

# ENVIRONMENTAL IMPACTS OF ATOMIC BOMB BLAST AT CHAGHAI HILLS IN PROVINCE OF BALOCHISTAN (A SHORT REVIEW)

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**ABSTRACT :** *The main objective of this article is to point out the Environmental impacts of Atomic Blast at Chaghai in region of Balochistan with pros and cons of the present circumstances in Balochistan. Environmental impacts of Atomic Blast at Chaghai have been discussed in the light of the chemistry & economy of Atomic Blast with reference to present international current affairs and the possible recommendations have been envisaged.*

## 1. INTRODUCTION

Approximately 60,000 sq.km. was awarded to Afghanistan under Anglo–Afghan boundary commission decision in 1869. The province of Balochistan comprises of more than 900 miles of Arabians cost lines and Persian Gulf.



Figure-1. Map of Chaghai.

The historical development of nuclear weapons process stems back to 30s of the last century. Its tremendous destructive potential is the based on nuclear combination (fusion) and nuclear break up (fission) reactions. To counter Nazi German atomic bomb project, Manhattan project was launched in

1930 by the United States, Canada and United Kingdom during world war-II. Two atomic bombs were dropped on Japan ending the pacific war in august 1945. During this time USSR also stepped in this race to develop atomic weapons developing more destructive nuclear device namely “Hydrogen Bomb“. After the world war II, the political rivalry aggravated the race for the development nuclear arsenals, leading to the modification of nuclear devices with more destructive potentials.

The basic principle however, was the same. The nuclear fission phenomenon is shown in Figure -2, in which the nucleus of the fissile atom (enriched uranium) absorbs thermal neutron due to which that becomes unstable and splits into two new atoms and so on. The chain reaction thus begins, releasing a tremendous amount of energy.

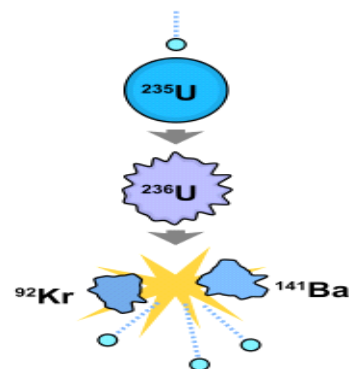


Figure-2. Nuclear Fission

The atomic blast of chaghi-1 as shown in figure-3 was the code name referring to the five underground nuclear tests conducted by Pakistan at 15:15 hrs.(3:15 pm PST) on 28 May 1998. The tests were conducted in secret in Chaghai, a district of the Balochistan province of Pakistan in Fig. 1. The Atomic Blast shown in Figure-3



**Figure -3. Atomic Bomb Blast .**

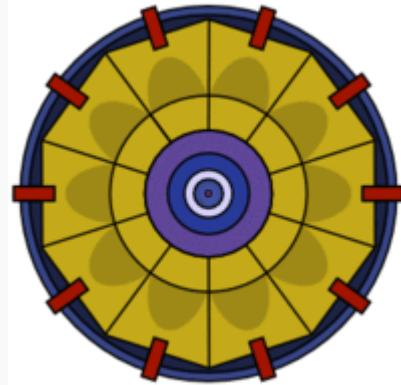
The Chaghai's five tests Atomic Bomb were in the direct response to the Indian second nuclear test blast (operation Shakti on May 11 and 13 , 1998), despite the warnings from big powers of economic embargo from big 8s, especially by USA., yet completed the task to enhance its defence capabilities.

Consequently, Pakistan emerged the seventh nuclear power in the world to successfully developed and publically test nuclear weapon instead of internal fury. Due to uneasy relation of Pakistan with India, Afghanistan and the former Soviet Union the policy of the nuclear power as part of its defense strategy [1] since the independence of India and Pakistan, the India had waged two declared wars against Pakistan in 1947-1948 and 1965 followed by another in 1971. The national security of the country of the Pakistan has endangered reference to economic embargo [2] by United States and its alliance with other western countries , it was offset of conventional inferiority of the country against India to face the advancing Indian Program after 1965, the country Pakistan started struggle to launch a specified and clandestine Atomic Project [3] .

