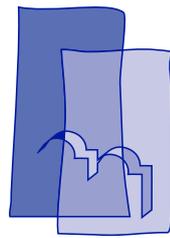


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# ANNUAL REPORT 2017



ALMARAZ  
TRILLO





**Edition**

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**Coordination**

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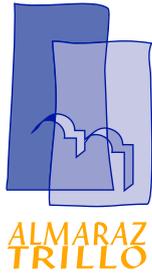
**Design and Layout**

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CNAT photo archive





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# PRESENTATION

## Almaraz NPP (UI-UII)

### OWNERS:

Iberdrola Generación Nuclear, S.A.U. (52,687%)  
Endesa Generación, S.A.U. (36,021%)  
Gas Natural Fenosa Generación, S.L.U. (11,292%)

**LOCATION:** Almaraz (Cáceres)

### TECHNICAL SPECIFICATION:

Reactor Type: Pressurized Water Reactor (PWR)  
Supplier: Westinghouse  
Thermal Power: 2.947 MWt (U-I) - 2.947 MWt (U-II)  
Fuel: Enriched Uranium Dioxide (UO<sub>2</sub>)  
No. of fuel elements: 157  
Gross Electrical Output: 1.049,43 MWe (U-I) - 1.044,45 MWe (U-II)  
Net Electrical Output: 1.011,30 MWe (U-I) - 1.005,83 MWe (U-II)  
Cooling: Open Circuit. Arrocampo Reservoir

**Inicio Operación Comercial:** 1 September, 1983 (UI) - 1 July, 1984 (U-II)

**Current Operational Authorisation:** 08/06/2010 for a period of 10 years

**Cycle Duration:** 18 months both units

## Trillo NPP

### OWNERS:

Iberdrola Generación Nuclear, S.A.U. (48%)  
Gas Natural Fenosa Generación, S.L.U. (34,5%)  
Iberenergía, S.A.U. (15,5%)  
Nuclenor, S.A. (2%)

**LOCATION** Trillo (Guadalajara)

### TECHNICAL SPECIFICATION:

Reactor Type: Pressurized Water Reactor (PWR)  
Supplier: KWU  
Thermal Power: 3.010 MWt  
Fuel: Enriched Uranium Dioxide (UO<sub>2</sub>)  
No. of fuel elements: 177  
Gross Electrical Output: 1,066 MWe  
Net Electrical Output: 1,003 MWe  
Cooling: Natural Draft Towers (Tajo River)

**Commencement of Commercial Operations:** 6 August, 1988

**Current Operational Authorisation:** 17/11/2014 for a period of 10 years

**Cycle Duration:** 12 months

## SUMMARY OF THE YEAR

The Almaraz and Trillo plants ended 2017 with excellent operating results. Both facilities have obtained their best records for collective doses, the lowest since they began commercial operations. In the case of Almaraz NPP, gross production of 16,986 million kWh was achieved which was the best annual result in its history, with the 500,000 million kWh production milestone reached on 3 April. In 2017, Trillo NPP also recorded its sixth best gross production year with 8,530 million kWh, in addition to accumulating 10 consecutive years without an automatic reactor shutdown.

Refuellings took place between 26 June and 29 July at Almaraz NPP Unit I, and between 5 May and 3 June at Trillo NPP, periods in which significant improvements were made with regard to technological updating and safety at both plants (all modifications derived from the Fukushima accident analyses have been completed). In relation to the management and storage of spent fuel at Almaraz NPP, the construction of the Independent Spent Fuel Storage Installation (ISFSI) as well as its interconnection with the Plant is almost completed, and at Trillo NPP, as a consequence of a change of container model, the activities required to adapt the facilities and the current ISFSI to the new ENUN 32P model have been completed, and trial runs required prior to container loading are in progress.

The CNAT Action Plan (2017-2021) has been consolidated as an essential instrument for continuous improvement. Since 2017, this strategic project has been promulgated with a renewed spirit, consolidating the objectives already achieved and setting additional goals: improvements to operational, cost and organisational efficiency, safety, training, communication and systems for reporting, monitoring and assigning responsibilities.

And to complete this summary, 2017 has seen the deployment of the new CNAT Leadership Model, in which the attributes necessary for effective management performance are specified as a means to unify and reinforce this model throughout the organisation. The CNAT Business Model has also been defined, oriented to ensuring fulfilment of its mission, through values shared by everyone working in and for CNAT and which are materialised in their day-to-day behaviour.



# CNAT PROFILE

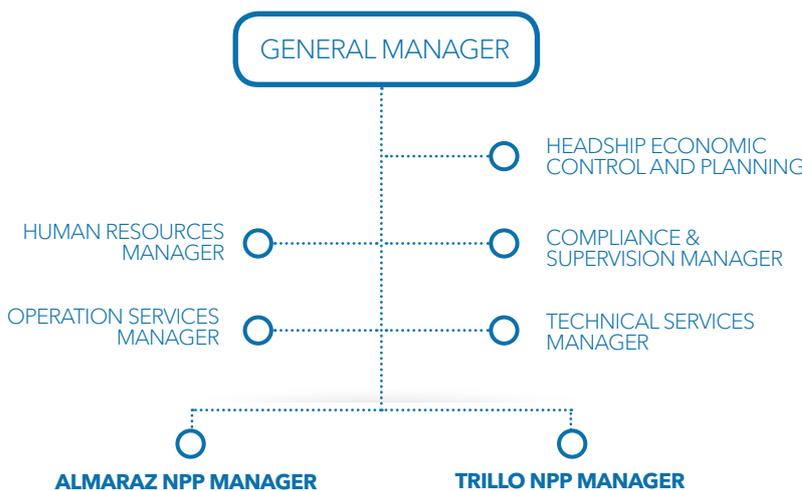
## OWNER COMPANIES

The shares of the companies that own the Almaraz and Trillo Nuclear Power Plants in terms of the installed capacity of the two plants are as follows:



