# French Nuclear Explosions in the Algerian Sahara: The Cases of Reggane and In Ekker.

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## Abstract:

This study aims to shed light on the French nuclear project launched through a series of military surface explosions, scientific tests, and several other undisclosed military operations. These activities, carried out by French authorities, caused significant and lasting damage—not only to the specific test sites of Reggane and In Ekker but to the wider Algerian Sahara and even parts of neighboring countries.

The local civilian population was treated as test subjects for studying the effects of nuclear radiation on human beings. This led to a sharp rise in mortality rates, widespread infertility, frequent miscarriages, and a growing number of children born with physical weakness. Cancer rates increased, as did cases of genetic diseases. The damage affected human cells and organs, disrupted immune and nervous system functions, and caused a wide range of other serious health conditions. These impacts violated both the sanctity of the land and the dignity of its people.

**Keywords:** Nuclear explosions, Reggane, In Ekker, radiation, deformities

## 1. INTRODUCTION:

During the 1950s, while Algeria was still under its control, the French political and military authorities saw no better location than the Algerian Sahara for conducting their nuclear military activities. Despite international opposition from both institutions and individuals, and in the face of several UN resolutions and global condemnation, the French government insisted on pursuing its nuclear ambitions and went ahead with detonating its first atomic bomb.

On February 13, 1960, France conducted its first nuclear explosion on Algerian soil. This marked the beginning of a series of nuclear tests in the Reggane and In Ekker regions, which continued even after Algeria gained independence. These tests left behind severe human tragedies, extensive health problems, and long-lasting ecological and environmental disasters.

Given the scope and persistence of these harms, the nuclear tests must be recognized as fully-fledged international crimes. This classification is supported by principles of international humanitarian law, environmental law, and international criminal law.

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This paper contributes to efforts to uncover—even if only partially—the scale and severity of these nuclear experiments. It particularly focuses on the health and environmental consequences endured by the people of Reggane and In Ekker, whose suffering continues to this day.

## 2. The Preparation Phase of the French Nuclear Project

The French authorities began preparing and planning the implementation of their nuclear project, with the aim of enabling France to manufacture weapons of mass destruction, particularly nuclear weapons and bombs. This project can be divided into three main phases:

### A. The Scientific and Research Phase (1946–1951)

During this period, the French Atomic Energy Commission focused on developing scientific research in the field of nuclear energy. It worked to acquire nuclear technology and to benefit from the expertise of French scientists specializing in this field—especially those who had previously worked in the nuclear sector in Canada during the Second World War.

This phase laid the groundwork for the project's timeline and strategic goals. One of the most notable achievements of this stage was the establishment of the Zoé nuclear reactor in 1948. In addition, the French authorities identified key research areas and began building the necessary laboratories. These facilities were mainly located in Grenoble, Saclay, and Chatillon (Dehekal, 2004, p. 48).

### B. The Technical and Material Phase (1952–1956)

This phase was marked by the development of a specialized program aimed at obtaining plutonium and building nuclear reactors. It also involved securing the necessary budget to finance the nuclear project (Belaroussi, 2015-2016, p. 59)During this period, the EL2 reactor was constructed in Saclay in 1952, followed by the G1 reactor in Marcoule in January 1956. The latter was the first French nuclear reactor capable of producing plutonium (Dehekal, 2004, p. 84)

The French government allocated substantial financial resources to complete the nuclear project. These funds were significantly increased at the beginning of 1952, especially after physicist Bertrand Goldschmidt and his research team succeeded in producing large quantities of plutonium. Finance Minister Félix Gaillard took a strong interest in the project. The new leadership of the French Atomic Energy Commission, headed by General Pierre Guillaumat, ensured that all material, financial, and military support was provided to guarantee the success of the French nuclear program (Boujla, December 2015, page 124)