In the making of the nuclear weapon, the Pakistan decision became very clear after the turning point of the war of 1947, with India due to which the east of Pakistan succeeded as Bangladesh. Essentially at the result of which only less than two weeks, 90,000 were taken as prisoners of wars, including Pakistani soldiers and their east Pakistan civilian supporters.79,676 prisoners were uniformed personnel, of which 55,692 were army, 16,354 paramilitary, 5,296 police, 1000 navy and 800 PAF around were taken as POWs by India and as well as the 5,000 sq miles(13,000 km<sup>2</sup>) country territory and the POW returned to Pakistan, which left deep scene in Pakistan's civil society as well as leaving the political and military misery [ 4-5].The armed liberation war and the war of 1971 was an unforgettable experience and lesson to political and military establishment. So, it was clear

defeat of Pakistan, psychological set back that came from the defeat from the hand of intense rival of India due to which half of the territory has lost by Pakistan and geo-political role of Pakistan was seeing dark and also, the existence of Pakistan seemed to be in great mortal and therefore grievously Pakistan should rely on itself [6] to work for the gaining of nuclear weapon.

The Development was initiated in PINSTECH institute [7] in 1974. During this meeting the word of bomb was never used but the participants fully understand the nature of the work. This founded the "Wah group scientists" (denoted as WGS) with US, educated mechanical engineer Hafeez Qureshi as director general. also, during the same time, a new Directorate of Technical Development (DTD) was setup to coordinate work on the various specialized group working in PAEC on design, development and testing of nuclear weapons under chemical engineer Dr. Sheikh Farman reference to complex assembly methods of implosion bomb design was favored over the compared simple gun type method, and the protection of the reactor and weapon-grade and the separation of weapon-grade plutonium isotopes were massive undertakings of the PAEC as the weapon grade plutonium isotopes shown in the Figure -4



**Figure-4. Weapon-grade plutonium isotopes.**

All the five atomic devices were of the spherical-implosion type similar to one in the explanation but the government did not mention anything reference to the detail of the technical sides the tested weapons as public due to its sensitivity.

Fig 4.Shows five possible arrangements of weapon grade plutonium isotopes for spherical implosion devices. Details were never provided to the government of Pakistan for its test due to sensitive preventing in every work and corner of the planet earth.

With first nuclear explosion in the neighboring country India [8] it was inevitable initiate the atomic bomb project on may 1974by Pakistan. The project was accelerated with emphasis on uranium enrichment project, i.e., the Kahuta project. Abdul Qadeer Khan, working as a senior scientist at the URENCO group wrote a letter to Prime Minister of Pakistan Mr. Zulfikar Ali Bhutto through the embassy in Amsterdam reflecting the supremacy of India in the region consequence of which, he was offered a position to join the atomic bomb project in 1976. The Engineering Research Laboratory (ERL) had already been initiated since 1974 under the Directorship of Corps of Engineer, Lt. General Zahid Ali Akbar to build nuclear weapons. Dr Abdul Qadeer Khan with his team

joined ERL to enhance the commercial and weapon grade uranium enrichment. The calculations and weapon designing were completed in the year 1978. The isotopic separations with gaseous diffusion, Ultracentrifuges were accomplished with the help of PAEC. Needless to mention, ERL achieved the enrichment of uranium above five percent and produced the first batch of Highly Enriched Uranium (HEU) fuel rods of nuclear device with code name "Kirana-1 [9] on March 11, 1983. Twenty four more cold test were repeated by PAEC, with which weapon design were tested and improved. Ultimately, which joint venture of teams in ERL and PAEC and indeed efforts spanning over decades, Pakistan under the leadership of Prime Minister Mr. Nawaz Sharif tested its five divers underground nuclear implosion devices in Chaghai Hills [10]

The suitable location for an underground nuclear test preferable in the relief of Granites Mountains was chosen by research scientists of PAEC in the year 1976, the PAEC scientist's preferred the granites mountain Koh.Kambaran in the Ras Koh Hills range in Chaghai division of Balochistan in the year 1978, the cliff of the mountain in the vicinity of ground raised to 3009 meters. General Rahimuddin Khan the then the Governor and Martial Administrator looked after the designing of diverse shaped tunnels throughout 1980s,