## ORGANISATIONAL STRUCTURE

The chart reflects the organisational structure of the A.I.E. Centrales Nucleares Almaraz-Trillo implemented on 1 January 2017



## MISSION, VISION, KEY STRATEGIES

The Mission of Almaraz-Trillo Nuclear Power Plants is to produce electricity in a manner which is safe, economic, respectful to the environment and guaranteeing long-term production by optimum operation of the Almaraz and Trillo plants.

the development and participation of people enable higher levels of safety, productivity and efficiency to be achieved.

Our Vision aims to position the Almaraz and Trillo Plants between the benchmark Plants for safety, quality and costs, by employing a management model in which

To achieve this mission and move towards the goals established in the Vision, Almaraz-Trillo Nuclear Power Plants develop strategy around the following key elements:



# ACTIVITY REPORT

## OPERATIONS

### ALMARAZ PLANT

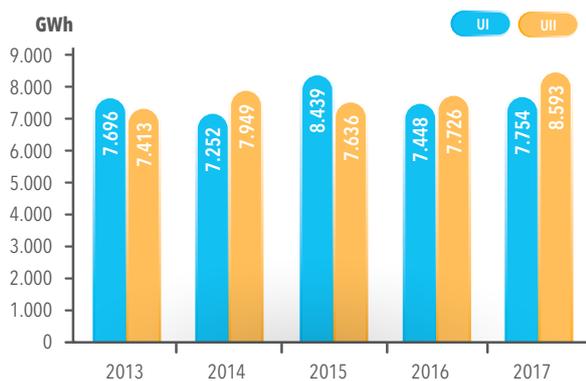
At the end of the year gross production generated by the two units at Almaraz Nuclear Power Plant was 16,986 million kWh, and joint net production was 16,347 million kWh, both data representing another new milestone for the plant as they are the best annual results achieved since the plant started operations. Another milestone in plant operations was the one celebrated on 3 April when an accumulated production of 500,000 million kilowatt-hours was reached. Gross electricity production for Unit I was 8,048 million kWh, and 8,938 million kWh for Unit II.

In 2017, the twenty-fifth refuelling and general maintenance outage took place at Unit I. Executed in 32 days, between 26 June and 29 July, more than 9,000 activities were performed with the participation of 1,200 workers in addition to the usual workforce. Significant improvements included installation of the Filtered Containment Vent System, and design modification of the new turbo-pump control for the auxiliary supply water system.

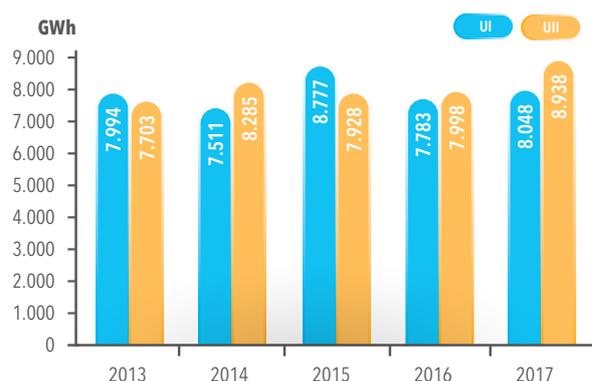
Events reported during the year included a load reduction to 72% nuclear power at Unit I in March due to increased vibrations in a main power water turbine pump, and in April there was an automatic reactor stoppage due to the loss of power supply in one of its cooling pumps. Unit II experienced a scheduled 3-day outage for operability tests on the 4DG Diesel generator.

On 19 October, the Annual Internal Emergency Drill was held, which this year involved declaration of a Category IV emergency (General Emergency). With a scenario that included adverse weather with strong winds and rains, a situation involving the unavailability of the CAT and Control Room communication systems was recreated, for which control of the emergency was transferred to the CAGE (Alternative Emergency Management Centre). Subsequently, additional failures were attributed to various items of equipment that caused complete loss of the functions required to bring the reactor to a hot shut-down. It also included the need to provide care for an injured person, a fire in the safeguards building of Unit 1, and a request to activate the Military Emergency Unit (UME).

ALMARAZ NPP - NET PRODUCTION UI+UII



ALMARAZ NPP - GROSS PRODUCTION UI+UII



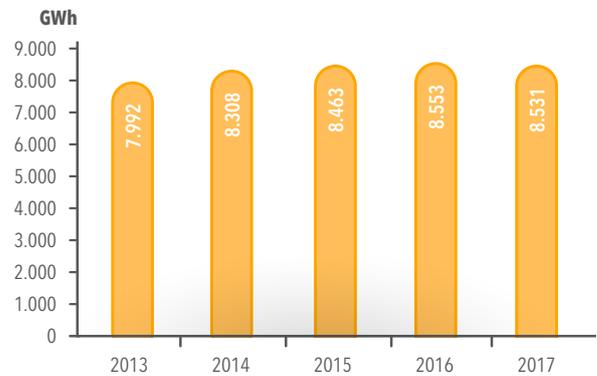
## TRILLO PLANT

Operation of the Trillo Nuclear Power Plant during 2017 also presented good results with regards to production of generated electric power, 8,531 million kWh, and this was also the year in which the lowest total collective dose was recorded since the plant began its operation, accumulating 10 consecutive years without automatic reactor stoppages.

