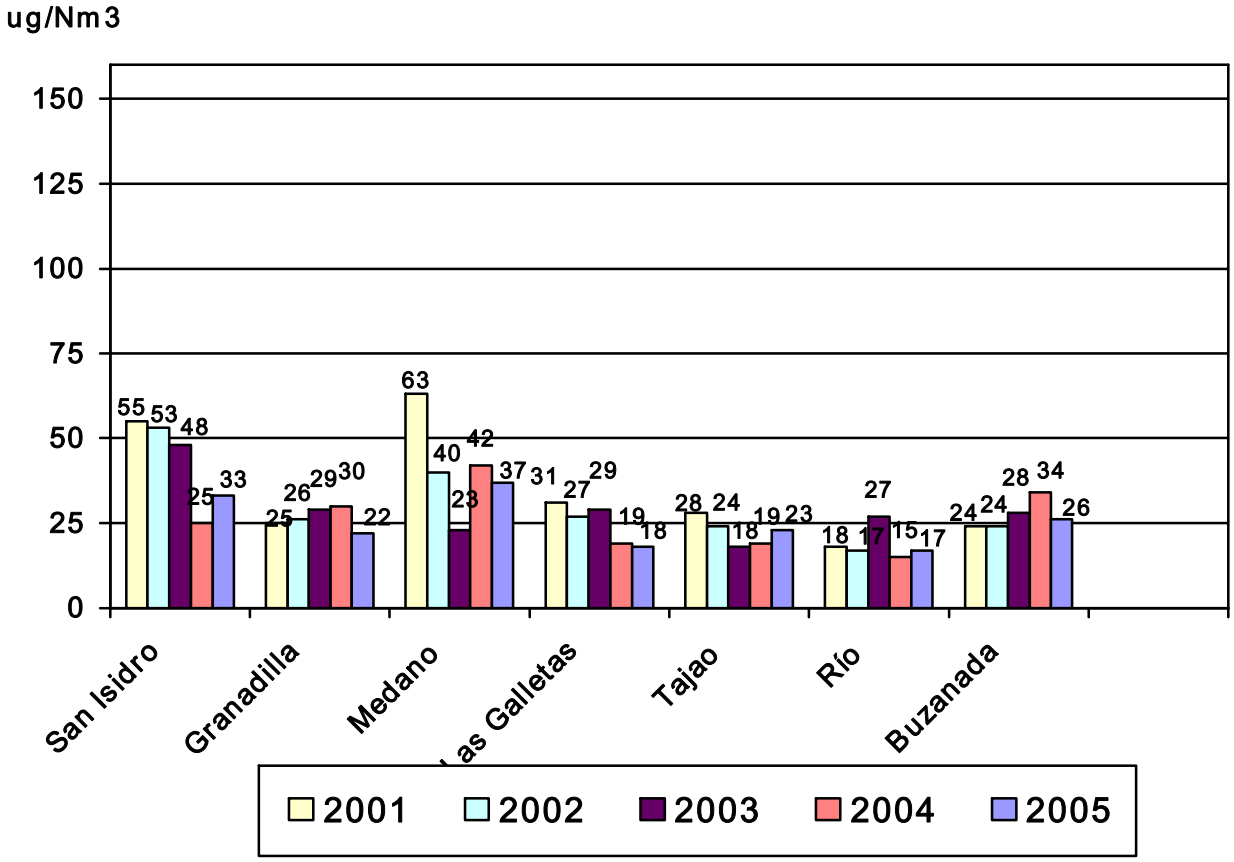
7.2.2 Immission

Granadilla power station power station has its own atmospheric surveillance network to monitor the air quality in the surrounding area. This network consists of seven automated stations located in Tajao, El Río, San Isidro, El Médano, Granadilla, Las Galletas y Buzanada. The values measured, together with meteorological data from two of the stations, are sent in real time to the Sub-department for Industrial Development and Technological Innovation of the Canary Islands Regional Government.



The following graphs show the data collected from the various automated stations for each of the parameters monitored. All of them present values that are well below the legal limits.

