

Radioactivity Neutralization with Paul Brown's Gamma Ray Method

Paul Brown had developed a method of neutralizing radioactivity with gamma rays which are detailed in this compilation of reproductions of three *Infinite Energy* magazine chapters. This ebook supplements "Radioactivity Neutralization Methods" www.padrak.com/vesperman and www.fukushimasolutions.com.

Gary Vesperman (Author), Advisor to Sky Train Corporation, www.skytraincorp.com
588 Lake Huron Lane
Boulder City, NV 89005-1018
702-435-7947
garyvesperman@yahoo.com
www.padrak.com/vesperman

TABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
BRIEF SUMMARIES	2
A Spate of Earthquakes, a Documentary about a Plane Crash, and an Old Power Plant... 7	
Remediation of Nuclear Waste	11
Photoremediation	13
Nuclear Solutions Appoints Dr. Qi Ao as VP-R&D.....	13
Japanese Scientists Corroborate Nuclear Waste Remediation Technology Owned by Nuclear Solutions, Inc.	15
French Scientists Reinforce NSOL's Photo-nuclear Technology	16
Two FBI Agents Targeted NSOL's Photo-nuclear Technology.....	18
Nuclear Solutions and Washington Nuclear Sign Contract	20
Nuclear Solutions Makes \$50 million Announcement	21
Paul Brown's IEEE Lecture at UNLV	23
Yucca Alternatives could be Problematic.....	27
Brown's Energy and Radioactivity Neutralization Inventions were Suppressed...29	
Paul Brown Euology	36
Nuclear Solutions Reports Transition Progress	41

Nuclear Solutions files 10-KSB Annual Report with the SEC	42
Nuclear Solutions Lost in Ambiguity	43
Paul Brown's Patents	47
Cost Breakdown of \$50 Million Pilot Photo-Remediation Plant.....	48
Senator Harry Reid is told about Paul Brown's Photo-Transmutation Technology	51
Neutralizing Nuclear Waste Using Applied Physics	52
Transmutation of Nuclear Waste Products Using Giant Dipole Resonant Gamma Rays	68
The Photon Reactor: Producing Power by Burning Nuclear Waste.....	74
Wilhelm Reich's Oranur Effect Method can Denaturize Radiation Sources	89
Ramsar in Iran has Earth's Highest Natural Background Radiation	90
Will Fukushima be Worse than Chernobyl?	91
Gamma Sponges, Glow Boys, Suicide Squads, Jumpers, Bio-Robots and Liquidators: It's All the Same... ..	92
Ever-Glowing.....	105

BRIEF SUMMARIES

A Spate of Earthquakes, a Documentary about a Plane Crash, and an Old Power Plant... –
Earthquakes, tsunamis, tornadoes, and falling jetliners could still rip apart 'over-engineered' nuclear reactors.

Each operating reactor contains about 1000 Hiroshima-sized bombs worth of radiation. So far, hundreds of thousands have died from the Hiroshima and Nagasaki radiation. Radiation which will keep on killing. The real number of dead from Chernobyl may already be over one million.

Remediation of Nuclear Waste – No solution has been found to the safe disposal of the highly radioactive and toxic waste produced by nuclear power stations.
Experiments with producing electricity while remediating radioactive waste.

Photoremediation – Dr. Paul Brown's 'photoremediation' process is summarized as involving the use of a high-energy electron beam impinged on a target which in turn produces a monochromatic gamma radiation that is tuned to induce 'photofission' and 'photoneutron' reactions in the target material causing rapid neutralization of radioactive isotopes. The efficiency claimed exceeds 500% due to the high cross-section reactions in the giant dipole resonance region.

Nuclear Solutions Appoints Dr. Qi Ao as VP-R&D – Dr. Qi Ao joins Paul Brown's company Nuclear Solutions, Inc., as an expert in the field of computer modeling and simulation, particularly in photonuclear physics processes.

Japanese Scientists Corroborate Nuclear Waste Remediation Technology Owned by Nuclear Solutions, Inc. – Independent research conducted by a consortium of five Japanese organizations confirms the viability of photonuclear transmutation for nuclear waste remediation,

French Scientists Reinforce NSOL's Photo-nuclear Technology – Three French atomic scientists have reinforced the scientific validity of Nuclear Solutions' electron accelerator-based photodisintegration process for remediation of nuclear waste and the safe generation of electricity called HYPERCON™ ADS. Their research indicated that the capital costs involved to build such a system would be significantly less than the proton-based systems currently used worldwide.

Two FBI Agents Targeted NSOL's Photo-nuclear Technology – Two FBI agents and a crooked stock 'short-seller' sought to purposely undermine the Nuclear Solutions public image and a few other unnamed companies. The FBI agents used the FBI confidential database which had inaccurate negative information on Dr. Brown.

Nuclear Solutions and Washington Nuclear Sign Contract – Nuclear Solutions, Inc., and Washington Nuclear Corporation sign a contract under which WNC will provide consulting services and identify market opportunities leading to demonstration, financing, and commercial deployment of NSOL's HYPERCON(TM) ADS process for transmutation of nuclear materials and generation of electricity.

Nuclear Solutions Makes \$50 million Announcement – Nuclear Solutions, Inc., sign a Letter of Intent for a \$50 million Developmental License Agreement with The Photodeactivation and Transmutation Institute of Europe, Ltd., for NSOL's electron accelerator-based photodisintegration process for remediation of nuclear waste and the safe generation of electricity.

Paul Brown's IEEE Lecture at UNLV – Dr. Paul Brown, President of Nuclear Solutions, Inc., lectures March 14, 2002 to the Las Vegas Section of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) on "Transmutation of Nuclear Waste By Means of Photon Acceleration Technology".

Paul Brown's biography, his most recent conference presentations and a technical summary of photodeactivation that he presented during his lecture.

Andrew Michrowski, Ph.D., President of Canada's Planetary Association for Clean Energy, and Gary Vesperman report on their meetings with Paul Brown.

Brown claimed that his photo-remediation technology can be used to generate energy at a capital cost of \$1,000 per kilowatt of capacity. Presently, nuclear power plants use neutrons to fission fissile matter to generate heat.

The major components evidently are all available as off-the-shelf items. For example, a high-power, low-energy (14 MeV) electron linac to produce the gamma rays has been operational in Japan since 1996. It seems to be a straightforward engineering exercise to build a demonstration pilot plant.

Las Vegas nuclear expert George Messenger listened to Brown's IEEE lecture and read his papers.

Messenger then calculated that even using the biggest gamma sources available, it would take at least three months to process about ten tons of high-level waste. This would hardly make a dent in the huge amount of waste awaiting disposal. Brown's photo-deactivation process is not cost effective or commercially viable unless someone invents a gamma source about 100 times as big as we now have.

Yucca Alternatives could be Problematic – Atomic nuclei contain a set number of subatomic particles called protons and neutrons. If the nuclei somehow acquire extra neutrons, they become unstable and give off radiation as they try to return to their proper proton/neutron balance. This is what causes elements to become radioactive. Transmuting nuclear waste involves injecting energy into radioactive material. Gamma photons at certain energy levels can excite the nucleus of an atom to cause it to give off one or more neutrons.

A photon is a football-shaped packet of electromagnetic waves with a content of energy equal to Planck's constant times the frequency of the waves. Visible light comprises of photons of a narrow range of frequencies with energy contents within which they can stimulate, but not over or under-stimulate, an eye's light receptors. Photons of far higher frequencies such as gamma photons (also known as gamma rays) have sufficient energy to alter nuclei.

If nuclear waste contains lots of isotopes, the transmutation problem becomes much more difficult (because different isotopes react to different energy levels). Thus the various isotopes must be separated before transmuting them. Nuclear Solutions' approach would avoid the separation problem by bombarding radioactive waste with photons across a broad range of energy levels to affect all the isotopes at the same time.

Electrical power-hungry particle accelerators are one source of gamma photons. Nuclear Solutions' 'gamma laser' approach could be as effective as particle accelerators while using less power, Nuclear Solutions' transmutation reaction generates enough heat to potentially run a steam turbine that could further reduce the drain on outside electricity grids.

Launching nuclear waste into space runs the unacceptable risk of launch failures.

Brown's Energy and Radioactivity Neutralization Inventions were Suppressed – Several dozen cases are recorded in www.padrak.com/vesperman of energy invention suppression by the fossil fuel companies and their allies in the U.S. Government. A few cases have also been recorded of suppression of radioactivity neutralization methods,

U.S. Department of Energy Secretaries and other very high-level DOE officials deviously acquire details of radioactivity neutralization inventions and then attempt to classify them or otherwise suppress them.

DOE declares intent to not ever provide any funding to anyone for the purpose of remediating radioactive emissions in spent nuclear fuels.

Paul Brown suffered from vicious suppression tactics when he tried to commercialize his 'hyper-cap E-converter' – a thick quarter-sized battery which converts natural radioactive decay material into electricity for more than a half-century. His method of neutralizing radioactivity with gamma rays was also suppressed by the U.S. Government.

Bob Lantz invented a 'Water and Power System' which apparently is a threat to the oil, coal, and centralized electricity generating companies. A WW II veteran, he is brutally suppressed by the U.S. Government.

Paul Brown Euology – Details of Paul Brown's fatal car accident April 7, 2002.

Thomas Valone, MA, PE, President, Integrity Research Institute writes and publishes a 'touching' euology to Paul Brown.

Nuclear Solutions Reports Transition Progress – After the death of Paul Brown his company Nuclear Solutions, Inc., announces management changes.

Nuclear Solutions files 10-KSB Annual Report with the SEC – A few weeks after Paul Brown's death Nuclear Solutions, Inc., reports to its stockholders and the SEC that progress is being made with the company's photo-remediation technology as well as additional management changes.