Due to the urgent need for heavy water, a key component for operating nuclear reactors, the French government sought international assistance to obtain elements not available in the global market. It chose Israel as an exceptional partner, given its expertise, knowledge in nuclear weapons manufacturing, and its success in smuggling critical materials needed for atomic bomb production. The Jewish scientist Israel Dostrovsky had notably developed a chemical method for extracting heavy water at low financial and energy costs (Dehekal, 2004, p. 78)

In 1953, France and Israel signed a secret agreement for cooperation in the nuclear field. This included studies related to heavy water and the treatment of relevant minerals. Over time, their relationship became strategic. In 1956, the government of Guy Mollet made the official decision to assist Israel in building the Dimona nuclear reactor (George Le Guelte, 1997, p. 208)

### C. The Preparatory and Field Phase (1957–1960)

By this stage, the French government, its military, and the Atomic Energy Commission had completed all the scientific and technical groundwork for the military nuclear project. The first atomic bomb had already been built. It now existed as a physical weapon, ready for testing, to evaluate the effectiveness of French nuclear research and measure the destructive power of this new technology—both on humans and the environment.

The first key step in this final stage was selecting a suitable location for nuclear testing and setting a timeline. In 1957, France officially announced that the first nuclear test would take place on March 31, 1960. Later, on July 22, 1958, General Charles de Gaulle made the final decision to conduct the nuclear explosion during the first quarter of 1960 (Boujla, December 2015, page 124)

As for the test site, several exploratory missions were carried out in areas proposed as potential test ranges. On January 10, 1957, a mission led by General Charles Aillert was dispatched to the Algerian Sahara to assess the nuclear testing grounds. As a result, three sites were selected: Reggane in Adrar, Taurirt Afella, and Tikrartine in Tamanrasset. (Suri and Bin Sahla, Thani Bin Ali, 2022, pp. 371-372)

In June 1957, the French high command officially selected Reggane 1 in the Adrar region as the site for its nuclear experiments. That same year, the Law for the Establishment of the Joint Saharan Zones (OCRC) was issued. On 13 June 1957, the Ministry of the Sahara was created and placed under the leadership of Max Lejeune (Boujla, December 2015, page 127)

A Nuclear Explosions Committee was also formed. It was chaired by General Crépin, assisted by Pierre Billot and Marc Larimondie. This sub-committee, part of the Directorate of Military Applications, included around 30,000 individuals: military personnel, scientists, engineers, and technicians (Charles Ailleret, 1968, pp. 265-348)

All nuclear research centers in France began preparations for the first nuclear detonation. One of the key facilities was Bruyères-le-Châtel, which housed departments of experimental physics, chemistry, and electronics (Al-Haik, 1993, p. 77). Additional reactors were built through a partnership between EDF and the French Atomic Energy Commission (Alain Peyre Fitte, 1994, pp. 52-13)At this point, theoretical research and physical components were in place, ready to be implemented in the field.

## 3. French Military Experiments and Surface Nuclear Explosions in Reggane

The Hammoudia area in Adrar witnessed several surface nuclear explosions and scientific tests in 1960 and 1961. These included officially unannounced military operations carried out by French forces. The consequences were severe, not only for the immediate test zones but for

the entire Algerian Sahara and surrounding regions. The most notable nuclear activities included the following:

### A. The First French Nuclear Explosion: Blue Jerboa

In the 1950s, French authorities conducted a series of surveys deep in the Algerian Sahara. Eventually, they selected Reggane, in the Touat region, for surface military and nuclear tests beginning in 1957 (Al-Mahrazi, 2019, pp. 15-16). Coordination took place internally with the Joint Command for Special Weapons and the Ministry of Defense in Paris, and externally with other nuclear states to position France within the Western Nuclear Affairs Directorate (Poirier, 1988, p. 295)

The French government allocated major funding to prepare and equip the Reggane nuclear test base. The rose budget from 56 million French francs in 1958 to 208 million French francs in 1959, and then to 2.85 billion francs by 1960. Additional support was provided by the Saharan Solidarity Fund and the African Investment Office. The region came to host approximately 6,500 French military and technical staff, including scientists and engineers, along with 3,500 Algerian workers who were assigned to build civil and military infrastructure for the Saharan Military Test Center (CSEM) (Dehekal, 2004, p. 87)