In march 2005, the former Prime Minister Benazir Bhutto said that Pakistan owned have had an atomic weapon long before preparation for a nuclear test had been made in 1977, because her father told from his prison cell that he was the initiator of the project. However, the plan was moved on to December 1977 and later it was delayed indefinitely. In an interview with Geo TV, Samar Mubarakmand of the Pakistan Atomic Energy Commission, has said that the team of Pakistan Atomic Energy Commission developed the design of atomic bomb in 1978 and had successfully conducted a cold test after developing the first atomic bomb in 1983 [11].

In April 2010, Mr. Nawaz Sharif informed the audience in a public gathering to celebrate nuclear blasts, that the then US president Bill Clinton warned about imposition of ban on Pakistan otherwise offered a package of US\$ 5-billion for not carrying the nuclear tests [12]. Mr. Nawaz Sharif was on a visit to Kazakhstan to meet the president Nursultan Nazarbayev when India tested an another nuclear weapon [13]. The entire nation of Pakistan pleaded in favor of nuclear tests. Mr. Mushahid Hussain a public figure and politician also advised to carry out the nuclear explosion in response Indian continuing second test. Mr. Sharif gave an interview to Pakistan and India journalists in the year 1999 emphasizing that if India had not exploded the bombs, Pakistan would have never done so, we had no choice left with us to continuing. The bomb blasts due to increasing public pressure [14].

Pakistanis top academic scientists were also united to carry out bomb blasts and posed with Koh Khambran to reflect support for this mission. The PAEC team comprised of team leader Mubarakmand, Tariq Salija, Irfan Burney and Tasneem M Shah (all of them with blue beret). The well-known Abdul Qadeer Khan of KRL seems to be missing on

the occasion and may be represented by General Engineer Zulfiqar Ali, administrator system at Combat Engineering Divisions of the Pakistan Army Corps of Engineer.

Five underground nuclear tests following implosion technology with varying plutonium isotopes at the chaghai site in the afternoon (3:16 pm) of 28<sup>th</sup> may, 1998 [15] were performed. The observation post was located about 10 km from the site where groups of mathematicians, physicists and other scientists remained busy with calculating the radioactive fallout and the yields. The calculation pertaining to precise and accurate yield are cumbersome and difficult even in a controlled environment. Different approaches for calculating the radioactive yields and other scientific parameters were opted for comparing the results. However, the tests on an average yielded 40 kilotons of TNT equivalent to the large over reported device yielding 30-36 kilotons [16]. Seismologists remains unconvinced and estimated the yield equivalent to be no greater than 12- kilotons, the leading US nuclear weapons expert David Albright was skeptical about Pakistan's claims [17]. US scholars approximated from their computers the possible yield range from 12-20 kilotons contrasting the figure of 40 kilotons by the government of Pakistan [18]. Explosions based on implosion technology were accomplished deep underground in grainete rocks, therefore, observation in the vicinal of tested site are more reliable, the intensity of seismic waves generated depends on locations because grainete rocks are surrounded with sand dumps where the intensity speed daily drops.

The mathematical division of PAEC's made the scientific data for the domain of public in light of the fundamentals of sciences [19]. These fundamentals equations obtained by Western observer, Terry Wallace (who applied on both India and Pakistan tests) follows:

$$Mb = 4.10 + 0.75 \log_{10} Y \text{-----}1$$

For the public domain the scientific publications continued and the emphasize measured 5.54 degree on Richter Scale, supporting the claim of the government of Pakistan. Also, the Prime Minister Nawaz Sharif addressed to the whole nation on TV and radio channels and congratulate to the whole nation of Pakistan and also celebrate the nation of the days followed through Pakistan.

This study stress on the Environmental Impacts of Atomic Blast at Chaghai Hills in region of Balochistan and it will be base line data for the researchers in future for the purpose of their research on the issue of Atomic Blast at Chaghai Hills.