Nuclear Solutions Lost in Ambiguity – Israel's government demonstrates an ambiguous but sometimes brutal policy with respect to nuclear whistleblowers and the medical effects of its nuclear facilities.

An Israeli company develops a radioactivity neutralization process called plasma-gasification-melting which works by using plasma (ionized gas) in a reactor in order to melt down the radioactive materials. Nuclear Solutions, Inc., has dealings with Israel companies and research institutes.

Paul Brown's Patents – Paul Brown was granted four U.S. patents – three of which abstracts are copied:

Brown's Radioactivity Neutralization Method

-4-

March 17, 2014

Layered metal foil semiconductor power device
Isotopic semiconductor batteries
Enrichment method for radioactive isotopes

Cost Breakdown of \$50 Million Pilot Photo-Remediation Plant – The cost breakdown of a 10-ton per year pilot photo-transmutation plant is:

Engineering – \$4M to \$7M.

Only one \$5M six-foot 1.2 megawatt accelerator from Japan's KEK Accelerator.

Reaction vessel – \$10M based on Canadian 'slowpoke reactor'.

Heat recovery system – \$20M based on estimate of \$1 per watt at 20 megawatts.

Building – \$5M based on power industry estimates.

Materials handling – \$8M based on logistics tools used in Hanford.

A full-sized plant would have 4 accelerators in a circular array around the reaction vessel 90 degrees apart.

Energy researchers express doubts re the photo-remediation's safety and the validity of the computer codes used to model the photo-remediation process.

Senator Harry Reid is told about Paul Brown's Photo-Transmutation Technology – Gary Vesperman meets Senator Harry Reid and his wife in a store. Vesperman tells Senator Reid about photo-remediation technology who becomes enthused and refers Vesperman to a female staffer in his Las Vegas office.

Neutralizing Nuclear Waste Using Applied Physics – A process has been demonstrated for neutralizing radioactive waste products whereby gamma radiation (x-rays) is used to induce nuclear transformations that change the normal half-life of radioisotopes, usually measured in thousands of years, to a half-life measured in days, simply by using applied nuclear physics. This means that the radioactive waste products decay into non-radioactive stable elements in a matter of days.

A photon is a football-shaped packet of electromagnetic waves with a content of energy equal to Planck's constant times the frequency of the waves. Visible light comprises of photons with a range of frequencies with energy contents within which they can stimulate, but not over or under-stimulate, an eye's light receptors. Photons of far higher frequencies such as gamma rays have sufficient energy to alter nuclei.

Transmutation of Nuclear Waste Products Using Giant Dipole Resonant Gamma Rays – There are about 300 different radioactive isotopes generated by the operation of a nuclear reactor, primarily as a result of neutron capture and neutron-induced fission.

Photonuclear reactions induced by gamma ray absorption by the nucleus, do not suffer the shortcomings of neutron reactions. Simply stated, the process is gamma irradiation with energies greater than the binding energy of the neutron to the nucleus. That is, a gamma photon of an energy equal to or greater than the binding energy which comes close to the nucleus is absorbed through giant dipole resonance resulting in the emission of a neutron.

The giant dipole resonance is characterized by the absorption of electromagnetic radiation by nuclei in the energy range from about 5 to 30 MeV,

Photodeactivation applies gamma rays to transmute radioactive isotopes into stable or non-radioactive isotopes. An electron accelerator is used as the prime driver for the reactions within the photon reactor. The accelerated electrons are used to generate gamma rays with an energy of about 10 to 14 MeV. The accelerated electrons are then directed onto a target of spent nuclear fuel.

The Photon Reactor: Producing Power by Burning Nuclear Waste – A linear accelerator, preferably of the monochromatic type, accelerates electrons which are directed onto a high Z target such as tungsten to generate gamma rays about 9 MeV, which are directed onto the fuel material such as U-238 which results in the (γ, f) reaction, thus releasing about 200 MeV. A reactor built according to this principle requiring an accelerator driven by 1 MW will develop about 20 MW of power.

The reaction is not self-sustaining and stops when the beam is turned off. This accelerator driven reactor may be used to 'burn up' spent fuel from fission reactors, if simply operated at 10 MeV. The photo-fission results in typical spent fuel waste products such as Cs-137 and Sr-90, which undergo photodisintegration by the (γ ,n) reaction resulting in shortlived or stable products. Chemical separation of the spent fuel isotopes is not necessary. Of course, more than one accelerator may be used to drive the reactor to higher power levels and speed up the burn-up process. The fact that the reaction is not self-sustaining is a safety feature allowing immediate shutdown in the event of a problem.

Wilhelm Reich's Oranur Effect Method can Denaturize Radiation Sources – Wilhelm Reich's 'oranur effect' method is based on his discovery that radiation sources could be denaturated (rendered less toxic) with a corresponding observation of variations in decay-rate 'constants'.

Unusual long-distance atmospheric, biological and geophysical effects from underground nuclear bomb tests and nuclear power plant accidents can only be explained by the existence of a radiation-irritated atmospheric/planetary energy continuum.

The life-energy field (call it cosmic ether if you wish) surrounding radioactive material is an active agent in radioactive decay processes.

Peter Sturrock at Stanford has discovered variations in decay-rate processes matching the sunspot numbers. Reich made a similar discovery decades earlier – as a part of his discovery on oranur.

Ramsar in Iran has Earth's Highest Natural Background Radiation – Ramsar's Talesh Mahalleh district is the most radioactive inhabited area known in the world – due to nearby hot springs containing radium and building materials originating from them. A combined population of 2000 residents from this district and other high radiation neighbourhoods receive an average radiation dose of ten times more than the ICRP recommended limit for exposure to the public from artificial sources.

Ramsar medical data does not provide justification to relax existing regulatory dose limits.

Will Fukushima be Worse than Chernobyl? – Decades of research have confirmed that radioisotopes become deposited in various parts of living systems.

In humans, I-131 and I-129 concentrate in the thyroid, Cs-137 in soft tissue, and Sr-90 in teeth and bones. Key to understanding effects is the difference between external and internal radiation. While external radiation, as from x-rays, neutron, gamma and cosmic rays can harm and kill, internal radiation (alpha and beta particles) when absorbed by ingestion and inhalation, releases damaging energy in direct contact with tissues and cells.

There is serious concern for the workers at the Fukushima plant, because of their proximity to the disabled reactors and to the fuel rods that have lost their protective cover of water. Some of the Fukushima workers, as with the 'liquidators' at Chernobyl are exposed to dangerous levels of gamma and neutron radiation.

Those who were not in close proximity to those sources of radiation will be spared some of the intense exposure, but will not escape the exposure from radionuclides that emit alpha and beta particles, as well as gamma radiation. These enter the bodies of humans by inhalation and ingestion of food and water.

Of the Chernobyl 'liquidators' the young and healthy men and women who worked to stop the fires and to contain the release of radioactivity from Chernobyl, by 2005, some 125,000 of the estimated total of 830,000 were dead (15%) mostly from circulatory, blood diseases and malignancies.

Children born to liquidator families were seriously affected with birth defects and thyroid diseases, including cancer, and loss of intellect. But other children, based upon the research of multiple researchers, it is estimated that in the heavily contaminated areas of Belarus only 20% of children are considered healthy.

With few exceptions, animals and plants exposed to Chernobyl radiation that were studied demonstrated structural abnormalities in offspring, loss of tolerance and viability, and genetic changes.

Gamma Sponges, Glow Boys, Suicide Squads, Jumpers, Bio-Robots and Liquidators: It's All the Same... – The former Soviet Union conscripted 830,000 young men to ‘clean up’ after the Chernobyl nuclear reactor explosion. Now, they're dropping like flies (with 125,000 dying by 2005). For example they would shovel radioactive graphite off the roof of the building for 45 seconds. Then it's someone else's turn.

In Japan it's happening again: Radiation detector needles are pegging on ‘high’, detectors are in short supply, and exposures are being crudely estimated.

The ‘heros’ – as the media have aptly dubbed them – who are working at the highly-irradiated Fukushima Daiichi nuclear power plant right now – are reportedly receiving 20 times their normal day's pay for a day at Fukushima Daiichi.

And perhaps a thousand times their normal daily radiation dose.

The Fukushima plant is still leaking enormous amounts of radioactivity and may continue to leak for years. Every nuclear power plant has the potential to become the next Fukushima. The next Chernobyl. Or the next ‘worst industrial accident ever’ – worse than Chernobyl. Worse than Fukushima.

Shut 'em down. This is crazy.

417,000 cancers are forecast for Fukushima 200 km contamination zone by 2061.

The United Nations is in favor of promoting nuclear power and glossing over its faults. All of the UN's member powerful nations are pro-nuclear. It is these nations' governments who provide the ‘leading scientists’ to write up the manipulated faux ‘consensus’ of lies about the medical effects of radiation. For example the “official death toll from Chernobyl is 43” whereas the real death toll may be more than 1,000,000.

Ever-Glowing – Is Las Vegas unhealthily radioactive from atomic bomb test fallout and depleted uranium from exploding ammunition rounds at nearby Nellis AFB? Dry windy climates disperse radioactive dust particles.

A Spate of Earthquakes, a Documentary about a Plane Crash, and an Old Power Plant...

From: Nikoli McCracken

To: Undisclosed-Recipient@yahoo.com

Sent: April 12, 2010

Subject: A spate of earthquakes, a documentary about a plane crash, and an old power plant...

And if we didn't have enough to worry about, there's this: And this man has studied the problem for 30 years. He also has a lot of people who report to him from 'inside' some of the worst nuclear plants. Read what he says about what Chernobyl did to, not only the people around it, but to the people around the world. Including us. With Yucca Mountain shut down, there is nowhere to put the waste generated every day. And one cautionary note: If Yucca Mountain has been cancelled, why was there quite a few million bucks in this year's budget for it?