The Algerian laborers were responsible for excavation and construction. To accelerate their work, they were misled into believing the project was part of the Constantine Plan, announced by General de Gaulle in 1957. They were told Reggane would become a “second Paris” (Kamoun, 2020, p. 34)On this point, Abba Saïdou, who worked at the Hammoudia test field, counted: “We were working in Hammoudia doing construction, digging tunnels, laying pipes, installing and connecting channels—summer and winter. But they never discussed the explosions with us. We were preparing for them without knowing (Al-Mahrazi, 2019, p. 43)

The French military authorities did not stop at forcing the residents of Reggane and nearby areas into the nuclear project. They also brought in prisoners and detainees from northern Algerian cities to work at the Reggane test site. AlChay Gouider, from Algiers, recalled: “The day the Skikda region was encircled by French forces, I was arrested in a local café and taken to a detention center. After six days, they asked why we weren't working. We said we were unemployed because we had no jobs… One day, the camp commander told us he found us work. They moved us in a 'Fourgon' truck to Casablanca airport, then to Reggane after confiscating our papers and giving us identity cards. Upon arrival, we began working in the large tunnel at the Military base… I did not know what this work was for, but after the explosion, when the thick smoke, dust, and wind rose and the earth shook, I realized there had been a bomb...” (Istanbul, pp. 201-202)

Mohamed Snafi, also from Skikda, had a similar account: “I was unemployed when arrested in 1960. They took us to the Mauriati barracks and prison, where we suffered insults, beatings, and torture. After one year, they offered us work in the desert. Without waiting for our answer, they moved us by truck to Casablanca airport and then flew us to Reggane. There, they put us in a warehouse and split us into work teams of six. Our task was to follow orders and perform various manual jobs. The French wore white suits and large masks. We wore blue worker uniforms and smaller masks. We were ordered to collect debris, including rocks and rubble. The French were always at the tunnel—before and after the test we were building it.(Istanbul, pp. 202-203)

Once excavation and site preparation were complete, the French authorities deliberately exposed thousands of local residents and all Algerian workers present at the test site to nuclear explosion hazards—specifically its light, heat, and radiation. Meanwhile, they immediately evacuated families of their military personnel to Adrar, to shield them from danger(Kamoun, 2020, pp. 35-36)

Algerian workers at the Hamoudia test base were subjected to discriminatory, racist treatment. They were given tags with their names and forced to wear them around their necks, lie face down facing away from ground zero, shielding their eyes with their hands. French officers, however, received black goggles and white protective suits(Kamoun, 2020, p. 36)

Reggani Mohamed Ben Hashem**,** who worked as a nurse, reported: "We prepared the locals for everything that might happen after the test. Along with the doctor from Ksar, we checked residents, distributed radiation-detection bands, and advised them to leave their homes on the morning of the test. We told them to lie face down outdoors with eyes closed at the moment of the explosion..." (Al-Mahrazi, 2019, p. 39)

This aligns with the testimony of Akhila Mohamed, who confirmed that residents were used as human samples to measure the extent of nuclear radiation exposure (Younes Mohamed, p. 331).

The French military used various animal species as test subjects in Reggane and In Ekker: camels, goats, dogs, donkeys, rabbits, cats, rats, reptiles, insects, birds, and plants (Jafal et al., 2007, p. 62). Although the International Commission for Protection against Nuclear Radiation and the International Atomic Energy Agency issued safety measures from 1951 onward, France ignored them. It implemented only superficial, nonprotective measures (Al-Jawani, 2022, p. 29)

