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NUCLEAR ENERGY SPEAKS FOR ITSELF
FROM THE LANDS OF EGYPT

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It is really a pleasure to introduce my self... my name is [THE NUCLEAR ENERGY]

The people who discovered me had different opinions upon determining the date of my birth, but I consider myself born in the year of 1896. In that year uranium radioactivity was discovered by the French Scientist BECQUEREL and that was one of the forms through which the world came to know me.

I consider the year 1896 was the actual date of my discovery, although my reality goes back as far as the existence of the universe itself, and probably before.

I wouldn't tell the story of my life. It is only sufficient to remind the public with my the real beginning of becoming known. Unfortunately, it was absolutely unpleasant one at all. It was 8:15 a.m. of August 6th, 1945 when the first atomic bomb was thrown 1000 feet over HIROSHIMA Port in Japan. It was made of uranium powered 12500 tons of T.N.T.; strong enough to melt bridges, raise temperature up to 10 million centigrades, remove buildings, immediately kill 92,000 people, and to cause severe burns to another 100,000.

Three days later; on August 9th 1945; the second atomic bomb was thrown over NAGAZAKI city in Japan too, this time made of plutonium powered 22,000 tons of T.N.T and killed 25,000 people and injured another 60,000.

Number of victims for both bombs have reached around 120,000 killed and 160,000 injured; totaled around 280,000 out of the two cities population, which was 430,000 only, at that time.

That's how my image became so ugly and deformed by complete destruction and total rack and ruin; which I might had a hand in; in the eyes of the public. Nevertheless, they couldn't realize that I am a double-edged weapon.

So, as I been abused by man's greediness, cupidity, selfishness and even his stupidity for destruction, demolition and killing, on the other hand I have a lot of white hands too in medicine, industry, agriculture and energy production.

From the first moment, that man had felt how far I can be deadly destructive if been misused in military purposes, he is trying hard since to employ me for his own benefit and welfare.

On 29th of July 1957 the International Atomic Energy Agency [IAEA] had come into being, it was the first international move ever to achieve "atom for peace" target. Its activity has been expanded to include 113 member states now.

Nowadays; I (the nuclear energy) have a lot of indispensable applications and advantages to man in all walks of life such as medicine, agriculture, industry, energy production and many more,

In medicine, man uses me in the form of strong radioactive sources for γ -rays to treat deep tumours, or of relatively weak sources in the form of needles, wires or unexpensive pills to treat head and neck tumours plus some other important applications as well. I could be used also in the form of radioactive substances like radioactive iodizing for some thyroid gland diseases. Medical diagnosis is one of my main relevance with thyroid gland diseases, brain, liver, kidney, lungs, bones, and others.... Also, I have been used in the form of γ -rays for sterilizing, pharmaceuticals and surgical tools and equipment.

If we come to the agriculture area, being used as radioactive isotopes or nuclear radiations has proved high

capability and great efficiency in fighting insects, induction of mutations in plants; sterilization of insects, killing of micro-organisms or slowing down of natural processes such as ripening of fruits. Also I have been used successfully in controlling tsetse flies in Africa and hybriding plants to obtain new descendants with more preferable specifications like increased crop production capacity, disease resistance, or ability to grow under some special environmental circumstances like salinity and dryness; besides being used as radioactive isotopes in studying plants fertilization, construction, assimilation and root growing and others. Alongside traditional methods of producing and processing food stuff, the technology of food irradiation is gaining more new grounds in thirty five countries so far, where they have already approved and exercised irradiation with 30 different kinds of food stuff, spices, grains, fruits and vegetables.

Speaking of industry, I (the nuclear energy) have an endless list of applications, for instance upgrading and creating new desired properties of industrial products. In plastics, nuclear radiation techniques are used to produce some kinds of plastics with more ability to endure high temperatures, and with high durability and toleration rates; these new properties are very useful in manufacturing injections, plastic packages, high tension electric cables,

and concrete supported with radioactive processed plastics for acquiring more durability, water resistance, and anti-erosion. Also, nuclear radiation techniques are used in improving wood attributes, producing chemical detergents and lubricating oils with selected desired characteristics. In addition, there is the radiation technology applied in cotton textiles and fabrics to acquire preferred specifications such as no wrinkling, no water absorption, ease to clean, high durability, more colours acceptance, and fire resistance. Nuclear radiation techniques are used also with processed rubber to get better capability to resist friction and changable weather; which is attractive for tyres, electric cables, and other products.

Besides that, there are the areas of quality control of welding and industrial products, final check ups and finishing, as well as controlling different industrial operations which require utmost precision.

The story of my participation in production of electric energy and process heat is truly a long one. However, it is a fact that my application in generating electricity already passed the none return point.

Fifteen years after discovering the possibility to set me free out of the atom nucleus through nuclear fission (discovered early in 1939), the first 5 MWe nuclear fission power reactor was put into operation in June 1954 at OBNINSK in Soviet Union.

Now and after fifty years of setting me free through nuclear fission, there are more than four hundred nuclear reactors on line in twenty six countries with a total electric capacity of about three hundred Megawatts in addition to one hundred twenty reactors still under construction.