From: Ace Hoffman

To: Recipient list suppressed

Sent: April 12, 2010

Subject: A spate of earthquakes, a documentary about a plane crash, and an old power plant...

Dear Readers,

A pair of old nuclear reactors operates – most of the time – about a dozen miles from where I live. I'm downwind of them a lot of the time.

Recently, two events – an ongoing series of local earthquakes, and a documentary about a local plane crash – reminded me what a nightmare-waiting-to-happen nuclear power plants really are.

'SONGS' (as the radiation factory calls itself) stands for San Onofre Nuclear Generating Station. I call it 'SONWGS', which stands for San Onofre Nuclear Waste Generating Station. The waste from 'SanO' has been building up since the first reactor opened in 1967. That unit operated until 1992, but nearly all its fuel remains on-site and is expected to stay there for the foreseeable future. (The proposed national repository, Yucca Mountain, has been all but cancelled by the Obama administration and in any case, is inadequate – and was more than a decade behind schedule when it was mothballed.)

The strongest of the recent earthquakes (and the only one I felt) was a 7.2, centered in northern Mexico, less than 100 miles from San Onofre. San Onofre is only built to withstand a 7.0 earthquake whose epicenter is no closer than about five miles away. That's hardly the same as a 7.2 earthquake directly underfoot. It's one thing to be shaken; it's another to be ripped apart.

It costs a lot to 'over-engineer' a building, but nevertheless the assumption made at San Onofre is that it has been over-engineered to withstand at least a 7.5 trembler, which is much, much worse than a 7.0 earthquake. (On the logarithmic Richter Scale an 8.0 earthquake creates ten times the ground shaking of a 7.0.) Thus, the 'experts' are routinely claiming that they are certain that San Onofre has been built to withstand five times more ground-shaking than it is actually designed to withstand! They delude themselves in many ways, and try to delude the public along with them.

Despite assurances, there is NO basis to assume San Onofre has been over-engineered at all, and every reason to think it might not survive a 'design basis earthquake' (7.0). For example, many other buildings, built more recently, did NOT survive earthquakes with magnitudes LESS than their design basis. Building earthquake-resistant structures is an inexact science, if not pure art.

The other event which occurred recently, and made me think about possible outcomes of San Onofre's continued operation, was the premier run of a documentary, Return to Dwight and Nile. The documentary covers the 1978 crash – mainly, the immediate aftermath – of Pacific Southwest Airlines Flight 182 in North Park, San Diego, about 50 miles from San Onofre. Shown only a few miles from the crash site, the movie brought many in the audience to tears.

PSA Flight 182 was a Boeing 727 three-engine jet, packed with 135 souls on board, originating in Sacramento, the state capital, with a brief stopover in Los Angeles, the state's largest city. On final approach to Lindbergh Field in San Diego, the jet collided with a Cessna 172 which had inexplicably changed course from the heading Air Traffic Control (ATC) had given it. The jet did not inform ATC that it had lost sight of the Cessna, despite having been told by ATC to maintain visual traffic separation. The tower was not using radar even though it was available to them. Just prior to the accident joking and laughter can be heard on the Flight 182 cockpit voice recorder...

Famously, a person on the ground managed to snap two photos of the doomed and plummeting jetliner moments before impact. The photos show the plane at about a 50-degree angle to the ground, right wing down and in flames, visibly gashed. "Ma, I love yah" are the last words on the cockpit voice recorder, coming about one second after the captain told the passengers, "Brace yourself" and a few seconds after his last transmission to ATC: "Tower, we're going down, this is PSA."

Many of the passengers happened to be PSA employees and probably knew that bracing themselves wouldn't have helped. After the crash, pieces of bodies hung from trees and were in piles knee deep in the impact zone. The mushrooming cloud of black smoke was visible for miles. 144 people died altogether, including the two occupants of the single-engine prop plane and seven people on the ground.

The normal commercial airline route from Los Angeles to San Diego overflies San Onofre Nuclear (Waste) Generating Station. There is a small uncontrolled airport near San Onofre, from whence crazy people have sometimes stolen airplanes. From whence airplanes have sometimes taken off only to crash into the sea less than a mile from San Onofre.

In 2003, in Angola, Africa, someone STOLE a 727 jet! It was never recovered.

At any moment, San Onofre could be hit by an earthquake or by a commercial jetliner, falling uncontrollably or guided by terrorists. And it's simply not worth the risk.

San Onofre's nuclear waste cannot be safely contained or transported. Nor can it be easily or entirely or efficiently or (for that matter...) cost-effectively transmuted, let alone destroyed. Virtually all of the waste ever created at every nuclear power plant in America is still located on-site where it was created – and NOT even in the famous ‘containment domes’ (only the fuel in the operating reactor is inside the domes, not the waste). The waste currently being stored at San Onofre contains the equivalent potential radiological impact of more than 50,000 Hiroshima-sized bombs. Each operating reactor contains about 1000 Hiroshima-sized bombs worth of radiation. Each year, about 50 bombs worth of plutonium is included in that production of radioactive ‘byproducts’. Rogue country's nuclear power plants do the same...

The vulnerabilities increase daily as more and more nuclear waste piles up with nowhere to put it. Waste so deadly that one sugar-cube-sized chunk of it, if it were dispersed locally, would be enough to contaminate a medium-sized city for thousands of generations and fatally poison tens or hundreds of thousands of people, if not millions.

Waste so deadly that in official public documents describing ‘worst case scenarios’ only a tiny fraction is released – on the order of 0.001% or even 0.000001% of the total inventory of one shipment or one storage cask (and most of what is released is assumed to remain nearby, in chunks...).

When the atomic bomb was used against the cities of Hiroshima and Nagasaki, many people died due to the immediate effects of the blast: First there is the intense broiling heat of the gamma radiation burst (which lasted only milliseconds). Then there comes an intestine-yanking, eyeball-popping, object-tossing, window-shard-making concussion wave. That's soon followed by tornado-force winds and the debris they carry, along with horizontal sheets of fire, which suck the oxygen out of the collapsing buildings. Then a rain of radioactive fallout, ‘hot’ chunks, some as big as your thumb, fall from the sky, a black rain, an inescapable, choking dust.

Then, in the aftermath, the lack of proper medication for so many gravely-injured people kills thousands more... But it was the long-term effects of the radiation exposure which killed the most people and which is STILL killing people. And deforming them. And debilitating them. So far, hundreds of thousands have died from the Hiroshima and Nagasaki radiation. Radiation which will keep on killing, because some of the isotopes are very long-lived... and because genetic damage can appear many generations after exposure... and because there is no safe dose of radiation. None whatsoever.

Unlike conventional weapons, which only kill noncombatants who happen to be in the vicinity of the blast, uranium and plutonium weapons kill randomly for many millennia after they are used – including so-called ‘depleted’ uranium weapons, which are only ‘depleted’ of one radioactive isotope of uranium, but not other radioactive isotopes. The use of uranium weapons in any form is truly a crime against all of humanity. So too is the use of nuclear power to generate electricity, or for propulsion for military vessels.

When Chernobyl exploded and spewed radiation into the water, air and soil globally, ‘only’ dozens of people died from the blasts, the fires, and the gamma radiation at the power plant, and other immediate effects. The entire nuclear industry's success – such as it is – is based on the lie that these deaths were virtually the ONLY deaths from Chernobyl. Nuclear power proponents don't even acknowledge the continuing deaths of the ‘liquidators’ – the brave (though often compelled into service, and kept ignorant about the risks) Russian citizen-soldiers who smothered the flames and built the cement enclosure – known as a sarcophagus – around the stricken plant (which leaks and must be rebuilt, and which will need to be rebuilt many times over the coming millennia). The nuclear industry denies that anybody who survived those first few days after Chernobyl's ‘accident’ was harmed in any way. But in fact it is an ongoing catastrophe.

Nuclear power proponents ignore all the damage to the local population around Chernobyl because they say all excess radiation fades to ‘background’ dose levels, which, they say, are harmless. Wrong! Wrong because many types of man-made radioactive isotopes are especially good at getting inside the body, where they can do the most harm. These isotopes are rare or unheard-of in nature but are created in copious quantities in nuclear power plants. And wrong because ‘natural, background’ radiation DOES cause cancer. Adding to the background radiation dose just causes MORE cancer.

According to peer-reviewed scientific studies which have been suppressed in the United States and by all nuclear nations, the real number of dead from Chernobyl may already be over one million, making it by far the worst industrial accident in history. And the death toll from Chernobyl will continue to climb for thousands of generations.

Cancers from a single (brief) high radiation exposure to a population tend to show up in waves: Various types of cancers often have ‘typical’ latency periods before appearing – they are now discovering types of cancers that only start to show up more than 50 years after exposure! Cancers from long-term exposures presumably also tend to have a latency period, but it's harder to define, and even harder to analyze.

Children in the areas surrounding Chernobyl are especially at risk, not only because of their much-greater sensitivity to radiation's harmful effects, but because they are much more likely to play in the dirt, and are closer to the ‘ground shine’ that still occurs nearly a quarter of a century after the accident, over thousands of square miles of contaminated soil around Chernobyl. (Nevertheless, the most common pathway into the body for radionuclides from Chernobyl is currently ingestion of contaminated food and water.)

Chernobyl is in our blood, in our our brains (not just figuratively) and in our flesh and bones. Chernobyl kills silently. We are ALL victims of Chernobyl. Chernobyl must never be repeated, yet another Chernobyl-size accident (or worse) is threatened daily by more than a thousand nuclear reactors, including military reactors and research reactors, both of which are just as dangerous as commercial reactors.

In the blink of an eye, reactor operators can make a fateful error. Pilots do. Submarine captains do. Presidents do. So naturally, one must assume that control room operators can and do, too. But even if they and everyone else were infallible, nature still has its say.

