The IMOURAREN Project
(Niger)

Discovered by exploration teams from the French Atomic Energy Commission (CEA) in 1966, the Imouraren deposit is located 160 km north of Agadez, 80 km from Arlit, and 1,200 km from Niamey, at the southern edge of the Sahara.

The orebody is between 105 and 170 meters below the surface, with an average grade of 660 grams of uranium per tonne of extracted rock. In 2006, favorable conditions in the uranium market made the mining of such a deposit feasible, and AREVA restarted the project.

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The Imouraren site covers 500 sq. km in the southern Sahara. One of the largest uranium mines in the world, it will double Niger’s production and make the country the world’s second-ranking uranium producer.

Characteristics of the project

Type of mine: open pit

Objective: use an innovative processing technique on a large scale and mine an extremely large uranium deposit

Investment: more than 1.9 billion euros

Nominal uranium production capacity: 5,000 tonnes/year

Life of the mine: 35 years

Ore processing capacity: 8 million tonnes/year

Volume extracted: 4 billion tonnes of waste rock and ore during the life of the mine

Processing method: Acid heap leaching

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STUDIES TO OPTIMIZE MINING OPERATIONS

Mining experts at AREVA have been working since 2010 to optimize the techniques for exploiting the Imouraren deposit, taking into account its specific characteristics. Specialized engineering firms have also conducted numerous studies and laboratory tests to deal with the technical challenges involved.

THREE PARTNERS IN FRANCE AND NIGER

There are three partners with specific roles in this project:

AREVA: project owner
A team of about fifty people based at Paris, Niamey and Imouraren chooses, develops and fine-tunes the mining and ore processing methods. This team also oversees the work at Imouraren.

TSU Projects: lead contractor (TECHNIP–SGN joint venture created in 2008)
A team of 100 to 120 people, it carries out studies and manages procurement and the construction work.

Imouraren SA: operator
The mining company, which hires and trains the 1,800 people who will have to be ready to go to work when the project owner hands over the installations. It prepares the mining site and removes the overburden.

Fati, a female heavy equipment operator:
“I was chosen from among 20,000 applicants in the region. After my training on a simulator, I worked at the SOMAİR mine. I was a good driver, so I was given training to operate the shovels, the ‘king’ of mining equipment. I’m now on a permanent contract and doing my part to see that the project goes smoothly.”

KEY DATES

1966
Discovery of the deposit

2006
New exploration permit

2007
Prefeasibility and environmental impact studies

2009
Mining permit

2010
Operational launch of the project

2012
Start of stripping and excavation

2013
Completion of mining installations

2015
Start of mining
OVERBURDEN STRIPPING

To reach the uranium deposit, the rock lying above is now being removed. These stripping operations require the use of a fleet of heavy mining equipment especially designed for this type of deposit. This equipment includes shovels with buckets that can hold 15 to 35 cu. meters of rock and trucks with a capacity of 220 tons. Workers are also testing the dewatering pumping systems that will be used to remove the groundwater that flows into the future mine pit.

The surface facilities, consisting of tire repair and equipment maintenance shops for the 20-odd pieces of mining equipment as well as refueling, lubrication and washing installations, are also being constructed at the present time.

CONSTRUCTION OF THE LEACH PAD AND ORE PROCESSING PLANT

The uranium will be extracted from the ore using the heap leaching method. This requires the construction of a leach pad – a flat, slightly sloped area covering more than 42 hectares (the equivalent of 60 football pitches) and made impermeable by a layer of compacted clay and a geomembrane liner.

A drainage layer of ore 6 meters thick is formed to facilitate the circulation of the acid solution through the ore heap and the recovery of the uranium-bearing solution at the base.

Treatment of the ore also calls for the installation of various types of equipment for chemical processing (extraction, decantation, washing, drying, packaging, etc.), for which numerical modeling is being done.

CONSTRUCTION OF OTHER INFRASTRUCTURES

While the preceding two operations are in progress, other infrastructures for the mining site are being constructed.

The main ones include the administrative buildings, living quarters, airstrip, roads, telecom and electrical networks (a total of 42 MW of power, half from generators and half from heat recovered at the sulfuric acid plant).

Some 200,000 tonnes of materials and equipment will have been hauled to the site by 2015 for the construction of the mining site – a tremendous challenge in the heart of the African continent.

What is heap leaching?

The ore from the mine is crushed, agglomerated, and then piled up on an impermeable leach pad using mobile grasshopper conveyors and radial stackers. Next, a sulfuric acid solution is dripped on the heaps. This reagent percolates through the ore for several months, dissolving the uranium. The uranium-bearing solution is then processed at the plant to produce yellowcake.
A PROJECT INTEGRATED IN THE REGION

SIGNIFICANT INVESTMENTS TO PROTECT THE ENVIRONMENT

An eco-design approach is being used in the project. As a result, energy consumption at the Imouraren mine has been more than 20% lower than projected in the prefeasibility studies done in 2007. This approach is based on:

- Optimization of ore conveyor lengths
- Installation of a cogeneration system at the sulfuric acid plant. The steam generated by this plant will be used to produce half of the electricity (21 MW) required for activities at the site and to heat the chemical baths
- Installation of the living quarters near the site, thus reducing personnel transport

To minimize the environmental footprint of the mining operations, three protective barriers are provided at the 260 hectares of storage areas:

- An active barrier (geomembrane liner)
- A passive barrier (layer of compacted clay)
- A leakage detection system

A LOCAL ECONOMIC DEVELOPMENT POLICY

IMOURAREN SA currently employs more than 1,500 people, including 270 from AREVA and 1,250 subcontractors. Once the mine is in operation, it will eventually provide 1,800 direct and 3,500 indirect jobs. AREVA is working with authorities on a program to facilitate home ownership in the city of Agadez for mine employees.

By hiring in the region of Agadez, thus providing local employment, and by setting up a program on the Arlit mining sites to train and upgrade the skills of young employees of IMOURAREN SA, AREVA is demonstrating its desire to be an important partner in the economic development of the region.

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