## 2. RESULTS AND DISCUSSION

The most devastating of weapons are nuclear arsenals based on technologies of explosion and implosion. One should set a lesson from the history of "Hiroshima and Nagasaki" where enormous radiation fall changed the genetic impulses and behaviour for generations to come and the other example could be sight of Chernobyl power plant nuclear accident. An estimated contamination from Chernobyl is equivalent to a nuclear detonation of about 20 kilotons but was comparable in extent to what might result from a small nuclear war in which a dozen or so weapons of nominal yield were exploded at altitudes intended to maximize blast damage.

Distribution of energy especially the radiation fallout depends on the yield of the weapon, the location of the detonation and the environment in the vicinal of the site energy distribution also depends on the attitude of the location. For example blast of a moderate sinned nuclear weapon in the kiloton range at a low attitude, the energy distribution estimated is to be 50% as blast, 35% as thermal radiations in the wide range of electromagnetic spectrum (Infrared, visible, ultraviolet, soft x-ray, 15% nuclear radiation like  $\alpha$  - particles,  $\beta$  and  $\gamma$ -radiation, 5% ionizing radiations due to neutrons and  $\gamma$  -ray bursts). The split radioactive poisons from the breakup of the nucleus constituting the highly radioactive wastes will cause enormous hazards in the environment.

The nuclear blast in succession of many devastating effects, changes finally into a fireball which grows rapidly and rise like hot balloon. It is estimated from tests that detonation within a millisecond produces a fire ball of diameter 150 meter and a one mega ton air burst. This fire ball increases to a maximum diameter of 2200m within ten seconds and is rising at the rate of 100m/sec. The initial rapid expansion compresses the surrounding a severe and powerful shock wave. Ultimately, the altitude of the location and the blast-site affect air bursts. Surface bursts, sub-surface bursts or

high altitude bursts. It is generally accepted that -implosion as compared to explosion causes relatively less damage with fissioning of fissile fuels provided it is done in sea or sub-surface at a location which is geologically dead or non-active. Our Nuclear tests at chaghai disturbed the international community of the planet earth as a consequence of which the united nations along with sister organization including none of nation condemned and suspended its foreign relations with Pakistan. The nuclear tests at Chaghai Hills in Pakistan were of diverse categories and computable with international standards. These were far superior to Indian and many technology advanced countries nuclear tests. They were afraid of the proliferation of nuclear technologies. Economical sanctions were imposed by international monetary fund on Pakistan.

**Air Bursts.** An air burst explosion is the blast where the altitude of the blast become below 30 km. In such like blasts causes serious injuries on ground and has maximum thermal effects on skin and many significant hazards and such blasts usually use against the troops in ground vicinity. Tactically, air bursts are the most likely to be used against ground forces as shown in Figure-5.

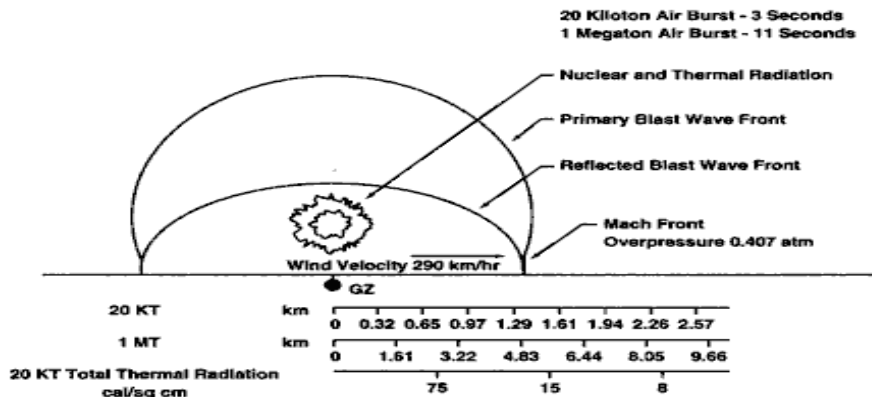


Figure-5, Chronological Development Of Air Burst

**Surface Burst.** In case of surface burst the detonated explosion usually takes place slightly above the surface of the earth and in such like burst the damages and casualties usually less than Air bursts.