The tsunami sea wall at San Onofre is only about 30 feet high. Dry casks, filled with used reactor core assemblies, are stored along the coast, and are said to be effective under up to 50 feet of water – but it was never properly tested, of course, or even asserted to be true under oath. In 2004 there was widespread evidence of tsunami waves greater than 60 feet. And in the past few years there have been widespread allegations of fraud and cover-ups in the dry cask construction business, including at San Onofre.

Nuclear power is an expensive excess. We don't need it because there are safer ways to get electricity, which is, itself, only a transport method for getting energy to do work wherever we happen to need it or want it. There is no intrinsic reason our electricity must be generated by one source over any other. The cleanest possible energy source should be used, and nuclear power has no place in any proper energy portfolio. It's yesterday's solution that didn't work then, and doesn't work now.

Energy conservation (such as a widespread and rapid switch to L.E.D. lights, for instance) combined with pumped energy storage, offshore wind farms, solar panels on rooftops, and a variety of other renewable energy methods would rejuvenate our economy, eliminate excess CO₂ production, reduce our risk, eliminate future costs of handling nuclear waste we don't make, and promote the public welfare, as required by law and common sense.

Like most of the world's nuclear power plants, San Onofre is old and dilapidated. It's falling apart. And even if it weren't, even if it were shiny and new, the combination of San Onofre's incredibly toxic, unbelievably unstable, unquestionably immoral, and undoubtedly uneconomic (in the long run), lethal waste amidst millions of mostly-unaware people and 'routine' events like earthquakes and airplane crashes dooms Southern California for no good reason.

It's time to shut San Onofre and all of the other nuclear power plants for good.

Sincerely,

Ace Hoffman
Carlsbad, CA

The author has studied nuclear power for many decades, and has had a fascination for aviation and aircraft handling characteristics, as well as accident statistics, for even longer. He also writes award-winning educational science tutorials for The Animated Software Company.

Ace Hoffman
Author, The Code Killers: An Expose of the Nuclear Industry
Free download: acehoffman.org
Blog: acehoffman.blogspot.com
YouTube: youtube.com/user/AceHoffman
phone: (800) 551-2726; (760) 720-7261
address: PO Box 1936, Carlsbad, CA 92018
Subscribe to my free newsletter today!
Email: ace [at] acehoffman.org

Remediation of Nuclear Waste

Since the dawn of the nuclear age, no solution has been found to the safe disposal of the highly radioactive and toxic waste produced by nuclear power stations. 12,000 tons of spent fuel is produced annually.

Thousands of tons of these deadly substances are still stored in ‘temporary’ facilities at nuclear installations around the globe. The exact quantities and status of this waste is often unknown.

In some cases, the waste is so dangerous that it cannot be approached or disturbed. An example of this is the infamous building B12 at Sellafield in the UK.

Production of Electricity from Nuclear Waste

In the 1990s, CERN conducted experimental tests on a concept developed by Dr Carlo Rubbia he has called the ‘energy amplifier’. The energy amplifier uses the concept of ‘accelerator driven fission’ to disintegrate radioactive substances by bombarding them with high-energy neutrons. Excess energy is released by the nuclear reaction which can be used to produce electricity and run the initiating neutron accelerator. It is a sub-critical fast neutron system – as opposed to a conventional fission reactor which operates on the principle of a chain reaction sustained by slow neutron emission.

This improvement on conventional nuclear fission would allow current nuclear waste to be burned up as fuel in an energy amplifier to produce electricity. The waste products are radioactive but short lived and so decay away to stable harmless end products quickly. Other long-lived waste can be rendered harmless by the energy amplifier using the system of ‘adiabatic resonance crossing’, which was experimentally tested at CERN in an experiment called TARC. Other experimental verifications called FEAT, MUSE and MEGAPIE have also been carried out.

FEAT was the First Energy Amplifier Test, carried out under Rubbia’s direction at CERN. This verified the principle in a test that was limited to a power output of 1 watt.

TARC was the second set of experiments carried out under Rubbia to examine adiabatic resonance crossing of neutrons in a lead matrix with samples of technetium-99. The experiments showed that ARC is a viable and powerful method of neutralizing nuclei showing resonances, which is the case for all nuclei in nuclear waste management.

The energy amplifier concept has two other advantages: It is a sub-critical system which cannot enter into a critical chain reaction or Chernobyl-type reactor meltdown, and it does not produce plutonium waste that could then in turn be used to manufacture atomic weapons. Therefore it only has civil applications – energy and medical uses – and cannot be used for military purposes. This could make it an ideal form of nuclear power that could provide an answer to nuclear weapons proliferation concerns.

Research in the USA has lagged behind, with no experimental tests carried out to date as far as we know. Research is also being carried out in Japan and Russia into this concept.

References

1. "Conceptual Design of a Fast Neutron Operated High Power Energy Amplifier", CERN AT 95-44, 29/9/95, DR Carlo Rubbia.
2. "Design of an Accelerator Driven System for the Destruction of Nuclear Waste", Y. Kadi, JP Revol, 3-7/9/01, Lectures given at the Workshop on Hybrid Nuclear Systems for Energy Production, Trieste.
http://www.meridian-int-res.com/Energy/Kadi_002.pdf
3. "Conception of Secure Atomic Energy Plant with Sub Critical Reactor and 100meV Proton Accelerator", AN Didenko, AD Koljaskin, GL Horasanov, VE Kalantarov (Downloaded from CERN website)
<http://www.meridian-int-res.com/Energy/THP101G.pdf>
4. Laser Driven Photo Transmutation of Iodine-129 - a long lived nuclear waste product, Ledingham et al., J. Phys. D., Appl. Phys., 36 (2003), L.79 - 82.

5. The Photon Reactor: Producing Power by Burning Nuclear Waste, Dr Paul Brown, Nuclear Solutions LLC. <http://www.meridian-int-res.com/Energy/PhotonReactor.pdf>

Source: <http://www.meridian-int-res.com/Energy/Remediation.htm>

Photoremediation

June 14, 2002, long-time friend, physicist, and email correspondent Andrew Michrowski, Ph.D., emailed Gary Vesperman two reports. Dr. Michrowski is with The Planetary Association for Clean Energy, Inc. (in French La Société planétaire pour l'assainissement de l'énergie, inc), 100 Bronson Avenue / Suite 1001, OTTAWA, Ontario K1R 6G8 (613) 236-6265 fax: (613) 235-5876 pacenet@canada.com <http://pacenet.homestead.com>.

One report is a copy of Bill C-27 submitted to Canada's Standing Senate Committee on Energy, the Environment and Natural Resources as "An Act respecting the long-term management of nuclear fuel waste".

The other report was written by Mark Porringa of Zeropoint Techtonix Inc, 430 Bass Lake Road, R R # 1, Deep River, Ontario K0J 1P0 (613) 584-2960 fax: (613) 584-4616 porringam@aecl.ca. Porringa provided brief descriptions of nine alternative, peer-reviewed techniques as candidates for the global clean-up of nuclear waste. Only the text of Porringa's brief description of Paul Brown's photoremediation is copied below:

The *Photoremediation* process of the American Dr. Paul Brown is essentially conventional physics, *albeit* applied in a new and novel way. The process involves the use of a high-energy electron beam impinged on a target which in turn produces a monochromatic gamma radiation that is tuned to induce *photofission* and *photoneutron* reactions in the target material causing rapid neutralization of radioactive isotopes. The efficiency claimed exceeds 500% due to the high cross-section reactions in the giant dipole resonance region. The 10 million electron-volt (MeV) electron beam produces typical fission reactions in the 200 MeV range – effectively turning high-level solid wastes such as spent fuel into an energy source. The process is apparently intended for on-site treatment with some waste-partitioning required, an aspect which may not be desirable in certain countries.

While this idea is similar in topology to a system being developed by Los Alamos National Labs, Dr. Paul Brown's approach offers several advantages: no need for extensive chemical pre-processing and the energy required to effect transmutation is greatly reduced. No new technology needs to be developed, yet the engineering of such a photon reactor must be completed, and it could itself become a practical method for generating power.

Nuclear Solutions Appoints Dr. Qi Ao as VP-R&D

Tuesday November 13, 10:00 am Eastern Time

Press Release

Dr. Qi Ao Named Vice President, Research and Development For Nuclear Solutions, Inc.

MERIDIAN, Idaho--(BUSINESS WIRE)--Nov. 13, 2001--Nuclear Solutions, Inc. (OTCBB:NSOL - news) is announcing the appointment of Dr. Qi Ao as Vice President, Research and Development.

Dr. Ao will direct Nuclear Solutions' R&D program, which is targeted at further developing and modeling the company's proprietary HYPERCON(TM) ADS technology, which holds the promise of neutralizing nuclear waste safely and economically.

“As a well-known and respected scientist, Dr. Ao brings to Nuclear Solutions a wealth of experience in the field of computer modeling and simulation, particularly in photonuclear physics processes,” said Nuclear Solutions President Dr. Paul M. Brown.

“With a scientist of Dr. Ao's caliber at the helm, I am confident we will soon take the next step in the development of this technology. That step involves modeling all of the parameters so that engineering and construction of a demonstration facility can begin.” Dr. Brown said.

Prior to joining Nuclear Solutions, Dr. Ao worked at Thermo Gamma-Metrics, where as senior principal scientist he led an R&D team in the modeling and development of a variety of commercially deployed nuclear instrumentation products.

During the course of his technical career, Dr. Ao has developed specific-purpose MCNP (Monte Carlo N-Particle transport code) for numerous nuclear applications, including low-energy photon transport physics, detector response functions, and radiation transport systems.

Dr. Ao is also a member of the MCNP beta test group managed by the U.S. government's Los Alamos National Laboratories. MCNP is the most popular, powerful and standard nuclear process simulation code in the nuclear industry today.