**B. French Underground Military Tests and Nuclear Explosions in the In Ekker Region**

Following widespread internal and international opposition to France's colonial nuclear tests on the surface of the Reggane region in Hammoudia, and amid growing UN demands to halt such testing (Dahman, 2008, p. 129), France began searching for a new site. The new location needed to be safer, more remote, and climatically suitable for its nuclear agenda. The authorities ultimately selected the In Ekker region—specifically the Takorourmiyat area, located south of In Ekker and close to the commune of Ain Amguel, deep in southeastern Algeria. This site offered mountain chains with granite formations suitable for tunnel drilling (Dahman, 2008, p. 129)

Preparation for nuclear underground testing at In Ekker began in 1960 (Sheikh Moulay Al-Tahami Ghitawi, 2011, p. 212) The French connected the site to water, electricity, telephone lines, and transportation networks. Facilities were built. Around 1,000 Algerian workers were assigned to dig wells and tunnels. Locals, including Tuareg residents, were misled. They were told that France had come to set up a mining zone. Construction began, tunnels and wells were dug, and housing for scientists and soldiers was built. Starting in 1961, horizontal tunnels were drilled into the mountains, with teams working around the clock (Sheikh Moulay Al-Tahami Ghitawi, 2011, p. 213)

Eyewitnesses, including Algerian workers from nearby communities, reported harsh and racist treatment by French soldiers. Many were unaware of the nuclear purpose of their labor. Mr. Mohamed Ben Abdelkader Ba Mohamed, from Ain Amguel, worked at the site starting in 1960. He was assigned to carry electric cables and supply power to the tunnels. He observed French scientists conducting animal tests but never witnessed an explosion. He was dismissed in 1967. He noted that, before each test, the workers were transferred to the Tegormists or Hoggar regions. His experience is echoed by Samu Ben Ansbaghou and Saleh Ben Mubarak Ba Mohamed, also from Ain Amguel (Dehekal, 2004, p. 146)

Tawahria Tahar, born in Illizi, reported: "We slept on-site in prefabricated wooden cabins. Some people lived in tents. The French officers and officials stayed in Ain Amguel, which was relatively far from the site..."

Despite performing hard labor and unknowingly exposing themselves to nuclear waste and radiation, the Algerian workers were degraded by the French, who referred to them with slurs such as "pelouie", a term laden with racism. This was confirmed by Hussein Dihkal and El-Safi Hania in their recorded statements(Dehekal, 2004, pp. 143-145)

Testimonies from those who worked at In Ekker indicate that many of the nuclear underground tests failed. Some tests resulted in visible smoke that drifted eastward due to wind. This contaminated the Mertoutek area. Residents of nearby villages developed health conditions and deformities. Animals and crops were also affected. Large quantities of copper were left scattered on the ground (Istanbul, pp. 207-213)

According to officially released French records, the nuclear underground test program in In Ekker involved dozens of military explosions. In addition, at least three underground tests were claimed to have a scientific purpose.

**Table 1:** Military Experiments and Nuclear Explosions in the Algerian Desert

| Military esoteric nuclear explosions | Scientific esoteric nuclear explosions |
|---|---|
| - Bombing of Agat on November 7, 1961 with a force of 20 kilotons.<br>- The bombing of Beryl on May 1, 1962.<br>- The bombing of Emrod on March 18, 1963 with a force of 10 kilotons.<br>- Amethyst bombing on March 30, 1963 with a force of 20 kilotons.<br>- The bombing of Ruby on October 20, 1963 with a force of 60 kilotons.<br>- The bombing of Opal on June 15, 1964 with a force of 20 kilotons.<br>- The bombing of Turquoise on November 28, 1964 with a force of 20 kilotons.<br>Serious bombing on May 30, 1965 with a force of 20 kilotons<br>- Cogendon bombing on October 1, 1965 with a force of 10 kilotons.<br>- The bombing of Tormelin on December 1, 1965 with a force of 10 kilotons. | The explosion called Opal Ain al-Her, also named Michel, on February 14, 1964, had a magnitude of 307 kilotons.<br>The explosion of the puzzle bomb called Sapphire on February 27, 1965 with a power of more than 120 kilotons.<br>The explosion of centuries on February 16, 1966 reached a magnitude of about 13 kilotons.<br>The power of these three explosions alone was about 145 kilotons and they occurred in the same month of February but in different years, and what distinguishes them from each other is their explosive power and the depth at which they were placed in order to detonate them inwardly. |

| | |
|---|---|
| The military underground nuclear explosions amounted to about 220 kilotons, equivalent to 11 nuclear bombs such as those dropped on the Japanese city of Hiroshima.. | |