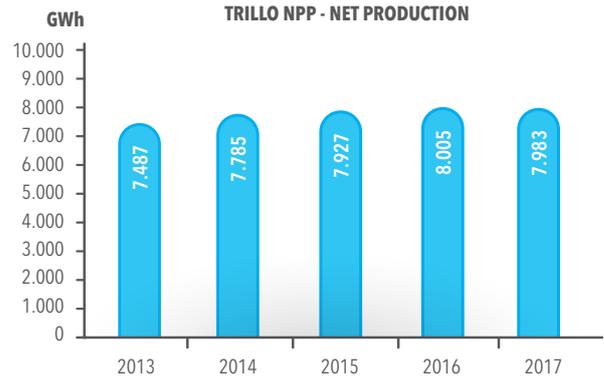
Improvements made in this financial year include the installation of the Filtered Containment Vent System and the start of design modifications related to the change from DPT containers to the new ENUN 32P containers from ENSA. This is a passive system designed so that, in normal operation as well as in case of abnormal events and postulated accidents, it maintains safety functions: structural integrity, confinement (non-dispersion of radioactive material), heat dispersion capacity (integrity of the fuel), shielding capacity (maintenance of the dose to workers and the public below the established limits) as well as sub-criticality and recoverability of fuel elements.

In June about one hundred civil guards and media belonging to the Air Service, the Rural Security Group (GRS), the Immediate Response Protection Unit (UPRIM), the USECIC (Citizen Security Unit HQ) and Citizen Security Service agents, participated in a drill at the Trillo Nuclear Power Plant, which was also attended by representatives of the Nuclear Safety Council. The Annual Internal Emergency Drill took place on 16 November with an imagined fire at a safeguard diesel, an event that triggered the Internal Emergency Plan in Category II.

TRILLO NPP - GROSS PRODUCTION



TRILLO NPP - NET PRODUCTION



# ACTIVITY REPORT

## REFUELLING OUTAGES

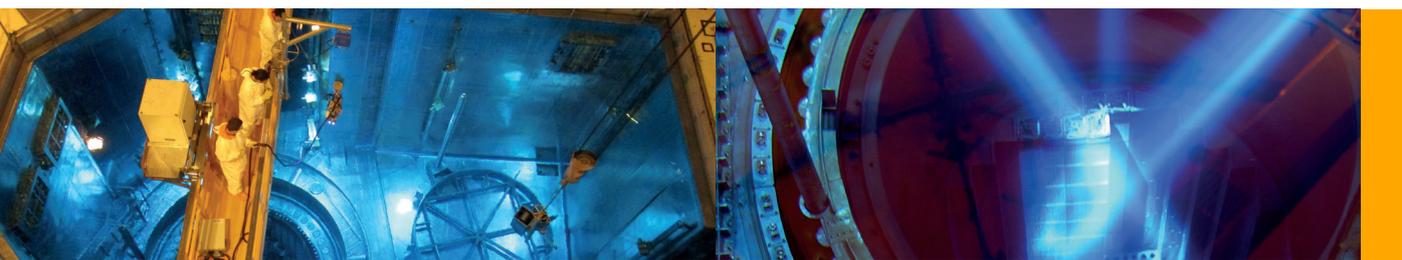
### ALMARAZ PLANT

The twenty-fifth refuelling and general maintenance of Unit I took place during the first-half of 2017 from 26 June to 29 July.

During this period, activities included fuel unloading, steam generator inspections and fuel loading. Safeguard trains maintenance, penetration maintenance and work on the turbogrupo were carried out in connection with inspection and testing of the alternator and replacement of the exciter, as well as maintenance

work on the primary and secondary systems, and implementation of design modifications, including installation of the Filtered Containment Vent System and another related to the new turbo-pump control for the auxiliary feedwater system.

In the 32 days that the refuelling took, more than 9,000 activities were performed and 1,200 additional workers were involved, the majority from Extremadura.



### TRILLO PLANT

The twenty-ninth refuelling and general maintenance of the Trillo Plant began on 5 May and ended on 3 June. During the refuelling, approximately 3,700 activities were carried out, including installation of the Filtered Containment Vent System which was particularly important.

Refuelling activities included replacement of fuel elements and inspection of seals in a main pump of the primary circuit, ultrasonic inspection in the main pump housing of the primary circuit, visual inspection of the tubular plate and cleansing of

the steam generators, pressure test of the reactor containment, and capacity testing of the DC batteries. The body of the high pressure turbine, main steam pilot valves and the isolation valve was also checked.

1,000 workers from 40 specialised companies joined the usual staff of the Plant to perform the scheduled work. This refuelling resulted in the lowest total collective dose since the plant began operations.

## ■ RADIOLOGICAL SAFETY AND PROTECTION

During 2017 the installations operated completely normally, without producing any significant incidents affecting nuclear safety or radiological protection, neither to employees, nor the plant environment.

The results obtained from the measurements performed show the dose rate for professionally exposed personnel was once again well below

legal limits. In the case of Almaraz NPP, the staff collective dose totalled 424.42 mSv per person for the combination of the two units, and at the Trillo Plant, the dose totalled 166.63 mSv per person, the lowest collective dose recorded since the plants started operations.

## ■ TECHNOLOGICAL UPDATING

During 2017, CNAT continued the investment plan as part of the process that has been implemented over recent years to improve safety, as well as maintaining plant availability by renewing obsolescent equipment.