My contribution; I (the nuclear energy) in generating electricity has exceeded 16% out of the total worldwide electricity generation, Many countries are depending primarily on me (the nuclear energy) in generating electricity; for instance; nuclear share in France exceeds 70% of total electricity generated, in Belgium 60%, in Sweden 45%, and in Switzerland 38% .

My important role in electricity generation which proves my economical and environmental advantages, could be expressed through the words that been said by "Dr. Hans Blix" Director General of International Atomic Energy Agency [IAEA] in his speech in United Nations Headquarters in September 1988; he said:

"It is becoming more widely realized that, apart from hydropower, nuclear power is the only source that is now available to generate electricity in quantities, form, and reliability needed without producing any of the greenhouse gases".

Needless to say that its clearly obvious how much man had treated me unjustly and wrongfully. He threw the whole book at me, claiming that I am nothing but terrible deadly destructive weapon, inspite of being absolutly useful to him if; I say if; he could use me and manage me in the right way.

Human's fright of me is due to some psychological reasons and not to any practical or scientific ones.

First the extremly horrible rack and ruin I caused to both of HIROSHIMA and NAGAZAKI still lie down in the mankind's subconscious. Man believes that this is my real face and at the same time denying all the white hands I offered him and all the good deeds I did and still doing for him in medicine, agriculture, generating electricity and energy, and many other fields as well.

Second, man fears me because he still believes that I haven't reached yet to maturity and being completely submitted to his will. He believes that I am an intruder and trustless stranger. But, please give me a chance to defend my self. This is a mistaken feeling. Being tamed and used by man for his benefit is not a new phenomenon, it returns back to more than fifty years ago. I have been used in generating electricity since the middle of the 50's, and been used in medical and agricultural fields even before. Man's experience in operating power reactors has reached almost 5000 reactor year. So, from the technological point of view my usage is not new and I am not intruder.

The funny part in the story is that there are many other (more recent) technologies which had come into being after me and acquire more risks and troubles than I do, and at the same time we see man using them without any hesitation or perplexity. I ask him then; Why?? why me (the nuclear energy) in particular he still claiming not knowing me and understanding me well, and believing he can't reach to dominate and control me completely.

A third reason for man to scare me and not to accept and welcome me is his fear from risks which might raise from using and dociling me for his benefit. Actually human's exaggeration in this matter is due to rarity of those risks

upon my utilization and not being familiar with them. The clean operation records of my 5000 reactor year hold true with this fact where there weren't any death or injury accidents that took place so far except in CHERNOBYL Soviet reactor. In spite of its particular operating and safety systems and also the special reasons and circumstances that led to the accident, it caused the death of 31 persons only. Expectations to have cancer because of this accident (for the coming 70 years) are almost zero comparing with having cancer due to natural or medical reasons.

As a matter of fact comparing among the different electric energy production technologies and illustrating how safe I am (the nuclear energy) is a long talk and that's not the place for it. However, it proves with no doubt that my risks are much less than what other technologies for generating electricity have; or even any other technology of chemical industries, transportatin (land and air), or others....

The fourth reason is that man got used to accept and take chances for any risks (of his own choice) and not to accept whatever imposed on him nationally or socially. He accepts risks of smoking, driving cars, using electric elevators and aeroplans, and others; although they are all much more dangerous than using me (the nuclear enrgy) for his benefit, good, and welfare.

Now, let me explain the particular role I (the nuclear energy) can play in Egypt and why it is a "must" for Egypt to plan to use me in generating electricity .

There are some considerations behind focusing on nuclear power as a main technology for generating electricity in Egypt, they are:

- About 80% of hydropower capacities on the Nile River have been consumed in the High Dam and Aswan Dam, If it is possible to use all of the remaining capacities they won't add much.
- According to recent estimates coal reserves in Egypt are limited; about 35 to 50 million tons. So, it is not a reliable source to generate electricity. We have to depend on imported coal if we are to operate coal power plants.
- Oil and gas resources are limited and considered to be a drained wealth. Besides, relying on oil to cover increased electric energy demands would be on the account of what we can export; which represents a hard currency source for financing developing plans. In addition to that, gas could be guided to be used more wisely in other inevitable, vital, and useful aspects.

- Despite the fact that solar energy has high potentials in Egypt , the solar energy system (as a new technology for generating electricity) is still highly expensive and not economically feasible at present.

- Feasibility studies made in Egypt; and other countries; proved that nuclear energy alternative is more feasible and economic than oil, coal, or other alternatives used for electricity generation.

In addition to the constraints of available future energy resources which leads to inevitable dependence on nuclear energy for electricity generation, together with the economic advantages of nuclear electric generation; compared with coal, oil , and gas; there are other considerations to be counted.

Examples of such considerations are:

- Nuclear energy utilization in generating electricity is an inevitable choice for implementation of national, social and economic plans.

- The necessity to get involved with nuclear technology to take up and handle the future nuclear technologies; for example fast breeder and fusion reactors.