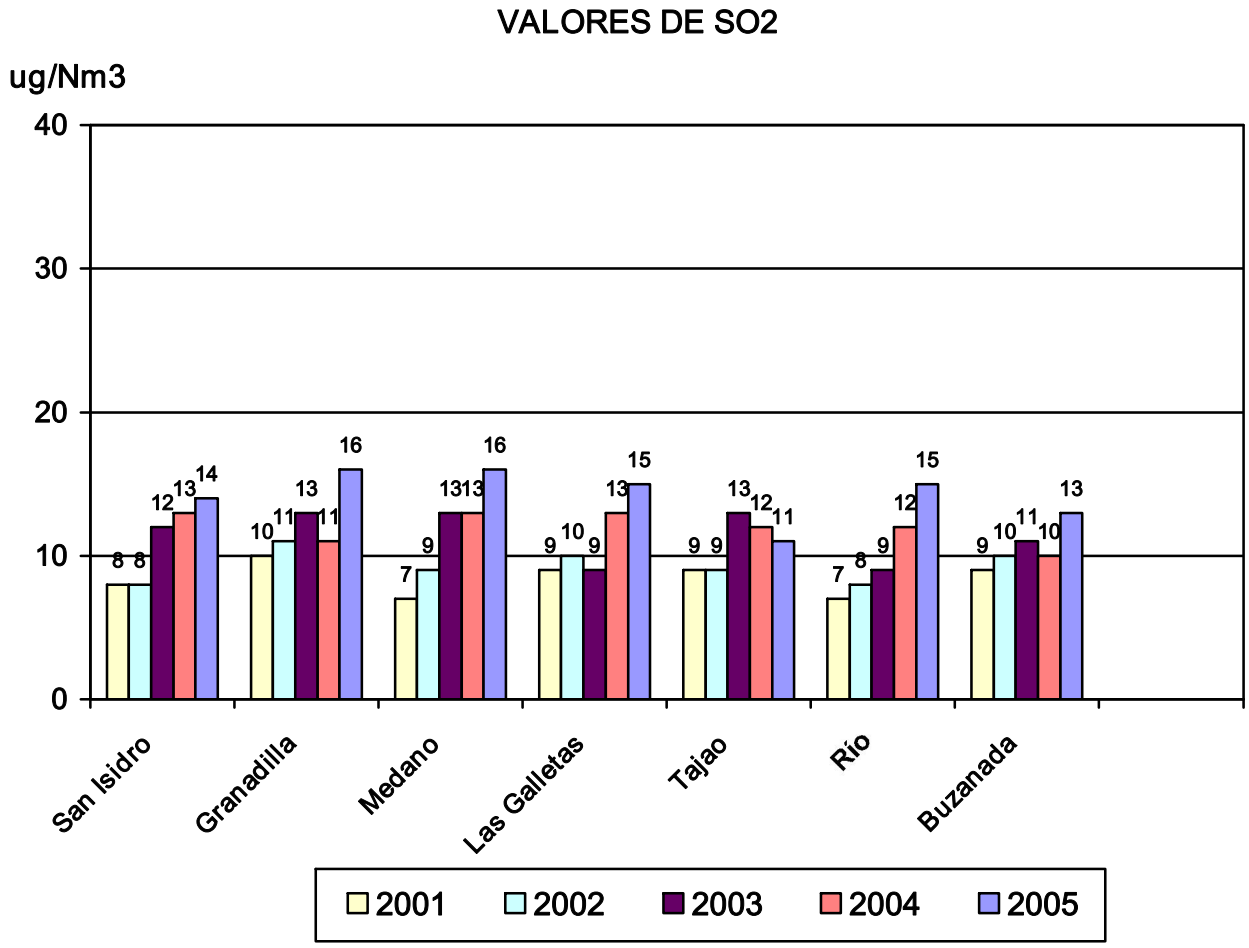
VALORES DE PARTÍCULAS



Number of times the hourly limit for health protection was exceeded

Hourly limit for health protection: 200 micrograms/m^3

	San Isidro	Granadilla	Médano	Las Galletas	Tajao	Río	Buzanada
Times exceeded	0	0	0	0	0	0	0