This timeline, numeric data, and detailed catalog of France's underground nuclear tests in In Ekker were established, analyzed, and studied based on information found in two tables in the work of Professor Tayeb Dihkal titled “The Municipality of Ain Amguel: Reality and Background of French Nuclear Tests in the In Ekker Region” (Dehekal, 2004, p. 646)

## 4. Divergent International Reactions to France’s Nuclear Tests

The military nuclear activities carried out by France in Algeria had severe, lasting, and wide-ranging consequences. These impacts affected the Algerian desert, neighboring countries, and even reached other parts of the world. As a result, various international reactions emerged. Many condemned and opposed these destructive tests. However, some reactions supported France’s continued nuclear military policy in Algeria.

### 1) France’s Reaction to Its Nuclear Tests in Algeria

The first to welcome and celebrate the French nuclear explosions in the Algerian Sahara was French President General Charles de Gaulle. Just forty-two minutes after the first nuclear explosion in Reggane on February 13, 1960, he sent an urgent telegram at exactly 7:46 AM to Pierre Guillaumat, the Minister Delegate and Commander of the French Armed Forces, stationed in Reggane. In the message, de Gaulle personally congratulated Guillaumat and all those involved in the operation, expressing his appreciation on behalf of the French people. He described the "Blue Jerboa" explosion as a success that made France strong and proud. The most notable line from the telegram read: “Glory to France. Since this morning, France has become stronger and prouder. Thank you from the bottom of my heart to all who contributed to this great success” (Hamilel, 1996, pp. 39–42).

The French authorities described their first atomic bomb detonated in Reggane as a "clean bomb"—free from radioactive danger and fallout. They claimed that even the rising smoke and the resulting nuclear mushroom cloud were normal features of such tests. The government issued an official statement to reassure both domestic and international audiences of the success of the explosion and the safe conditions under which it was conducted. This, they argued, was due to the strict preventive measures taken to protect the workers, local inhabitants, and surrounding areas. The statement also outlined the steps taken to prepare and detonate what was termed the "clean bomb" (Jafri, p. 53).

### 1) Algeria’s Position on the French Nuclear Tests

When the French colonial authorities announced in 1957 their decision to use the Algerian Sahara as a military base and testing ground for nuclear experiments, the National Liberation Front (FLN) immediately rejected these actions. A clear expression of this rejection appeared in an article titled “The Atomic Bomb in Our Desert”, published in the El Moudjahid newspaper—the official mouthpiece of the FLN—on April 15, 1958. This showed that the FLN

was closely monitoring the developments in Reggane and all stages of the French nuclear project in Algeria, despite France's strict secrecy and media blackout (Kammoun, 2020, p. 39).

From its founding on September 19, 1958, the Provisional Government of the Algerian Republic opposed all French activities in the Sahara, especially the preparations in Reggane for the first nuclear detonation. A week after the first test, Mohamed Yazid, Minister of Information in the provisional government, gave a statement to El Moudjahid on February 22, 1960. He said: "The French nuclear explosion carried out in our desert on February 13, 1960, is yet another crime to be added to France's long list. It is a crime against humanity and an affront to global conscience, which had already voiced its concern through a resolution passed by the UN General Assembly."

On the following day, February 14, Yazid also told the Tunisian newspaper L'Action: "France's nuclear tests are another crime added to its colonial crimes. This is not only a crime against the Algerian people but against all humanity. The French authorities ignored the global outcry, the condemnation, and the appeals to stop the tests. These tests represent a threat to all liberation movements worldwide." (L'Action, No. 1339, cited in Jafri, 1960, p. 53)

**2) Arab States' Position on the French Nuclear Tests in Algeria**

Arab states stood united in support of Algeria. Their opposition extended to both the colonial presence in Algeria and the nuclear tests in the Sahara.