As part of the **renovation plan due to obsolescence**, the following actions were covered:

### **Almaraz Nuclear Power Plant**

- Replacement of power supplies and I&C cards, with the purchase of Foxboro cards to increase stock due to the cessation of manufacturing.
- Modernisation of the auxiliary power water turbo-pump control in Unit I during which the existing control unit was replaced by a new digital one, qualified according to the EPRI dedication guides for digital software, and this renewal was completed and modernised at both units.
- Implementation of the new electric power measurement system (cross flow) in Unit I, which is planned for installation in Unit II during the first quarter of 2018.

- Implementation in Unit I of the new cooling units in the Switch Room that use a new refrigerant gas that does not have adverse effects on the ozone layer.



New Switches Room Cooling units

These new cooling units will be replaced during Unit II refuelling in April 2018. In addition, detailed design of the modifications required to replace the Control Room Cooling units, which also use a new refrigerant gas, has been completed. Deployment of these new Control Room units will begin in 2018, and they are scheduled to begin operations during the first quarter of 2019.

## Trillo Nuclear Power Plant

- Replacement of S5 technology controllers, cards and automated controllers.
- Installation of the vessel new level measurement system during refuelling.
- Launch of the modernisation project for the H&B actuators, on completion of the detailed design of phase 1 to be implemented during the 2018 refuelling.
- In the electrical area, assembly of the new Safeguard rectifiers has been completed, as well as detailed design of the modification in which the GZ40 rotary converter was replaced by two redundant static inverters equipped with a static automatic transfer bypass of the supply, to be implemented during the 2018 refuelling. Manufacture of the new equipment was completed in 2017.



New Safeguard rectifiers

### Activities associated with safety improvements include the following:

- In 2017, the assessment of the documentation submitted for the transition to fire protection regulations (NFPA 805) was received from the NSC. The commitments acquired from the NSC to close the evaluation will be resolved during the first half of 2018, and the design of some of the modifications identified in the analyses is already in-hand for implementation in 2018 and 2019.

- Detailed design of the required modifications for channelling and collecting oil leaks from the motors of the 3 Reactor Cooling Pumps, OSPS project (Oil Spillage Protection System) has been completed for both Almaraz NPP units. One tank will be available per pump for the collection, with sufficient capacity for the entire oil inventory (1000 litres per pump). These modifications will be implemented during the Almaraz refuellings during 2018 (April-May U-II and November UI). Activities associated with the IS-30 will be terminated with this implementation.

- Trillo NPP continued this year to implement modifications derived from IS-30, and the improvements corresponding to the expansion of the fire protection detection and extinguishing systems in the main areas of the plant are of note. In addition, the status of the passive protections has been inspected, and the programme to review identified improvements is currently in progress.

- Installation of the new Filtered Containment Vent System has been completed at both plants, enabling containment to be vented in a controlled manner at pressures around the design pressure following an accident beyond the design bases of the plant. All the modifications committed to following the analyses after the Fukushima accident are considered to be completed with this implementation.

- The design modifications required to comply with MINETAD's conditions for starting-up the Filtered Containment Vent System are currently in progress which requires installation of an activity meter in the filter discharges and a team to take samples in the discharge of each filter. These modifications will be implemented in 2018 and 2019 at both plants.



New Filtered Containment Vent System CNT

New Filtered Containment Vent System CNA

- Detail design of the modifications required to handle risks resulting from an open phase condition (OPC) in the power transformers from 132 KV (Trillo), 220 kV (Almaraz and Trillo) has been completed at both plants and 400 kV (Almaraz and Trillo). These modifications will be implemented at both plants throughout 2018.
- Activities related to the CSN Technical Instruction have continued, following guide NEI 09-10,

concerning the prevention and management of gas accumulation in pipelines. These actions, which affect various systems at both plants, have already begun at Almaraz NPP (2017-2018) and the required preliminary studies are underway at Trillo NPP, with a view to implementing the improvements identified during the period (2019-2021).

In relation to the management and storage of spent fuel, the construction of the Independent Spent Fuel Storage Installation (ISFSI) as well as its interconnection with the Plant was almost completed at Almaraz NPP at the end of 2017, and at Trillo NPP, as a consequence of the container model change, activities required to adapt the facilities and the current ISFSI to the new ENUN 32P model have been completed, and trial runs required prior to container loading are in progress. We are waiting for approval by MINETAD of Rev.4 of the ENSA Safety Study for the new ENUN32P container, in order to submit the Authorisation request for start-up and fuel loading in both plants.



CNA ISFSI facilities

Movement of the container in the Fuel Building (CNA)

Maneuver of lifting (CNT)

Trolley transfer ENUN32P (CNT)

# ACTIVITY REPORT

## QUALITY

Quality is intrinsic to all activities at CNAT and is the main source of confidence for our owners, the social environment, employees and business partners. Since 1995, CNAT's commitment to quality has been recognised by the Spanish Association for Standardisation (AENOR) by granting an official certificate, which certifies compliance of our Quality Management System with the UNE EN ISO 9001 standard for the production of electricity from nuclear sources. In 2017 AENOR performed a follow-up audit to maintain certification of our Quality System and found it to be satisfactory.

Voluntary international evaluations were also requested to determine the degree of excellence of the organisation. These include the WANO Peer Review, independent evaluation by a group of international experts, who in January 2017 carried out a Follow-up at the Almaraz Nuclear Power Plant, and in October, a Peer Review at the Trillo Nuclear Power Plant, in both cases satisfactory overall results were obtained. In addition, WANO Technical Support Missions (TSM) were requested, to evaluate specific

aspects with reference to industry best practices, such as in 2017 the Factory Supervision TSM, the Indicator TSM and the Independent Nuclear Supervision TSM, all of them corporate.