Limit values under Royal Decree 1073/2002

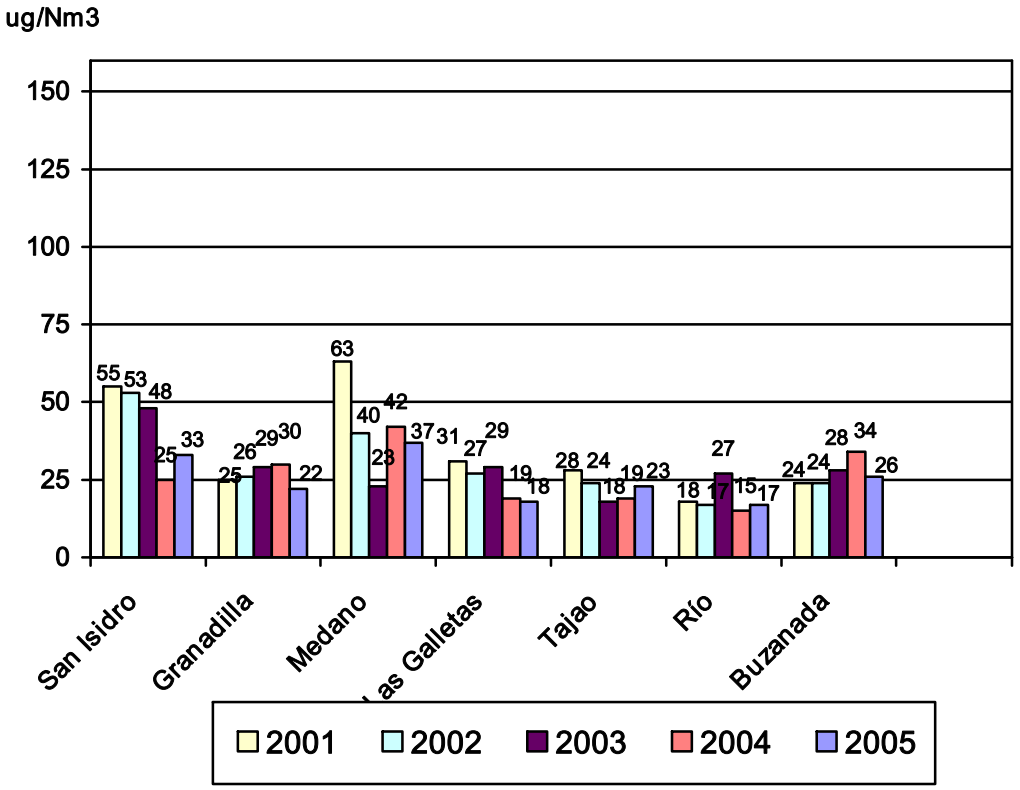
Number of times hourly and daily limits were exceeded

Hourly limit for health protection: 350 micrograms/m^3

Daily limit for health protection: 125 micrograms/m^3

	San Isidro	Granadilla	Médano	Las Galletas	Tajao	Río	Buzanada
Hourly times exceeded	0	0	0	0	0	0	0
Monthly times exceeded	0	0	0	0	0	0	0

VALORES DE PARTÍCULAS



The annual average values shown on the table for 2001–2004 refer to total particles, while those for 2005 refer to PM-10.

Limit values under Royal Decree 1073/2002.

Number of times the daily limit for health protection (50 microgramos/m^3) was exceeded:

	San Isidro	Granadilla	Médano	Las Galletas	Tajao	Río	Buzanada
Times exceeded	47	4	72	5	13	9	26

Not to be exceeded more than 35 times per year.

Most of these excess values were the result of episodes of dust from the Sahara carried by the wind to the Canary Islands.

-Average annual value for human-health protection:

San Isidro	Granadilla	Médano	Las Galletas	Tajao	Río	Buzanada

Annual average: 40 ug/m^3	Complies	Complies	Complies	Complies	Complies	Complies	Complies

7.2.3 Effluent releases

The liquid effluents produced by Granadilla power station come from several different sources:

- Cooling waters
- Sulphur-removal waters
- Other effluents

All effluents are released via an underwater outlet to avoid the effects of temperature on the receiving medium.

The power station's environmental-surveillance system continuously measures and monitors the quality of the final effluent. The surveillance programme is completed with regular measures applied by an officially endorsed agency to monitor effluents and the marine receiving medium, as well as an annual inspection of the underwater outlet.