**a) Tunisia's Position**

Tunisia, as a government, a people, and through its political parties, firmly rejected the French nuclear tests in Algeria. This position was natural, given the deep bonds of brotherhood and shared destiny between the Tunisian and Algerian peoples. The geographical proximity and the potential health and environmental impacts on Tunisia further fueled this stance.

Opposition in Tunisia began even before the tests were conducted. On January 21, 1960, the ruling Neo Destour Party held a meeting to discuss the French nuclear project being prepared in Algeria. At the end of the meeting, the party issued a statement that declared:

"Since it has become clear that France is determined to proceed with its horrifying nuclear experiment, despite opposition from global public opinion and especially from African nations... we strongly renew our condemnation. This action represents a blatant aggression against African peoples who desire only peace and security." (Jafri, pp. 54–55)

**b) Morocco's Position**

Morocco played an active role in the 1959 session of the United Nations General Assembly, which issued a resolution expressing concern over France's nuclear preparations in the Algerian Sahara and calling for their suspension. In February 1959, Morocco sent an official letter to Paris expressing its opposition to the French nuclear project and urging France to halt its plans (Dihkal, 2004, p. 106).

At the party level, Morocco's Istiqlal Party called for a general strike on February 14, 1960, to protest the French nuclear tests. The strike took place that day from 2:00 p.m. to 6:00 p.m. (Al-Sabah newspaper, No. 2336, 16/02/1960, p. 1).

At the popular level, mass protests were held in Casablanca on January 31, 1960, to denounce France's colonial nuclear policy in Algeria (L'Action, No. 1339, cited in Jafri, 14/02/1960, p. 56).

**c) Libya's Position**

The Libyan government condemned the French nuclear tests at the highest official level. King Idris I described France's actions as an affront to human values. He ordered preventive measures to protect the Libyan population from the effects of the nuclear explosions. On February 15, 1960, the Libyan government submitted an official protest note to the French Embassy in Libya (Dihkal, 2004, p. 107).

**d) Position of the United Arab Republic**

The United Arab Republic issued a statement condemning France's aggression against Algeria. The statement also criticized France for violating the rights of the Algerian people. Both Egypt and Syria saw widespread demonstrations rejecting France's nuclear policy in Algeria. In a statement to the Middle East News Agency, the Minister of Culture and National Guidance, Mr. Abdel Qader Hatem, declared: "As long as the French nuclear tests remain a clear act of aggression against humanity, its hopes and its future, they must be considered a grave violation of the rights of the Algerian people." (Dihkal, 2004, p. 107)

## 5. Divergent International Reactions to the French Nuclear Tests in Algeria

The international response to the French nuclear tests varied. Some states rejected the tests outright, while others expressed support. Most African, Asian, and Latin American countries condemned the tests. In contrast, Western countries and Israel welcomed France's entry into the nuclear powers club through its activities in the Algerian Sahara.

**a) Reactions from African States**

Many African countries strongly denounced the French nuclear experiments in Algeria. Several called on France to stop the tests immediately. Others took even more forceful positions.

**– Republic of Guinea:** Guinea threatened to cut diplomatic relations with France if it continued its nuclear policy in Algeria. This was reported by Radio Conakry. The official protest issued by Guinea was particularly firm. President Sékou Touré accused the Federal Republic of Germany of providing financial and technical assistance to France in the development and production of its first nuclear bomb in Reggane. This accusation led the German Foreign Ministry to issue a formal protest and deny any involvement in France's nuclear program (Jafri, pp. 59–60).

**– Ethiopia's Position:** Ethiopia, both at the government and popular levels, condemned the French nuclear tests in the Algerian Sahara. It expressed its firm opposition to all weapons of mass destruction, whether in Africa or elsewhere. Ethiopian media also reflected this stance. The Voice of Ethiopia newspaper wrote: "If France wants to challenge global public opinion and insists on continuing its nuclear experiments, it should carry them out on its own territory, not on African soil." (Jafri, p. 60).