Continuous Improvement is part of CNAT's organisational culture and that is why we manage annually about 5,000 corrective and improvement actions, which originate not only from independent internal evaluations (Quality Assurance audits and inspections), but also from activity and process self-assessments by the units themselves. In addition, trend analyses of low level incidents are conducted to enable preventive actions to be identified to avoid incidents of greater severity.

# ENVIRONMENT

## — ENVIRONMENTAL QUALITY MANAGEMENT

A.I.E. CC.NN.'s commitment to respect the Environment is expressed in the organisation's Environmental Policy.

The Environmental Policy drives application of the Environmental Management System and its continuous improvement, reflecting the Board's commitment and constituting the

starting principles on which the annual objectives programme is based, and in more general terms, activities of the company in relation to the Environment.

## — ENVIRONMENTAL POLICY

The mission of A.I.E. CENTRALES NUCLEARES ALMARAZ-TRILLO is to produce electricity in a manner which is safe, reliable, economic, respectful of the environment and which guarantees production over the long term, by optimum operation of the Almaraz and Trillo nuclear power plants, and an Environmental Policy has been defined appropriate to its nature, magnitude and environmental impact, which serves as a reference for the establishment and review of objectives and environmental aims, and based on this, it commits to:

- Comply with the environmental legislation in force and other voluntarily accepted requirements, whilst maintaining an attitude of ongoing adherence.
- Fully integrated the environmental dimension and respect for the natural environment, in the strategy of the organisation.
- Take note of and evaluate the opportunities and environmental risks in relation to activities performed, to guarantee achievement of the expected results.

- Operate installations with respect for the environment, identifying, preventing, controlling and minimising as far as possible, the environmental impact of its activities.
- Continually making improvements to all processes which could have environmental repercussions.
- Controlling and reducing, as far as reasonably possible, leakages, and conventional and nuclear waste.
- Motivating and training staff to respect the environment, stimulating development an environmental culture and communicating the Environmental Policy within and outside the Organisation.
- Report, in a transparent manner, environmental actions and results, maintaining the appropriate channels to encourage communication with interest groups.
- Introduce and maintain updated a standard Environmental Management System.

# ENVIRONMENT

## ACTION PLANS

Almaraz-Trillo Nuclear Plants have continued to perform significant activities in relation to environmental issues during 2017, which are incorporated in the Environmental Management Programme, the most significant of which are detailed below:

- Reduction of the production of radioactive waste: optimisation of the design to minimise leakage of chemical products with impact on the generation of radioactive waste, and material declassification methodologies.
- Enhancing Legionella control in cooling towers, by changing the tower filling.
- Modifications to chillers with a view to the complete elimination of the use of fluorinated gases impacting the ozone layer.
- Control of environmental impacts in the aquatic environment: implementation of an oxygen and temperature telemetering system

in the Arrocampo reservoir and reduction of the need for cleansings in the Trillo NPP catchment, through the installation of a floating barrier.

- Reduction of the risk of spills of chemical products.
- Actions to reduce the consumption of paper and toner throughout the organisation.

With regard to high level waste constituted by spent fuel extracted from the reactor, Almaraz began the construction of an Independent Spent Fuel Storage Installation (ISFSI), after having obtained a favourable Environmental Impact Declaration Resolution issued by MAGRAMA and the corresponding administrative authorisation from MINETAD.

The project was implemented throughout 2017 and is almost completed.

## ENVIRONMENTAL AUDITS

The Environmental Management System of Centrales Nucleares Almaraz - Trillo A.I.E has been certified since 2005 by AENOR, in accordance with the international standard UNE-EN-ISO-14001.

Adaptation to the updated version of the UNE-EN-ISO-14.001: 2015 standard was carried out in 2017, and from 18 to 21 September 2017, the Environmental Management System Audit was carried out by AENOR INTERNACIONAL SAU and was found to be "compliant".

The auditors inspected the Almaraz and Trillo plants and activities at the Power Plant Offices. Previously, in April, an internal audit of the System was performed, an obligatory part of the verification process.

There were several inspections by the Nuclear Safety Council on subjects related to the environment at both plants.

## ENVIRONMENTAL MONITORING PROGRAMMES

Almaraz and Trillo Plants have historically run several environmental monitoring programmes with the aim of verifying the absence of significant environmental impacts as a consequence of their activities, whether of a radiological or conventional type.

### AQUATIC ECOSYSTEMS STUDY

Basically, two environmental studies are carried out in the surroundings of Almaraz NPP, which includes the Arrocampo and Torrejón reservoirs: an ecological study of the aquatic ecosystem and a thermal study of the reservoirs.

These surveillance studies are far reaching because the Arrocampo must also be considered as another Plant system, as it was built exclusively for industrial use cooling Almaraz NPP, and is used for final heat dissipation and therefore it is necessary to obtain as accurate information as possible about its characteristics in terms of its ability to perform its cooling function, in both the short and long/term. This requires intensive

monitoring and surveillance of both physical and chemical parameters, especially temperature, as well as biological factors.

The environmental study which is carried out in the vicinity of the Trillo plant consists currently of monitoring the river Tajo, where the thermal surplus discharge is made, and the Entrepeñas reservoir, located downstream in the proximity of the Plant.

This study include evaluating the water quality from the physico-chemical viewpoint, and its content of metals and other undesirable substances, as well as the characteristics of other elements of the aquatic ecosystem such as sediments, benthic algae, phyto and zoo plankton and ichthyofauna.