Dr. Ao has also developed codes for use in nondestructive assay methods of materials characterization (Prompt Gamma-Ray Neutron Activation Analysis, X-Ray Fluorescence Analysis). He has authored several refereed archival journals, transactions, and conference proceedings.

Dr. Ao received a Ph.D. in nuclear engineering from North Carolina State University. He earned both a masters degree in nuclear science and engineering, and a bachelors degrees in applied geophysics, at China's Chengdu Institute of Technology.

This press release may be deemed to contain forward-looking statements that could affect the financial condition and results of operations of the company and its subsidiaries. Further information on potential factors that could affect the financial condition, results of operations, and expansion projects of the company are included in filings with the Securities and Exchange Commission.

NOTES TO THE EDITORS:

1. Nuclear Solutions' technology, the HYPERCON(TM) ADS process, is an electron accelerator-based photodisintegration process that reduces the atomic mass of radioactive materials, thereby rendering them non-radioactive or radioactive with a short half-life. These processes involve accelerator-driven technology and photo-nuclear reactions, incorporating the most recent advances in the photo-nuclear industry.
2. The technology could be developed into new applications for remediation of nuclear waste. Industrially, it would operate at a sub-critical level, so the heat produced by the process could also be used to generate electricity in a safe and environmentally benign manner.
3. A detailed C.V. for Dr. Ao is available by request to the contact identified above.

Contact:
Nuclear Solutions
Dr. Paul M. Brown, 208/846-7868
www.nuclearsolutions.com

Japanese Scientists Corroborate Nuclear Waste Remediation Technology Owned by Nuclear Solutions, Inc.

Wednesday November 14, 9:03 am Eastern Time

Press Release

SOURCE: Nuclear Solutions, Inc.

Japanese Scientists Corroborate Nuclear Waste Remediation Technology Owned by Nuclear Solutions, Inc. MERIDIAN, Idaho--(BUSINESS WIRE)--Nov. 14, 2001--Independent research conducted by a consortium of five Japanese organizations confirms the viability of photonuclear transmutation for nuclear waste remediation, Nuclear Solutions, Inc. (OTCBB:NSOL - news) announced today.

Nuclear Solutions is engaged in the development of a photonuclear-based system for transmutation of nuclear waste and safe, clean generation of electricity.

Based on the development of a new high-intensity gamma laser system and research on its applications, Japanese scientists have concluded that the use of gamma rays is a feasible approach to efficiently transmute nuclear waste into stable non-radioactive end products. Their results were reached through scientific experimentation and study of concepts closely related to the photonuclear, gamma-neutron reactions currently being developed by Nuclear Solutions as the foundation of its patented and patents pending waste remediation technology.

“The Japanese should be congratulated for conducting such positive research in a relatively unexplored area of nuclear science,” said Dr. Qi Ao, Vice President, Research and Development for Nuclear Solutions.

“It's great to know that scientists are independently validating what we have been saying all along: Photonuclear transmutation is a feasible approach to solving the nuclear waste problem once and for all without having to resort to burying it underground,” Dr. Paul M. Brown, President and CEO of Nuclear Solutions.

The research, which was presented at the American Nuclear Society 2001 Winter Meeting, “Nuclear Research and Development,” conference this week in Reno, Nevada, was conducted jointly by five Japanese organizations:

The Institute for Laser Technology
Institute of Free Electron Laser, Osaka University
Himeji Institute of Technology
Mitsubishi Heavy Industry
Kansai Electric Power Corporation

Nuclear Solutions, Inc. is marketing its patented and patent pending technology to the nuclear industry through licensing and joint ventures.

This press release may be deemed to contain forward-looking statements that could affect the financial condition and results of operations of the company and its subsidiaries. Further information on potential factors that could affect the financial condition, results of operations, and expansion projects of the company are included in filings with the Securities and Exchange Commission.

NOTES TO THE EDITORS:

1. Nuclear Solutions, Inc. (NSOL) is pioneering the application of photonuclear physics for the treatment of nuclear waste and the safe, efficient generation of electricity. Development of this patented and patent pending technology could result in the elimination of nuclear waste and a new generation of nuclear reactors that are able to burn their own waste.

The application of photonuclear physics to nuclear waste is called Photodeactivation (a term coined by the inventor, Dr. Paul M. Brown).

Photodeactivation involves the irradiation of specific radioactive isotopes to force the emission of a neutron, thereby producing an isotope of reduced atomic mass. These resultant isotopes are characteristically either not radioactive or radioactive with a short half-life.

NSOL's technology works on the laboratory scale, and preliminary computer simulations suggest that this technology will also work on the industrial scale. NSOL is taking the steps necessary for commercialization of the technology. Like most of the advanced nuclear technologies developed today, computer simulation is one of the most important and necessary steps. NSOL will use and improve a series of nuclear simulation codes. The new set of simulation codes will allow the NSOL research and development team to design, test, improve and develop experiments and commercial facilities through computer modeling.

NSOL plans to capitalize on its patented and patent-pending technology by forming strategic alliances and joint ventures with the well-established leaders in the nuclear industry. Continued revenue streams are expected through licensing of the technology with both upfront fees and ongoing royalties.

2. Nuclear Solutions' technology, the HYPERCON(TM) ADS process, is an electron accelerator-based photodisintegration process that reduces the atomic mass of radioactive materials, thereby rendering them non-radioactive or radioactive with a short half-life. These processes involve accelerator-driven technology and photo-nuclear reactions, incorporating the most recent advances in the photo-nuclear industry.

3. The technology could be developed into new applications for remediation of nuclear waste. Industrially, it would operate at a sub-critical level, so the heat produced by the process could also be used to generate electricity in a safe and environmentally benign manner.

Contact for Nuclear Solutions
Dr. Paul M. Brown, 208/846-7868
www.nuclearsolutions.com

French Scientists Reinforce NSOL's Photo-nuclear Technology

Press Release

SOURCE: Nuclear Solutions, Inc.

French Scientists Reinforce NSOL's Photo-nuclear Technology

MERIDIAN, Idaho--(BUSINESS WIRE)--Nov. 20, 2001--Nuclear Solutions, Inc. (OTCBB:NSOL - news) said today that three French experts have reinforced the scientific validity of the company's electron accelerator-based photodisintegration process for remediation of nuclear waste and the safe generation of electricity called HYPERCON™ ADS.

The three researchers from France's atomic energy agency (CEA), Bruno Bernardin, Danas Ridikas, and Henri Safa, presented a technical paper, entitled "A Prototype Sub-Critical Reactor Driven by Electron Accelerator", at the Nov. 11-15 meeting of the American Nuclear Society 2001 Winter Meeting, "Nuclear Research and Development" conference. The research indicated that the capital costs involved to build such a system would be significantly less than the proton-based systems currently used worldwide.

Nuclear Solutions President and CEO Dr. Paul Brown said he is "delighted to see a prestigious international research organization of CEA's caliber independently substantiating the feasibility, practicality and economics of NSOL's HYPERCON™ ADS technology. Now that the Japanese have verified that the process works for the treatment of nuclear waste and the French have verified that the process is practical for producing power, we as a company are ready to move from the R&D stage into marketing."

The French scientists consider an electron driven photo-nuclear system such as the HYPERCON™ ADS "an unusual system...eliminating most of the problems encountered in conventional Accelerator-Driven Systems (ADS)."

Moreover, the CEA researchers have been using the MCNP (Monte Carlo N-Particle) computer code that NSOL has been expanding to model its technology. This code has been used by international researchers to model other nuclear applications, but not photo-nuclear ones. "The same MCNP code enhanced with photo-nuclear capability has been used to model neutron production with electrons," the French wrote. Nuclear Solutions Vice President for Research and Development Dr. Qi Ao, himself an expert in MCNP code modeling, emphasized that NSOL is also refining the code to enhance its photo-nuclear capabilities and would welcome the opportunity to work with CEA in that area.

This press release may be deemed to contain forward-looking statements that could affect the financial condition and results of operations of the company and its subsidiaries. Further information on potential factors that could affect financial conditions, results of operations, and expansion projects of the company are included in filings with the U.S. Securities and Exchange Commission.

NOTES TO EDITORS:

1. Nuclear Solutions, Inc. (NSOL) is pioneering the application of photonuclear physics for the treatment of nuclear waste and the safe, efficient generation of electricity. Development of this patented and patent-pending technology could result in the elimination of nuclear waste and a new generation of nuclear reactors that are able to burn their own waste.

The application of photonuclear physics to nuclear waste is called 'photodeactivation' (a term coined by the inventor, Dr. Paul M. Brown). Photodeactivation involves the irradiation of specific radioactive isotopes to force the emission of a neutron, thereby producing an isotope of reduced atomic mass. These resultant isotopes are characteristically either not radioactive or radioactive with a short half-life.

NSOL's technology works on the laboratory scale, and preliminary computer simulations suggest that this technology will also work on the industrial scale. NSOL is taking the steps necessary for commercialization of the technology. As for most of the advanced nuclear technologies developed today, computer simulation is one of the most important and necessary steps. NSOL will use and improve a series of nuclear simulation

codes. The new set of simulation codes will allow the NSOL research and development team to design, test, improve, and develop experiments and commercial facilities through computer modeling.

NSOL plans to capitalize on its patent and patent-pending technology by forming strategy alliances and joint ventures with well-established leaders in the nuclear industry. Continued revenue streams are expected through licensing of the technology with both upfront fees and ongoing royalties.

2. NSOL's technology, the HYPERCON™ ADS process, is an electron accelerator-based photodisintegration process, incorporating the most recent advances in the photo-nuclear industry.

3. The technology could be developed into new applications for remediation of nuclear waste. Industrially, it would operate at a sub-critical level, so the heat produced by the process could also be used to generate electricity in a safe and environmentally benign manner.

www.nuclearsolutions.com

Contact:

Nuclear Solutions, Inc.