**Subsurface Burst.** A subsurface burst is an explosion which usually takes place beneath the surface of the earth but its effects are less than surface bursts .

**High Altitude Burst.** A high altitude burst is one in which the explosion usually takes place above 30 km of the earth and in such blasts more and more casualties usually takes place.

Any near consistence cooperation or collaboration from US was suspended in May 1998 with an exception of humanitarian aid [20]. The US grants and funding were

changed into loans repayable in foreign exchange [21]. All the sanctions were terminated when president General Musharaf allied Pakistan with US in its war on terror. Pakistan's government in the era of General Musharaf, after having its finances improved, ended its IMF program in the year of 2004.

The large section of population residing in the surrounding and vicinity of the Chaghai test site depends upon sheep breeding and agriculture. They used to cultivate fruits like grapes, pomegranates, figs etc and vegetables from some sporadic steams in the Hills. The water in Balochistan is secure with nuclear tests, at adjacent areas and the surrounding locations were changed into a perfect desert, as a consequence of which there is a lingering drought, short fall



**Figure-6. Residents of the arid Chaghai District lack electricity and other basic services**

of perennial rain water, adverse conditions for living and livelihood for people over there, loss of livestock due to death of sheep and cattle and above all the human loss. There is a continuing death toll due to dangerous radiations emitting from the test site.

## CONCLUSIONS

Pakistan, due to avoidable reasons and for her sovereignty, carried out nuclear tests of diverse categories in May 1998 at Chaghai hills terrains in eastern Balochistan. With known facts that high doses of radiations are harmful and cause acute and somatic effects like diseases of various kind including leukemia, gastrointestinal, indigestion, nervous and genetic disorders. It was inevitable to choose a site relatively less populated and merge resources of water. The sparse location is one of the best advantages can be gained. The radioactive fallout is a limitation which we circumvented again considering a location of granite rocks surrounded by sand dunes. The estimated fallout from the blast site is about four thousand miles which can be controlled by pumping molten bright glass to observe radioactive poisons and reduce the temperature of the fireball. We have to think about the problems of the communities residing in chaghai town and the surrounding areas. The shielding materials have to be used for making the perennial water safer from radioactive poisons and radiations too.

As the people of the Chaghai were staging protest against some problems at the results of Atomic testing blasts like that of the agriculture and shortage of drinking water but the government of Pakistan did not ask from the public directly about their problem even that the consequences of the testing of the blasts were similarly to that of the Chernobyl as Professor Dr. Hoodbhy said that the Atomic Energy Commission did not take any environmental protection measurements in the concerned area of Chaghai.

Moreover, at last but not less important, at the result of the Atomic Blast at Chaghi in Balochistan, the foreign countries like India and USA has started intervention in the affairs of

the peoples and public of Balochistan through media and other sources on the regard of Balochs in Balochistan but the Govt. of Pakistan particularly the Army of Pakistan has taken serious steps in shape of packages, fellowships and quota to Balochistan youth in the process of admission and jobs for the compensation of the losses at the result of Atomic Blast at Chaghai and similarly solved the problems created by the foreign countries to the Govt. of Pakistan

## 4. RECOMMENDATIONS

- The Govt. Pakistan should compensate the losses at the result of the Chaghai Atomic Blast particularly to those people who are directly effected..
- The Govt. Pakistan should give more and more packages to the public of Balochistan for the inculcating of the idea of patriotism with Pakistan for the purpose to contribute for their own society.
- More and more facilities should be given to the public youth of the Chaghai to stand them in the annals of other province people.
- For the better environment in the Balochistan particularly in the area of Chaghai, there should be compensation of the damages of the people for the wining of the sympathies of Balochs toward the making of the developing of Pakistan.
- For the purpose of the developing of prosperous Pakistan , the government of Pakistan should emphasize on the developing of education for the eradication of illiteracy and ignorance of the awkward and backward areas of Balochistan .

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