### ENVIRONMENTAL RADIOLOGICAL MONITORING

The Almaraz and Trillo Plants exercise continuous strict control and monitoring of their own



Aerial view of the Entrepeñas reservoir



Aerial view of the Arrocampo reservoir

# ENVIRONMENT

## ENVIRONMENTAL MONITORING PROGRAMMES

radioactive effluent emissions. Nonetheless, with the objective of verifying experimentally the impact radioactive elements might have on the environment, the plants have implemented an Environmental Radiological Monitoring Programme (ERMP) through direct measurement of radiation levels in the surroundings near to the installations, and of the content of radioactive substances from a series of types of environmental samples which are collected from a set of sampling points.

Comprehensive monitoring is carried out on all abiotic elements and living organisms represented in the ecosystems associated with all the natural resources of the surroundings of the plants (air, land and water).

Both Plants collect a large number of samples annually for different types of analysis (gamma spectrometry, beta activity, environmental dose, strontium, tritium and radioiodines).

The usefulness of the analytical results are assured through parallel implementation of a quality control programme by another, independent laboratory, and by the implementation of a programme of independent monitoring (PVRAIN) directly by the Nuclear Safety Council.

Also, in the case of the Almaraz Plant, a collaboration agreement is maintained with CEDEX to enable this official body, reporting to the Ministry of Development, to carry out independent surveillance of the aquatic resources in the proximity of the Plant. Extremadura Council also carries out independent radiological monitoring, with the help of the University of Extremadura.

The results obtained during 2017 at both plants indicate that the radiological state of the ecosystems of their surroundings have experienced no significant variations during the year, with natural background values remaining unchanged, confirming the absence of environmental effects due to the leakage of radioactive elements, rendering radiologically insignificant any leakages from both plants.

### METEOROLOGICAL STUDIES

Almaraz and Trillo plants employ meteorological stations which are used continuously to measure and record the most significant parameters such as temperature, precipitation, wind direction and speed, humidity and solar radiation. The meteorological information is of particular relevance for various applications related to the environment, providing an excellent description of the climate at the site, after thirty years of monitoring.

The stations provide the required redundancy to ensure continuous availability of meteorological information.

## SOCIAL

### PEOPLE MANAGEMENT

Our people are the main asset of Almaraz-Trillo Nuclear Power Plants (CNAT). Their collaboration, commitment and identification with the Organisation are the best guarantee for safe operation of the plants and achievement of the business objectives. Therefore, the human resources policy aims to promote a work environment that facilitates professional and personal development, with special attention to the health and safety of employees.



At 31 December 2017, CNAT employed a team of 851 professionals characterised by their experience and high qualifications: 49% have a university degree. 411 employees are located at Almaraz NPP, 345 at Trillo NPP and 95 in the Headquarters.

There were 43 new recruits during the year and in all cases prior to recruitment to the work place, they received initial training and coaching about their work place functions.

In 2017 Almaraz - Trillo Nuclear Power Plants A.I.E. has obtained the certificate ISO-10.667-2:2011: Assessment service delivery. Procedures and methods to assess people in work and organizational settings carried out by AENOR INTERNATIONAL S.A.U. with the final result of "compliant".

With an average age of 49, CNAT staff is concentrated mainly in Extremadura (48%), Castilla-La Mancha (41%) and Madrid (11%). Also female representation in the different groups within the company stands at 9.98%, and there is an emphasis on the recruitment of young graduates with a broad qualification.

It should also be noted that CNAT staff are continuously supported by personnel from external companies during normal operation of the plants and especially during refuelling.

### PREVENTION OF WORK-PLACE RISKS

All accidents could and should be avoided. Safety and health of people and the integration of prevention at all levels of the Organisation are a priority for CNAT.

During 2017, there were 15 accidents at CNAT, 5 of them were considered accidents with sick-leave. Promotion of awareness and dissemination to the field of matters concerning Occupational Risk Prevention require constant action. To this end, CNAT has initiated several activities this year to achieve the objective of integrating prevention into the General Management System.

With this objective, a total of 104 Prevention Observations have been carried out, and these are an effective tool to promote the integration of prevention and a facilitator for supervision of work on-site. They enable safe behaviours of people to be reinforced, and in addition improve the quality of the work directly by involving managers.

Another important measure to advance awareness of prevention has been dissemination of the "Safety Minute". In 2017, 14 Safety Minutes

## PEOPLE MANAGEMENT

were disseminated, and they were shown at all management and coordination meetings, as well as on the Intranet. This tool has enabled the lessons learned from accidents and incidents to be disseminated, as well as expectations regarding prevention of occupational hazards and preventive measures for the different risks in our installations. In addition, there were awareness campaigns about the use of harnesses and tasks involving electrical risks.

Another relevant aspect in the year was the external evaluation of the CNAT Preventive Culture, and based on it, definition of a Strategic Plan for prevention. These measures will result in the integration of prevention with the CNAT General Management System, as well as the reduction of risks, promotion of the spirit and culture of prevention, and health and safety improvements for all professionals.

In addition, CNAT's Prevention Service has two Health Surveillance units that supervise the health of workers at the three work centres. Specific health monitoring protocols required in accordance with the risk assessment performed by Technical Prevention for each job are applied in medical examinations. Also, this unit performs functions of health care, support in medical emergencies or accidents, and maintains Level I accreditation for caring for irradiated and contaminated casualties.



Regarding the integration of prevention, participation of the line in specific meetings has been encouraged to analyse incidents, investigate accidents, plan improvements and action plans, as well as participation in the coordination of business activities.