Dr. Paul M. Brown, 208/846-7868.

www.nuclearsolutions.com

Nuclear Solutions Inc (OTC BB:NSOL.OB - news

Two FBI Agents Targeted NSOL's Photo-nuclear Technology

(Source is Thomas Valone's email to Gary Vesperman)

From: "Integrity Research Institute, Thomas Valone" <iri@erols.com>

To: "Integrity Research Institute, Thomas Valone" <iri@erols.com>

Subject: New Energy Targeted by FBI Agents

Date: Mon, 10 Jun 2002

Attachment: FrenchVerfiesNSOL.doc (49k), elgindy.ind1e.pdf (137k)

(Source of above chapter "French Scientists Reinforce NSOL's Photo-nuclear Technology")

Future Energy eNews June 11, 2002

Emerging Energy Company is One Company of Several Targeted by Two 'Rogue' FBI Agents

Since I was interviewed for over an hour for this story by two Wall Street Journal reporters regarding Dr. Paul Brown and Nuclear Solutions (the main company targeted by this scam), I thought the material in the indictment would be made public in this article. Reading the attached indictment makes it clear that two FBI agents, "on administrative leave," and a crooked stock 'short-seller' Elgindy, sought to purposely undermine the Nuclear Solutions public image and a few other unnamed companies.

Meanwhile, the FBI confidential database that the agents were using also had inaccurate information on Dr. Brown, which makes the scheme seem even more fraudulent. The question may be why an emerging energy company that realistically challenges the administration's Yucca Mountain storage plan would be targeted by FBI agents who appear to be risking their careers for a few bucks. (Maybe chief counsel Coleen

Rowley would be interested in this mysterious plot.) No mention of Nuclear Solutions or Brown is made in this article sent to me by the reporter, which probably is in print by now. – TV

IN THE MONEY: Stock Scheme May Have Had More Targets

By Carol S. Remond

06/07/2002

Dow Jones News Service

(Copyright (c) 2002, Dow Jones & Company, Inc.)

A Dow Jones Newswires Column

NEW YORK -(Dow Jones)- An alleged stock-fraud scheme that targeted six companies and led to the arrests of two federal investigators and a well-known short seller may have had more companies as potential targets. How many more companies than the original six mentioned in the federal indictment handed down late last month in Brooklyn, N.Y., isn't known. But testimony at a bail hearing earlier this week indicated that at least one defendant was looking for more information on 10 individuals or companies.

And there is talk in the short-selling community that the same defendant – a former federal law enforcement officer – may have tried to peddle his services to other investors. His lawyer declined comment.

As reported, short-seller Anthony Elgindy and two associates were arrested in the case, as were Jeffrey Royer, a former Federal Bureau of Investigation agent, and Lynn Wingate, currently on administrative leave from the FBI. Royer and Wingate were charged with supplying Elgindy confidential information from FBI databases that he and others used to pressure stock prices of companies they had already shorted.

In addition, the indictment alleged, the information was used to extort stock from the target companies. Royer left the bureau in December and went to work with Elgindy in San Diego.

At the bail hearing for former FBI agent Royer earlier this week, a New Mexico police officer was called to testify. Royer was reincarcerated last week after prosecutors charged he violated the terms of his initial release because he had contacted a potential witness in the case – the New Mexico police officer.

Officer Michael Mitchell told the court he knew Royer from working with him on a joint law enforcement narcotics task force last year. He testified that Royer called him this past March and April “no more than 10 times” to run checks on people. The Gallup, New Mexico, police officer, who isn't charged in the case, was testifying in court at the request of Brooklyn Assistant U.S. Attorney Kenneth Breen.

Law enforcement agencies across the country have access to a centralized computer that contains information on people's criminal backgrounds. It is this same kind of information that Royer had allegedly accessed and passed along to Elgindy that is at the heart of the government's case against him. Mitchell testified that Royer told him he needed the database searches because of unfinished FBI business and also for his new line of work as a private investigator.

During the court hearing, Mitchell said Royer asked him to do some background checks on people, including past arrests. On one occasion, Mitchell said he provided Royer with information about an unnamed person's previous drug conviction in Florida. The officer, who said he ran searches in the National Crime Information Center Database, didn't say what names Royer asked him to check.

However, people familiar with the matter said one person who Royer was looking for information about was Michael Zapetis, a large investor in a Boca Raton-financial startup company called Investco Inc.

Zapetis was arrested in 1982 on drug smuggling charges. He was sentenced to 15 years in prison but the sentence was later amended, and he ended up serving just eight months. Zapetis and his relationship with Investco was explored in a Dow Jones Newswires column in early April. Additional columns about Investco explored an acquisition Investco said was key to its growth strategy but which never took place. And a third column explored the involvement of Investco's chief executive in the famous "Mob on Wall Street" case in the late 1990s. He received immunity for testimony against a defendant in the case.

Investco, its chief executive officer Joseph Lents and First International Finance Corp. (FIFC), a company controlled by Zapetis, were charged with violating securities laws by the Securities and Exchange Commission in May. Elgindy mentioned Zapetis' previous drug conviction in several messages to subscribers of anthonypacific.com, one of his Websites, in April. Based primarily on Zepetis' previous conviction, Elgindy recommended to short sell Investco on April 4.

During his testimony this week, police officer Mitchell said that he usually relayed the information requested by Royer by telephone and, on one occasion, by fax, "from my office to his office in San Diego."

Brooklyn Assistant U.S. Attorney Breen last week said Royer attempted to tamper with a witness in the case when he called Mitchell shortly after his release on May 23.

Mitchell said he stopped providing information to Royer in April after he developed a "bad feeling about him." "At that time, I decided I didn't have to have that association," Mitchell told Breen.

Under cross examination by Lawrence Gerzog, Royer's lawyer, Mitchell said he didn't know that Royer was using the information for securities trading. In addition to Mitchell, Royer also contacted FBI special agent Vincent Sanchez on May 24, in what the prosecution says was an effort to learn more about the nature of the evidence gathered against him and agent Wingate. Later, when asked why Royer called the FBI agent, Gerzog said "It's not clear." Gerzog added that the phone call was not important because he would have access to all of the evidence anyway during the discovery process of the case.

Royer and Wingate have pleaded not guilty. Egindy's two associates, Derrick Cleveland and Troy Peters, are out on bail and have yet to plead in the case. Elgindy remains incarcerated in San Diego. On Tuesday, he agreed to be moved to New York to face charges. A lawyer for Elgindy said the short seller would likely arrive in New York next week.

By Carol S. Remond, Dow Jones Newswires; 201-938-2074;
carol.remond@dowjones.com
Copyright © 2000 Dow Jones & Company, Inc.

Nuclear Solutions and Washington Nuclear Sign Contract

Press Release

SOURCE: Nuclear Solutions

Nuclear Solutions and Washington Nuclear Sign Contract

MERIDIAN, Idaho--(BUSINESS WIRE)--Nov. 7, 2001--Nuclear Solutions, Inc. (OTCBB:NSOL - news) and Washington Nuclear Corporation (WNC) have signed a contract under which WNC will provide consulting services and identify market opportunities leading to demonstration, financing, and commercial deployment of NSOL's HYPERCON(TM) ADS process for transmutation of nuclear materials and generation of electricity.

WNC is an international consulting and information services company. Based in suburban Washington, D.C., the company provides services to all segments of the commercial nuclear power industry and the international political arena and has clients in the United States, Asia, Australia, Canada, and Europe.

“We are excited to have WNC on board as we look to the possibilities for our technology,” said Nuclear Solutions President Dr. Paul M. Brown. “We are confident that WNC's international experience in the nuclear arena will position us well.”

WNC Director Eric Lindeman added, “We believe the Nuclear Solutions technology holds tremendous promise for the safe handling of nuclear materials, particularly radioactive waste, while at the same time generating electric power.”

This press release may be deemed to contain forward-looking statements that could affect the financial condition and results of operations of the company and its subsidiaries. Further information on potential factors that could affect the financial condition, results of operations, and expansion projects of the company are included in filings with the Securities and Exchange Commission.

NOTES TO THE EDITORS:

1. The Nuclear Solutions technology is an electron accelerator-based photodisintegration process that reduces the atomic mass of radioactive materials, thereby rendering them non-radioactive or radioactive with a short half-life. These processes involve accelerator-driven technology and photo-nuclear reactions, incorporating the most recent advances in the photo-nuclear industry.
2. The technology could be developed into new applications for remediation of nuclear waste. Industrially, it would operate at a sub-critical level, so the heat produced by the process could also be used to generate electricity in a safe and environmentally benign manner.

Contact:
Nuclear Solutions
Dr. Paul M. Brown, 208/846-7868

Nuclear Solutions Makes \$50 million Announcement

Press Release
SOURCE: Nuclear Solutions, Inc.
Nuclear Solutions Makes \$50 Million Announcement

MERIDIAN, Idaho--(BUSINESS WIRE)--Nov. 27, 2001--Nuclear Solutions, Inc. (OTCBB:NSOL - news) announced today the signing of a Letter of Intent for a \$50 million (USD) Developmental License Agreement with The Photodeactivation and Transmutation Institute of Europe, Ltd., for NSOL's electron accelerator-based photodisintegration process for remediation of nuclear waste and the safe generation of electricity.

The Letter of Intent details a two-part license agreement. Part One will constitute a developmental license. Part Two will constitute a use license. In addition to the \$50 million License Fee, NSOL will be paid, per installation, (a) an Accelerator Driven System fee; (b) electric generation/cogeneration fees; (c) an annual license renewal fee; and (d) fees for nuclear material storage, handling and processing.