**b) Reactions from Asian States**

Asian countries aligned with the global position rejecting France's nuclear tests in Algeria. Among these, North Korea submitted an official protest to the French government through diplomatic channels, denouncing the nuclear tests as criminal acts. The Soviet Union also expressed strong opposition. The TASS news agency reported:

"France conducted a new nuclear explosion on March 18 in the desert, on the territory of the Algerian Republic. In this regard, the Soviet authorities consider France's actions a direct challenge to global public opinion." (Belaroussi Abdel-Fattah, 2022, p. 178

**c) Reactions from Western Countries**

Most Western governments supported the French position, particularly France's allies in Western Europe. These governments issued statements welcoming France's entry into the nuclear club. Several also sent congratulatory messages to the French President and government, celebrating the successful detonation of what was described as a "clean atomic bomb."

However, this official stance did not reflect public sentiment. In many of these countries, large-scale protests took place. Demonstrators gathered in front of French embassies in various capitals, voicing rejection and condemnation of the nuclear tests. (Jafri, pp. 60–61)

**d) Position of the Zionist Entity**

It is not surprising that the Zionist entity, which partnered with France in its nuclear program in the Algerian Sahara, was among the first to celebrate the military success of the nuclear experiments. Although no official statements were issued by Israeli political leaders—likely due to the sensitivity of the subject and the presence of Jewish scientists and military personnel in Algeria at that time—Israeli newspapers reported that: "France's nuclear experiment is joyful news for France and of great significance for the entire Western world." (Jafri, pp. 60–61)

**e) Position of the United States**

The U.S. Department of Defense welcomed France's first nuclear detonation in Algeria in 1960. It considered the bomb "clean" due to the safety measures adopted by French authorities to protect workers, local populations, and the surrounding areas. On February 17, 1960, U.S. President Dwight D. Eisenhower gave a press statement in which he expressed hope that negotiations to limit the nuclear arms race would continue. He described France's nuclear experiment as expected and logical. (Dihkal, 2004, p. 106)

## 6. Effects and Fallout of the Nuclear Explosions

While the French celebrated owning the nuclear bomb as a symbol of power among great nations, the same act had dire consequences for the people of the Algerian Sahara. The radiation

contamination affected both the environment and human health in both the short and long term. Whether surface or underground, the detonations had catastrophic results across the region (French nuclear tests in the Algerian desert, a study on the nuclear explosion in Reggane, February 1, 1998, page 11) Victims of the tests, as well as former site workers, agree that the fallout caused severe and irreversible effects. The president of the "13 February 1960" association expressed it most clearly: “The worst sacrifice feared by the victims of the explosions is being forgotten.” (Ouguirt, February 13, 2010).

In his view, ignoring the catastrophic consequences on human beings and the environment amounts to a grave crime.

By examining the effects of nuclear detonations in the Reggane and In Ekker zones, it becomes clear that the French authorities knowingly committed numerous heinous acts—acts that may constitute crimes against humanity under international law. Among these are:

1. Wide radiation spread over extensive areas. The fallout polluted the soil, water, humans, animals, and plants. The effects persist and pass down through generations. Safe distances of 100–150 km between tests should have been observed, but were disregarded. This rendered approximately 400–600 km² permanently uninhabitable (Jafal et al., 2007, p. 54)
2. Seismic tremors And vast clouds of dust and intense light stunned many inhabitants. Lack of protection caused cases of blindness. The tests affected regions far beyond detonation sites(Jafal et al., 2007, p. 55)
3. Prisoners of the National Liberation Army 4 Were deliberately exposed to atomic radiation. They were used as test subjects—human guinea pigs—to study radiation's impact. This occurred with clear intent and planning.