- Limitation of environmental pollution which shall be caused by coal and oil power plants alternatives if they would operate on a wide scale as a substitute for nuclear power plants to cover the increasing future electricity requirements.
- Making use of probable local resources of uranium ores which survey and exploration operations have shown some positive signs for it.
- Development and upgrading of local industries and national construction experiences through participating in nuclear power plants design, construction and maintenance.
- The possibility to keep strategic inventory of nuclear fuel for nuclear power plant operation enough to secure operation for many years without any fuel supply problems. An 1000 Mwe PWR nuclear plant needs annually around thirty tons only of nuclear fuel; comparing with around three million tons of coal required annually for operation of a coal based power plant of the same size with which it is impossible to keep strategic inventory for more than few months. Besides, the most available destinations for coal supply; such as Australia, Canada, China, and North Europe; are far away from Egypt and it is easy to get transportation routes cut down.

Let's now take a close look at the recent Egyptian stand regarding implementation of the first nuclear power plant.

On November 1983, the Nuclear Power Plants Authority (NPPA) of Egypt received offers to construct the first nuclear power plant (of PWR type) with 1000 Megawatt electric at El-Dabaa site, 160 Km west of Alexandria by the coast of Mediterranean Sea.

These offers were submitted from France, United States of America, and Federal Republic of Germany. They were technically economically, and financially evaluated . Recommendations of NPPA Evaluation Committee have been issued by July 1985. On March 1986, Tenderers were called for to clarify some items to avoid deficiencies and to match all General Terms and Conditions imposed by NPPA. On April 20th 1986, NPPA received final stands of bidders and a statement has been made regarding their situation. However, the nuclear power plant implementation process was influenced by the Chernobyl Accident on April 26, 1986. Despite no significant changes have been observed in the status of public and political acceptance of nuclear energy as well as nuclear power programmes on the international scale, Egyptian legislators had postponed taking decision whether to proceed on contracting or not until making sure of all safety measures and regulations connected with nuclear power plants.

In order to establish a healthy atmosphere for the Egyptians to accept me; the nuclear energy; and using me to generate electricity, Egypt has taken a lot of necessary measures, of which:

- Choosing approved and widely used nuclear power reactor type and assuring its design and operating safety features.
- Site selection to the most stringent international safety regulations. The site assigned for the first nuclear power plant in Egypt is at El Dabaa; 160 Km west of Alexandria on the Mediterranean Sea coast.
- Constant man power development in cooperation with IAEA and bilateral agreements to create technical staff capable for managing and dealing efficiently with such advanced project.
- Encouraging efforts for uranium exploration and extraction. A governmental organization called Nuclear Materials Authority was originated in Egypt for this purpose.
- Forming the Nuclear Regulatory and Safety Committee to be engaged in putting necessary regulations and safety rules as well as licensing nuclear activities, installations, and equipment.

- Furnishing an umbrella of international support, assistance, and cooperation in various nuclear energy activities and aspects in general, and in nuclear power in particular. This has been achieved through being a party to the International Treaty on the Non-proliferation of Nuclear Weapons and other international treaties and conventions pertaining nuclear energy peaceful uses as well as through bilateral agreements with nuclear technology and fuel services exporting countries.

- Keeping up public notification through all possible information channels (audio, visible and readable), through holding lectures, seminars, and through distributing booklets and pamphlets. These activities are directed towards building up a strong public front advocating and supporting utilization of nuclear energy.

Finally, I would like to put some recommendations that I hope nuclear communities, institutions and societies may take into consideration:-

- To encourage holding conferences and seminars between advocates and opponents of nuclear power. These conferences and seminars may be held in countries which have nuclear power programmes and trying to create public confidence; in nuclear energy; sufficient to support those programmes.

- The International Atomic Energy Agency (IAEA) to be requested to play a more active role in organizing and providing public information training programmes and courses, and to facilitate technical assistance in educational, informative, and public communication fields. This will help define more clearly nuclear energy issues and highlight its important role for the development and welfare of humanity. These fields will be very helpful for IAEA to achieve its objectives in accelerating and enlarging the contribution of atomic energy to peace, health, and prosperity throughout the world.

- The nuclear technology exporting countries to be called for providing technical assistance in public information dealing with nuclear energy, and offering all possible facilities such as movies, video tapes and books. They are to be called for offering necessary assistance and support to developing countries to establish their own nuclear information centres in order to assist them creating a strong public opinion advocating nuclear energy and believing in its vital role in our life.

- IAEA and other international nuclear energy institutions to be asked to make available versions of their public information services and publications in Arabic language for the benefit of Arab countries having nuclear power programmes.

Last but not least, allow me to conclude with some words of the statement by Director General of IAEA; Dr. Hans Blix; at the Post Accident Review Meeting on the CHERNOBYL Accident; in Vienna, 25 August 1986; which I have been honoured by participating in:

"I am convinced that the confidence and support of the many people who can be influenced by rational argument in nuclear matters, can only be gained by frank, open reporting of the facts. These facts are complicated and have to be simplified and explained by experts. For this to occur, the experts, themselves; must have access to the facts and be enabled to examine and discuss them".

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