With regard to contractors, significant efforts have been made by everyone to comply with CNAT's guidelines on occupational hazard prevention. Several meetings have been held with managers to establish action plans to reduce adverse trends, and a preventive culture index has been defined to classify them, taking into account the number of violations, accidents, incidents and Medical Service attendances for work-related reasons.

## VIDA SALUDABLE

Alimentación saludable  
al alcance de nuestra mano



Recuerda, algunas raciones caseras de referencia serían:

- Un puño cerrado: pasta, arroz, patata, alubias, garbanzos, lentejas, frutos secos. Unos 30g en crudo.
- Los 4 dedos de la mano: pan, ese ancho de una barra normal, equivale a unos 40g, que es una ración.
- La mano abierta, lo que quepa en tu mano: cereales, unos 60g., y fruta, unos 100g.
- Dos manos abiertas y unidas: lo que quepa en ella es la ración recomendada de verduras y hortalizas, unos 100g.
- Palma de la mano: carnes, pescados y huevos. El diámetro de la palma de tu mano, y aproximadamente 1-2 cm de grosor es una ración de carne y pescado para ti, unos 120-150g. En ese espacio se acoplan 2 huevos medianos, unos 120g.
- Punta del pulgar: aceite o mantequilla, aproximadamente una cucharadita de postre.
- Distancia puño-codo: una botella ancha de agua, equivale a 2 litros de agua, que es el aporte medio diario estándar para un adulto sano.



With the aim of maintaining the health of our workers at the highest quality standards, specific Health Surveillance activities, and a health promotion programme titled, "2017 Healthy Company Plan" were also introduced in the Preventive Activity Planning for 2017.

Throughout the year we continued with screening campaigns for colon cancer (occult blood in stool), oral health, melanoma prevention and dermatological and eye health pathology through non-mydratic retinography. An article on "Recommendations for a healthy diet" was also published in the internal magazine, "Mundo CNAT". All information sessions and campaigns have been very well received.

## TRAINING

The skills of individuals working for the Almaraz-Trillo Nuclear Power Plants are one of the priority interest areas, and for that reason CNAT has permanent resources devoted to planning and developing annual training plans for each work centre, not only with regard to initial training, but also for refresher-training and training in management skills.

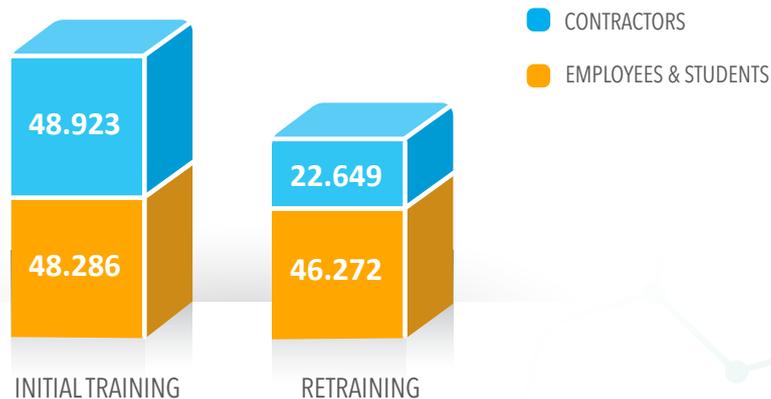
In 2017, 534 initial and retraining courses were provided, which resulted in **166,131 hours of training** for **5,000 workers**, including future plant operators (21 young students in training).

The part of the training programme dedicated to refresher-training represented 41%, and that corresponding to initial training was 59%.

During the year, **829 CNAT employees** (97.4% of the total) participated in training activities, totalling **61,328 training hours**, and the average training hours per employee was 74 hours. Training programmes for future plant operators prior to joining the workforce, resulted in more than **33,230 training hours** during the year.

In regard to monitoring the qualification of contracting personnel, CNAT continued to encourage improvements in their training by providing support for planned training activities, and by arranging specific training sessions for these workers. In 2017, **71,573 training hours** were dedicated to **4,150 workers belonging to contracting companies**.

### GENERAL BREAKDOWN OF PROGRAM 2017 (hours)



# SOCIAL

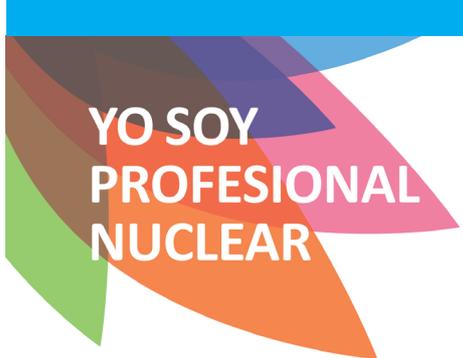
## PEOPLE MANAGEMENT

### INTERNAL COMMUNICATIONS

Internal communication has a fundamental and cross-company role within CNAT. In this regard, the Internal Communication programme in the CNAT Action Plan (2017-2021) was developed during 2017 with the objective that Communications be considered a basic part of the responsibilities of CNAT' managers.

CNAT employees use various communication channels provided by the company including the internal magazine "Mundo CNAT" and the monthly newsletter "En 5 minutos".

During 2017, several internal communication campaigns were launched to help meet corporate objectives. For example there was the campaign "Yo soy profesional nuclear" to promote compliance with CNAT's General Expectations, and others focused on internally disseminating the CNAT Business and Leadership Model.