Continuing Radioactive Contamination Nuclear expert Bruno Marino, after visiting the Algerian test sites, emphasized the ongoing danger of residual radiation: “Radioactive contamination is still present in debris and scattered equipment at the explosion sites... touching this equipment can lead to serious illnesses, including cancer. Some test locations are not marked on modern maps and remain unknown today.” (Marino, 02-22-2010) He also reported that during a visit in October 2010, he discovered a dead camel, which, upon testing, showed high levels of radiation—evidence that contamination continued to harm wildlife long after the tests ended. (Marino, 02-22-2010).

## 7. CONCLUSION:

The nuclear explosions conducted by France in Algeria stand among the most severe crimes of the colonial era. Their consequences were not limited to a single generation. Instead, they remain a lasting threat to future generations. To this day, France has neither acknowledged its responsibility nor taken meaningful steps to address the damage. The evidence clearly indicates that the test zones remain contaminated. These areas continue to contribute to the spread of disease and the degradation of the natural environment.

Many residents of the Sahara still suffer from radiation exposure. In a televised interview broadcast on Algerian national television (Channel 3) in February 2011, a citizen named Ammar Bejallala—who is not a native of the region—shared his personal experience. He stated: “While serving in the national army in Tamanrasset, I approached one of the nuclear testing areas. After completing my service, I began to suffer from various illnesses and physical

deformities. Medical tests later confirmed that these conditions were caused by nuclear radiation."

Because of the grave and enduring nature of these crimes—crimes that are not subject to statutes of limitation—it is necessary to pursue the following actions:

- Reactivate and accelerate the work of the Algerian-French joint commission sworking on the historical memory file.
- Apply political, diplomatic, and economic pressureon the French government and French investors operating in the region. Algeria must link France's strategic interests in the area to its official recognition of its nuclear crimes in the Algerian Sahara. This includes accepting full historical, ethical, and legal responsibility for its violations of international law during and after the colonial period. France must compensate the victims, rehabilitate contaminated areas, and disclose the full records of its nuclear programs to the Algerian authorities.
- Compile a complete and detailed national fileon France's nuclear tests and explosions in Algeria. This file must be prepared in advance, in case Algeria wishes to submit a formal international claim.
- Encourage Algerian victims of the nuclear teststo bring their cases before French courts, exhausting all legal remedies. This would allow the Algerian state to submit an international claim under diplomatic protection, if it chooses to do so.
- Include the history of French nuclear crimes in the Algerian Saharain the national educational curriculum at all levels, and promote academic and historical research in this field.
- Establish two memorial monumentsin Reggane and In Ekker, to honor the victims of the French nuclear holocaust in Algeria.

**Footnotes and Explanatory Notes**

1. The municipality of Reggane was established by Executive Decree No. 63/421 dated October 18, 1963. Its total area is 124,298 square kilometers. It is bordered to the north by the municipality of Sali, to the south by the district of Bordj Badji Mokhtar, to the east by the districts of Aoulef and In Salah, and to the west by Mauritania. It is located in the southern part of Adrar Province and includes several sand dune fields such as Erg Chech, Erg El Yabes, and Erg Ougdi. The population of Reggane originates from Berber, Arab, and African tribes. See:(Belarussi Abdel Fattah, 2022, p. 211)
2. The name "In Ekker" is a Berber word that means "a branch of a valley." See:(Ziani, no date, p. 141)
3. The nuclear explosions left serious and lasting effects on human health. Among the most significant were miscarriages, increased child mortality, widespread infertility, the appearance of rare diseases, and a noticeable rise in the number of children born with weak or underdeveloped bodies. See: Nuclear Tests in Algeria:(Nuclear Tests in Algeria: Studies, Research and Testimonies, undated, p. 12)
4. This practice is in violation of the Fourth Geneva Convention of August 12, 1949, concerning the protection of civilians during wartime. Article 13 prohibits exposing prisoners of war to health risks, and forbids their use in scientific or medical experiments. It also requires humane treatment of all protected persons. See the full text of the Convention available online.

## 8. List of References


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