The annual averages for the continuously controlled parameters are shown below:

	Conductivity (µS*cm)	**Temperature (ºC)**	**pH**	**Free chlorine (mg/l)**	**Dissolved O_2 (mg/l)**
2001	51.28	25.43	7.13	0.04	7.00
2002	56.34	24.04	7.10	0.01	7.33
2003	48.31	27.08	6.93	0.04	5.14
2004	54.43	28.21	7.05	0.01	6.81
2005	53.99	27.66	7.13	0.01	5.54

7.2.4 Waste

Data on the waste generated at the power station is shown in the following table:

Waste	2001 t	2002 t	2003 t	2004 t	2005 t
Fuel-impregnated rags and burlaps	26.8	12.81	32.0	32.18	36.35
Ash and slag	311.2	369.4	535.5	370.76	412.36
Hydrocarbon sludge**	775	774	1,685.12	2,091.54	1,385.61
Used oil	-	-	-	-	8.8
Empty metal oil drums	-	-	-	-	1.0
Empty paint drums	0.2	-	0.9	2.0	-
Boiler-washing sludge	31.08	56.81	55.175	88.10	89.4
Soil polluted with hydrocarbons or oil	4.96	1.87	55.75	15.6	12.6
Ionic exchanger resins	0.2	0.7	-	-	-
Fluorescent tubes	0.357	0.123	163(2)	0.25	4.267
Fuel sediment	12.56	9.04	156.16	135.2	3.5
Lead accumulators w/o electrolyte	0.4	0.3	-	-	0.059
Alkaline batteries	0.15	0.04	0.04	-	-

(1) Fuel sludge generated at the power station was not considered before 1999, hence the difference between the two years.

(2) Data refers to units.

Granadilla power station is officially recognised as a manager of hazardous waste for certain types of waste generated at its own facilities and at others belonging to Unión Eléctrica de Canarias Generación, S.A.U. The waste-management figures are cited below:

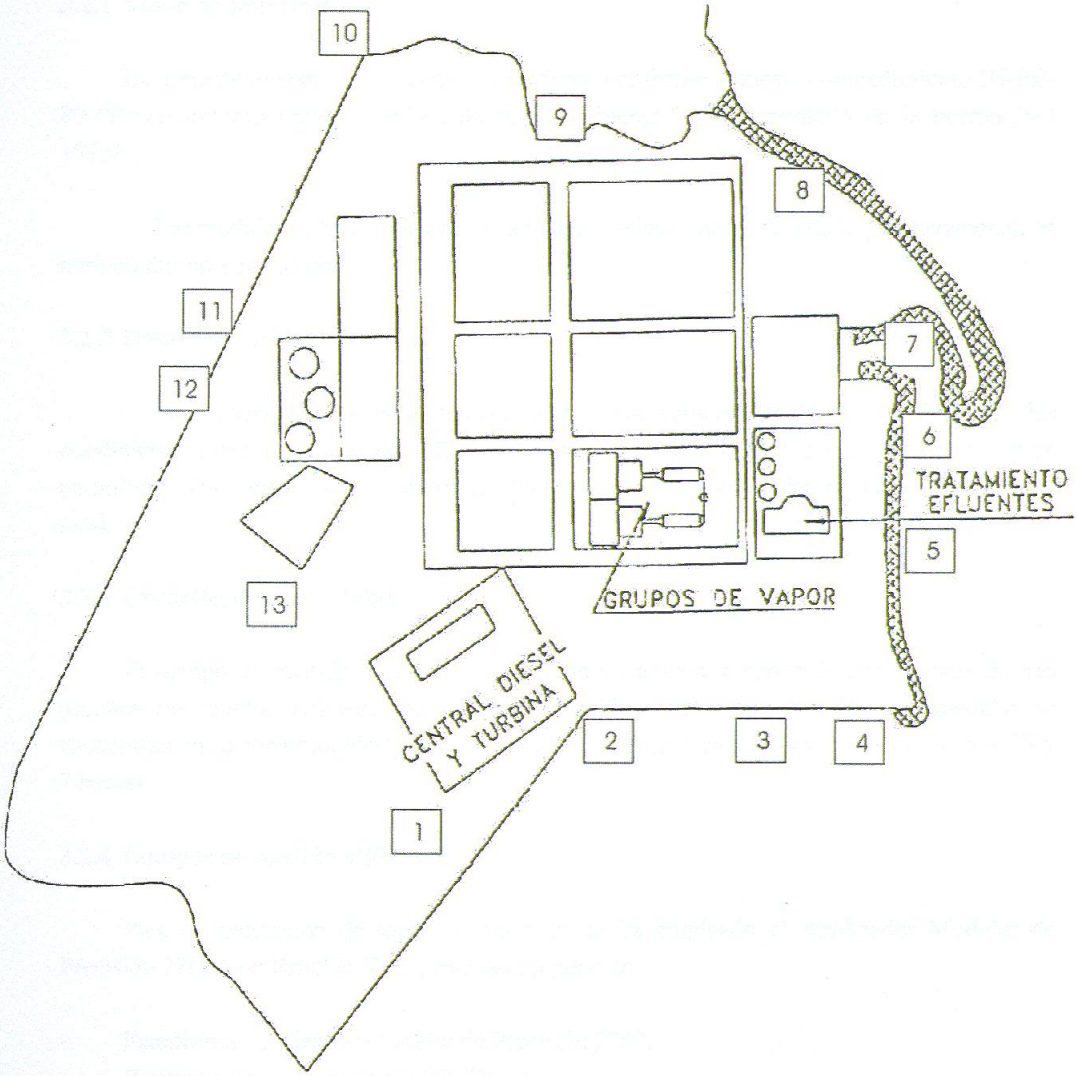
Waste	2001 t	2002 t	2003 t	2004 t	2005 t
Hydrocarbon sludge**	1,301.5	1,442.5	1,342.2	2,091.54	1,857.65
Used mineral oil	71	4	-	-	8,8