## YO SOY PROFESIONAL NUCLEAR

*"Cumpló y me adhiero a los valores asociados a las Expectativas Generales de CNAT"*

**EXPECTATIVAS DE COMPORTAMIENTO PARA TRABAJAR EN CNAT**

- SEGURIDAD NUCLEAR
- SEGURIDAD PERSONAL
- PROTECCIÓN RADIOLÓGICA
- PROTECCIÓN CONTRA INCENDIOS
- NORMAS Y PROCEDIMIENTOS
- DESEMPEÑO PROFESIONAL
- SENTIDO DE PROPIEDAD
- CUALIFICACIÓN
- COORDINACIÓN Y TRABAJO EN EQUIPO
- APRENDIZAJE Y MEJORA CONTINUA
- RESPONSABILIDAD MEDIOAMBIENTAL
- SEGURIDAD FÍSICA

Colaboran:

- ALMARAZ TRILLO
- ABENGOA INABENSA
- AREVA
- BURTON
- elecnor
- ELECOR
- Falck SCI
- GDES
- GHESA
- moncobio
- OMEXOM
- SIEMENS
- siemsa
- TAMCIN
- tecnatom
- Westinghouse

## RELATIONS WITH SOCIETY

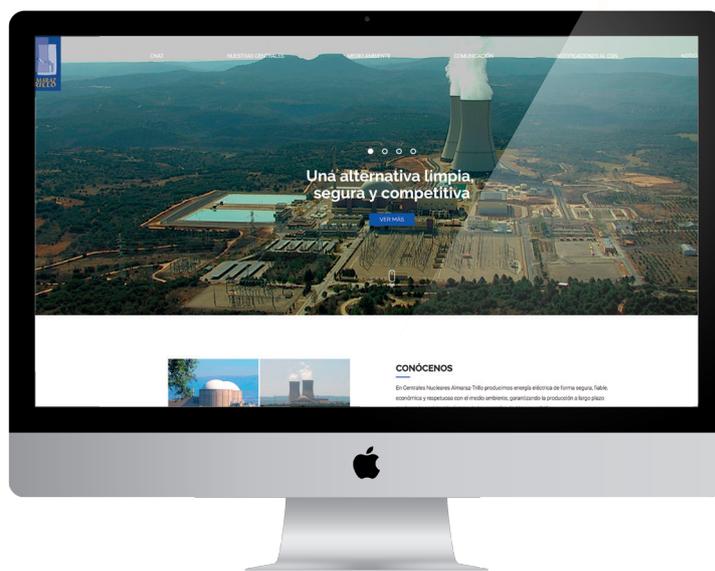
CNAT continues to have direct, fluid and stable relationships with institutions in surrounding areas, and in 2017 biannual meetings were held, two at each plant, with the mayors of nearby councils and with the media. All the information concerning operational results is presented at these meetings together with news about future plans and projects. 156 personalised meetings were also held with mayors of surrounding councils to study on a bilateral basis the relationships of the Plants with each municipality and potential collaboration channels. In addition, this year the management of both plants are actively involved in local Information Committees, convened by MINETAD, and they provide any information required whenever necessary.

The commitment of Almaraz and Trillo NPPs to their neighbouring communities is reflected in the cooperation agreements that have been renewed in the social-economic and environmental fields, and educational development projects.

In the same way, CNAT has renewed cooperation agreements with news and press agencies most representative of the Plant environs, and these are used to promote the training and specialisation of Information Science final year students on nuclear sourced electricity production. Also, a course on nuclear technology for media professionals is provided every year at our facilities in Trillo.

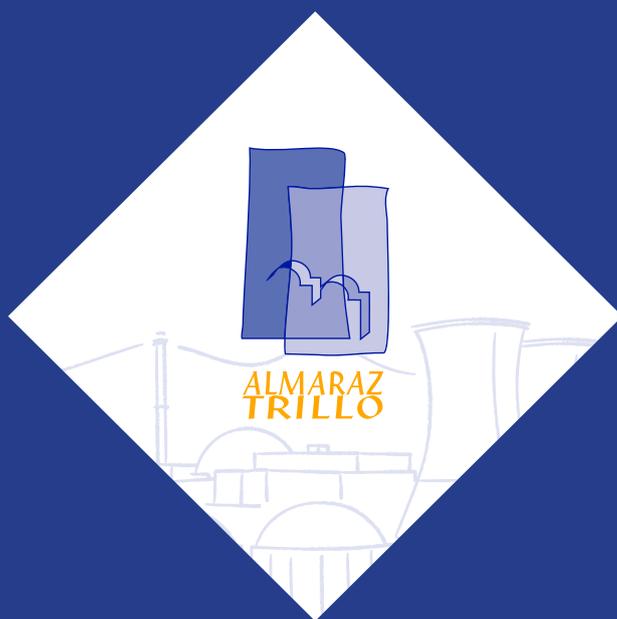
The informative actions by CNAT on nuclear energy and operation of its plants are evidenced by the welcoming of 6,883 visitors this year to the Information Centres, (2,883 at Almaraz and 4,000 at Trillo). Between the two Plants, over one million people have visited the Almaraz and Trillo installations since they began operating in 1977 and 1981 respectively.

In addition, both the web site ([www.cnat.es](http://www.cnat.es)) and the blog [www.energiaymas.es](http://www.energiaymas.es) provide interesting information about plant activities and their environments, and contribute to this effort to expand dissemination of information about the nuclear world.



To ensure continuous improvement of the quality of products and associated services, CNAT ensures that its suppliers are aware of and participate in the company's work processes and protocols.

Trading volume in 2017 was € 271.4 M. Of the total number of identified suppliers (973) with contract awards, 93.42% (909) are domestic suppliers.



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