NSOL and The Photodeactivation and Transmutation Institute of Europe, Ltd. will finalize the formal terms and conditions of the agreement within the next 45 days.

This press release may be deemed to contain forward-looking statement that could affect the financial condition and results of operations of the company and its subsidiaries. Further information on potential factors that could affect financial conditions, results of operations, and expansion projects of the company are included in filings with the U.S. Securities and Exchange Commission.

NOTES TO EDITORS:

1. Nuclear Solutions, Inc. (NSOL) is pioneering the application of photonuclear physics for the treatment of nuclear waste and the safe, efficient generation of electricity. Development of this patented and patent-pending technology could result in the elimination of nuclear waste and a new generation of nuclear reactors that are able to burn their own waste.

The application of photonuclear physics to nuclear waste is called Photodeactivation (a term coined by the inventor, Dr. Paul M. Brown).

Photodeactivation involves the irradiation of specific radioactive isotopes to force the emission of a neutron, thereby producing an isotope of reduced atomic mass. These resultant isotopes are characteristically either not radioactive or radioactive with a short half-life.

NSOL's technology works on the laboratory scale, and preliminary computer simulations suggest that this technology will also work on the industrial scale. NSOL is taking the steps necessary for commercialization of the technology. As for most of the advanced nuclear technologies developed today, computer simulation is one of the most important and necessary steps. NSOL will use and improve a series of nuclear simulation codes. The new set of simulation codes will allow the NSOL research and development team to design, test, improve, and develop experiments and commercial facilities through computer modeling.

NSOL plans to capitalize on its patent and patent-pending technology by forming strategy alliances and joint ventures with well-established leaders in the nuclear industry. Continued revenue streams are expected through licensing of the technology with both upfront fees and ongoing royalties.

2. NSOL's technology, the HYPERCOM(TM) ADS process, is an electron accelerator-based photodisintegration process, incorporating the most recent advances in the photo-nuclear industry.

3. The technology could be developed into new applications for remediation of nuclear waste. Industrially, it would operate at a sub-critical level, so the heat produced by the process could also be used to generate electricity in a safe and environmentally benign manner.

Contact:

Nuclear Solutions, Inc.

Dr. Paul M. Brown, 208/846-7868

brown@nuclearsolutions.com

Paul Brown's IEEE Lecture at UNLV

Subject: Re: IEEE meeting 3/14/2002
Yingtao Jiang yingtao@egr.unlv.edu
Date: 02/27/2002
To: steven.n.hinman@us.mwhglobal.com
cc: davidaviv@msn.com, yingtao@egr.unlv.edu
Subject: Presentation

Dear Steve Hinman:

Our next meeting is to be held March 14th at the UNLV BEH building (at the Beam Business Building) Room 112. Can you send the announcement to everybody immediately?

Thanks.

Best regards,
Yingtao

(UNLV is University of Nevada-Las Vegas)

The Las Vegas Section of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) will have as its guest speaker Dr. Paul Brown, President of Nuclear Solutions Inc. He will present original work that he has done on transmutation of nuclear waste by means of photon acceleration.

The official title of the talk and the speaker's name: "Transmutation of Nuclear Waste By Means of Photon Acceleration Technology" by Dr. Paul Brown, President, Nuclear Solutions, Inc.

Please advise the IEEE membership and guests of this event. It ought to be a "blowout". A one-page summary of the talk and a one-page bio of Dr. Brown is in the attachment to this e-mail.

Many thanks again and always for your help in the IEEE lecture program.

Sincerely,
David Aviv

(Dr. Brown's bio is next.)

PAUL M. BROWN, Ph.D.

Paul M. Brown is a highly innovative, interdisciplinary scientist and entrepreneur. He is a major contributor to the field of radio-isotopic generator research, particularly direct energy conversion, and is known to be an individualist in the field who has achieved noted successes. He has been a prolific research scientist in laboratory environments for more than 15 years. Today, as the President and CEO and Inventor of the core technology for Nuclear Solutions, Inc., Dr. Brown is paving the way for his management team and scientists to continue development and application of photonuclear transmutation for the efficient elimination of radioactive waste and the safe and environmentally benign generation of electric power.

The holder of numerous patents in the United States and throughout the world, Dr. Brown has specialized in all aspects of nuclear research and development, including project leadership, design, development, testing, prototyping, and consulting. He is also proficient in several other scientific fields, such as solid-state physics, chemistry, combustion engineering, plasma physics, and electrodynamics. He is affiliated with such distinguished organizations as the American Nuclear Society, the American Institute of Aeronautics and Astronautics, the Institute of Electrical and Electronics Engineers, and the American Association for the Advancement of Science.

Dr. Brown's innovative accomplishments over the years earned him recognition in 2000 by the International Biographical Center, Cambridge, England, which named him one of the "Outstanding Scientists of the 20th Century". He has been listed in editions of Who's Who Worldwide: Global Business Leaders and Who's Who of American Inventors.

Dr. Brown took the longstanding idea of transmutation via the addition of neutrons to the target nucleus and determined that one could efficiently transmute radioisotopes by way of subtracting neutrons from the target nucleus. This way of approaching the problem was quite counterintuitive but very feasible. Dr. Brown published the first papers on the use of photonuclear processes as the basis for an accelerator-driven transmutation system. While his idea was similar in topology to the system being developed by Los Alamos National Labs, the active mechanism of transmutation is effectively the opposite. Interestingly, his approach offers several advantages: There is no need for extensive chemical pre-processing and the energy required to effect transmutation is greatly reduced.

MOST RECENT CONFERENCE PRESENTATIONS:

American Nuclear Society 2nd Topical Meeting on Decommissioning, Decontamination & Reutilization of Commercial & Government Facilities, September 12-16, 1999, Knoxville, TN.

PHOTOREMEDIATION-AN EMERGING TREATMENT TECHNOLOGY.

American Nuclear Society – Fuel Cycle & Waste Management Division, Global '99, International Conference on Future Nuclear Systems, Aug 29-Sept 3, 1999, Jackson Hole, WY.

PHOTO-TRANSMUTATION FOR WASTE MANAGEMENT.

PHOTODEACTIVATION TECHNICAL SUMMARY

The nuclear fission of heavy elements following the absorption of electromagnetic radiation (photofission) was first predicted by Bohr and Wheeler in their famous 1939 paper. Haxby, Shoupp, Stephens, and Wells (1941) were the first to produce fission with gamma rays.

The process of photodeactivation is the application of gamma rays for the purpose of transmuting radioactive isotopes into stable or non-radioactive isotopes and may be summarized thusly; an electron accelerator is used as the prime driver for the reactions within the photon reactor. The accelerated electrons are used to generate gamma rays with energies of about 10 to 14 MeV. The accelerated electrons are directed onto a target of spent nuclear fuel where bremsstrahlung deceleration yields gamma rays within a few thousandths of an inch. These gamma rays in turn irradiate the spent nuclear fuel (or enriched fuel) to produce photofission (which releases some 200 MeV per event) as shown by many published papers such as Kase. This photofission produces the typical fission waste products Cs-137 and Sr-90 as well as fast neutrons. The attenuation of the primary gamma rays by the spent fuel target reduces the energy of the gamma photon to a level below the threshold of photofission in a fairly short distance (about 1 meter).

However, the fast neutrons produced may be used by a suitable converter material such as nickel to produce 9 MeV gamma rays as shown by Manfredini and others. The design then requires nickel converter rods rather than the typical neutron absorbing control rods, to recover the energy that would be lost with the fast neutrons. Such a process increases the efficiency of the burn-up, as well as helps to assure a general isotropic gamma and fast neutron irradiation. Matsumoto published his calculations in 1988 showing that the fission waste products Cs-137 and Sr-90 could effectively be incinerated by the (γ ,n) reaction (known as photodisintegration) and accelerate the decay to stable rate by 180 times with a gamma flux of 10^{18} gamma/cm²-sec. Such a gamma flux is achievable within our photon reactor. Yamadera and his associates have already shown that Cs-137 may be effectively converted into Cs-136 by the (γ ,n) reaction.

The basic principles are simply photofission, neutron absorption and photodisintegration but, of course, this all requires a low energy (about 10 MeV), high power (one megawatt beam power), electron accelerator that can operate in continuous manner as developed in Japan and complete since 1996, and in use by the Russians as well as the French.

The basic principles are well known, no new technology needs to be developed, yet the engineering of such a photon reactor must be completed which requires additional development of MCNP code to include photofission reactions as well as the complete library of photonuclear reactions.

Application of this photon reactor produces power while reducing the fissile materials to fission waste products and the fission waste products are converted to stable and short lived isotopes. This is the definition of photodeactivation. The French have verified that this is a practical method for generating power, is economical and will work using existing technology while the Japanese have verified that the process actually works for transmuting nuclear waste products to stable materials. The safety advantages over conventional nuclear power are readily apparent and of course, a solution to the nuclear waste problem would make nuclear power a viable power choice for the future.

(I first met Dr. Brown at an Institute of New Energy Symposium in Salt Lake City in 1998. Gary Vesperman)

From: pacenet@canada.com
To: vman@skylink.net
Subject: Re: UNLV March 14 IEEE meeting / Dr. Paul Brown
Date: 1 Mar 2002

Thank you for this notice.

Our Association is negotiating a multi-billion project for international nuclear waste decontamination. It would be interesting if you were to attend the presentation and feel him out whether he would want to be part of our initiative – which would be humanitarian and pro bono. We aim to treat medical, utility and military nuclear waste materials. We would like to include his technology along with several other proven ones for rapid decontamination. Although he is a fine and helpful member of PACE, and although he has worked with Atomic Energy of Canada on a contractual basis, when it comes to networking with his technologies – contrary to other PACE members, he is very hyper about doing anything outside of the US. But here we are embarking on a program which would be at least one-half for the advantage of US, which has most of the world's nuclear wastes.