**Note: From 2001 onwards the term “hydrocarbon sludge” has been used to cover mixtures of fuel-oil sludge and used oil. The proportion of oil in the mixture is very low, so the figures for fuel-oil sludge for 1999 and 2000 can reasonably be taken to refer to hydrocarbon sludge.

7.2.5 Noise

Granadilla power station has methods to monitor the noise levels produced by the power station, fixing data to enable them to be verified and establishing action sequences whenever necessary.

A plan of the facilities showing the noise-monitoring points is included on the following page.



UBICACIÓN DE LOS PUNTOS DE CONTROL

No noise-level measurements were made in 2005. When the combined cycle comes into service the corresponding measurement will be made.

7.2.6 Consumption of resources

1. Fuel

	Fuel oil bia 1% Kg	Fuel oil 0.3% Kg	Diesel oil Kg	Total Kg
2001	322,815,230	15,310,993	8,775,546	346,901,769
2002	322,187,622	708,602	44,675,906	367,572,130
2003	335,733,258	771,698	87,170,260	423,675,216
2004	339,014,391	1,394,791	173,616,735	514,026,457
2005	308,568,299	1,570,638	209,149,257	519,288,194

	Gross production kWh	Total consumption/ gross production kg/kWh
2001	1,581,175,570	0.219
2002	1,630,281,192	0.225
2003	1,820,635,155	0.233
2004	2,083,066,009	0.247
2005	2,065,747,934	0.251

2. The power station has its own desalinisation plant to produce all the process water required. Consumption was as follows:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Water 2001	11,593	10,761	11,443	12,348	12,072	10,346	12,056	11,438	10,807	11,985	12,097	14,022	140,968
Water 2002	12,134	11,039	12,573	11,675	10,612	10,001	11,525	12,418	12,005	12,132	12,003	14,727	142,844
Water 2003	13,058	10,801	11,838	13,113	13,403	13,646	13,835	14,245	16,608	15,257	11,414	12,803	160,021
Water 2004	15,690	9,276	10,893	11,012	11,297	56,232	25,613	84,923	11,196	12,760	12,947	30,629	292,468
Water 2005	11,458	12,245	12,229	13,299	9,905	25,035	15,007	9,735	19,281	13,225	6,953	13,924	162,296

Note: Data expressed in m^3/month

8 DATE OF NEXT DECLARATION

The management of Granadilla power station undertakes to submit the next annual Declaration by December 2007.

This Declaration has been prepared by Granadilla power station, with the approval of the person in charge, Alberto Domínguez López.

Signed: Alberto Domínguez López

Manager, Granadilla Power Station

DECLARACIÓN MEDIOAMBIENTAL VALIDADA POR

AENOR Asociación Española de Normalización y Certificación

DE ACUERDO AL REGLAMENTO Nº 761/2001
CON FECHA:

COMO VERIFICADOR ACREDITADO POR ENAC CON
Nº 01/VMA/001/96

Firma y sello:

D. Ramón NAZ PAJARES
Director General de AENOR