Could you send us a short, summarized, cv in case we were to consider your input into this program? By monday.

Cordially, and in goodwill,
Andrew Michrowski

(Forwarded from an announcement of the March meeting of the Las Vegas section of the Institute of Electrical and Electronics Engineers, Inc. If any questions, you may call me at 702-435-7947. Gary Vesperman)

Andrew Michrowski, Ph.D., is President of Canada's Planetary Association for Clean Energy (PACE). I recommend subscribing to their newsletter for news of new sources of energy, etc. Serious students of new sources of energy ought to purchase a copy of all of their back issues. They have been in business for over 20 years. Gary Vesperman

I met Dr. Paul Brown at an Institute of New Energy Symposium in Salt Lake City in 1998. I am glad he finally feels confident enough with his research to publicly announce his method of neutralizing radioactive waste. Now we can stop wasting money on the Yucca Mountain dump. Note that Dr. Brown's photo-remediation method offers the side benefit of safely producing electricity from the heat of the process. I met Al Throckmorton a year ago. Al is President/Chairman, Energy Research Group, Denver. Gary Vesperman)

Paul Brown had an eight-page handout on his photo-remediation technology for transmutation of nuclear waste. It appeared to offer a fundamentally different way of nuclear power that is cheaper, safer, and cleaner than light-water reactors. Any kind of radioactive or fissionable material can be used as fuel such as thorium and unenriched uranium as well as all existing isotopes of radioactive waste.

Brown claimed that his photo-remediation technology can be used to generate energy at a capital cost of \$1,000 per kilowatt of capacity. Presently, nuclear power plants use neutrons to fission fissile matter to generate heat.

The major components evidently are all available as off-the-shelf items. For example, a high-power, low-energy (14 MeV) electron linac to produce the gamma rays has been operational in Japan since 1996. It seems to be a straightforward engineering exercise to build a demonstration pilot plant.

From : GEORGE C MESSENGER <GPMESSENGER@prodigy.net>

To : Gary Vesperman

Subject : Re: Paul Brown dies in drag race

Date : Tue, 09 Apr 2002

Dear Gary,

After listening to his presentation and reading his papers, I made some calculations. Even using the biggest gamma sources available, it would take at least three months to process about ten tons of high level waste. This would hardly make a dent in the huge amount of waste awaiting disposal. His photo-deactivation is not cost effective or commercially viable unless someone invents a gamma source about 100 times as big as we now have.

Sincerely Yours,

George Messenger

From: Gary Vesperman
To: (Deleted)
Date: Tuesday, April 09, 2002 7:31 AM
Subject: Messenger - photo-deactivation not cost-effective

George Messenger attended with (deleted) and me Paul Brown's presentation to the IEEE at UNLV a month ago. I recall George questioning Paul about gamma ray cross-sections. I myself don't know enough about the subject to meaningfully comment on photo-deactivation. I know that George is considered a nuclear waste expert among Nevada public officials. To succeed with commercializing its photo-deactivation process, Nuclear Solutions, Inc., is going to have to credibly rebut George's calculations. I wonder if George plans to publish a paper on this subject.

Gary Vesperman

From: Gary Vesperman
To: George Messenger <GPMessenger@prodigy.net>
Date: Monday, April 22, 2002
Subject: Paul Brown's euology

George,
Thanks for your message explaining that your calculations show photo-transmutation to be inefficient at neutralizing radioactive waste. It is a puzzle to me that if the black helicopter people take Paul Brown seriously enough to harass him, why bother if photo-transmutation is not efficient in the first place?
Gary

(From a holder of shares of Nuclear Solutions)

For complete information on Paul and Nuclear Solutions please contact
Catalyst Group
Enrique Salinas
e@ideasonfire.com
727-441-8809
He is very knowledgeable about the man and the Company.

Yucca Alternatives could be Problematic

Yucca alternatives could be problematic
By Scott R. Burnell
UPI Science News
From the Science & Technology Desk
Published 4/17/2002

WASHINGTON, April 17 (UPI) -- (Editor's note: This is the third article in a four-part series from United Press International examining some of the scientific issues related to using Nevada's Yucca Mountain as a nuclear waste repository site. Congress has started a 90-legislative-business-day period where it must vote to override the state's objections to continue the project. The House Energy and Commerce Committee is to hold a hearing on the project on April 18.)

The proposed nuclear waste storage site at Yucca Mountain continues to face vociferous and determined opposition but other avenues for handling the deadly waste also must deal with many of the same scientific and societal obstacles.

Spent fuel from nuclear power plants and other waste components must be secured in some shape or form, given the thousands of years the material will remain dangerous. Isolating the waste in a stable geological formation remains the favored option among scientific groups, but current technology offers other solutions, scientists told United Press International.

The most intriguing possibility is called transmutation. Not the alchemist's dream of turning lead to gold, rather it involves artificially inducing radioactive elements to decay hundreds or thousands of times faster than normal.

Atomic nuclei contain a set number of subatomic particles called protons and neutrons. If the nuclei somehow acquire extra neutrons, they become unstable and give off radiation as they try to return to their proper proton/neutron balance. This is what causes elements to become radioactive. Transmuting nuclear waste involves injecting energy into radioactive material, said Patrick Herda, a vice president of Nuclear Solutions, an Idaho-based company attempting to commercialize the process.

“The nuclei are excited by something called a gamma-neutron reaction,” Herda told UPI. “Gamma photons at certain energy levels can excite the nucleus of an atom to cause it to give off one or more neutrons.”

The gamma or high-energy photons – the particles that carry light and other electromagnetic energy – accelerate the radioactive decay of nuclear waste, Herda said. The materials either become stable or change into other elements with much shorter radioactive lifetimes.

Herda said transmutation poses no risk of starting a nuclear chain reaction, something that also relies on the presence of extra neutrons. This is because transmutation does not generate particles with enough energy to support a chain reaction, he said.

David Bannon, a physics professor at Oregon State University, believes transmuting waste is technically feasible as long as some of the photons arrive at the radioactive nuclei with the proper energy level.

“If you can get the nucleus to (react) at that (energy level), the probability of its decay in certain cases may increase exponentially,” Bannon told UPI. “If the waste contains lots of isotopes, the problem becomes much more difficult (because different isotopes react to different energy levels).”

One way to deal with that challenge is to separate the various isotopes before transmuting them, Bannon said. But that would create an additional low-level waste problem in the form of contaminated equipment. As long as the entire procedure is cost-effective, however, transmutation could be preferable to storage, he said.

Herda said his company's approach would avoid the separation problem by bombarding the waste with photons across a broad range of energy levels to affect all the isotopes at the same time.

Transmutation's other primary challenge lies in efficiently generating the power necessary to create the high-energy photons. Government-operated research facilities have particle accelerators that can reach billions of electron volts, Herda said. Scientific panels, however, consistently have said the approach would consume too much electricity to be considered feasible.

Japanese researchers are looking at a ‘gamma laser’ approach that could be as effective as particle accelerators while using less power, Herda said, and Nuclear Solutions wants to refine that approach even more.

“The transmutation reaction generates enough heat to potentially run a steam turbine that could further reduce the drain on outside electricity grids.” said John Dempsey, another company executive.

Although the procedure would drastically reduce the radioactive lifetime of the waste, transporting and storing the remains still would be necessary, according to a National Academy of Sciences report released in 2001. Transmutation's main benefit would be reducing the volume of waste needing storage, thereby increasing the holding capacity of a geological repository, the report said.

Another means of disposing of nuclear waste – sending it into space – is a relative walk in the technological park compared to transmutation. The waste would be placed on a rocket booster and launched on a trajectory toward either the Sun or deep space, according to the NAS report.

Such an approach hits a nearly insurmountable wall when it comes to safety, however. The not-uncommon satellite launch failures, not to mention the space shuttle Challenger explosion, raise the risk of space disposal to unacceptable levels, the report said. The launch energy needed to reach the Sun also would substantially increase the option's cost.

Some Yucca opponents say there is no need to rush into picking a long-term solution, given the ability to store spent nuclear fuel in ‘dry cask’ containers at reactor sites. Victor Gilinsky, a former Nuclear Regulatory Commission chairman now advising Nevada in its anti-Yucca effort, said current regulations allow such storage for decades.

“The Department of Energy and the nuclear industry think a ‘permanent solution’ to the nuclear waste issue is the key to getting permission for more reactors,” Gilinsky told a group of reporters recently. “Despite DOE's current efforts to stampede the approval process, there's plenty of time to do much better.”

Brown’s Energy and Radioactivity Neutralization Inventions were Suppressed

Numerous cases of viciously thorough suppression of energy inventions as well as radioactive waste neutralization methods are available at www.energysuppression.com which is maintained by Sterling Allan and his friends. Gary Vesperman’s 123-page compilation of 95 energy invention suppression cases is accessible at www.padrak.com/vesperman and also at www.byronwine.com (do Find for Vesperman). Other sites can be found by entering in google.com Vesperman suppression and energy suppression. Additional energy suppression information is in <http://www.commutefaster.com/klooz.html> and http://blog.hasslberger.com/2007/03/pogue_hydrogen_stories_of_supp.html.

David Yurth has reported:

After being finessed into providing all the definitive laboratory data to Dr. Frank Goldner of DOE’s nuclear remediation division, then Secretary of DOE Spencer Abraham attempted to confiscate, classify and impound NRT’s technology while at the same time pretending to be considering providing grant money to support its continued development.

The fact that the technology in question had already been awarded six patents [K. Shoulders et al] was the only thing that prevented him from succeeding. Instead of providing grant funding, Dr. Goldner was instructed to put an end to NRT's pursuit of DOE funding for the development and deployment of its technologies. And that is precisely what he did.

During a conference call held on November 15, 2003, I was informed by Goldner that not only did DOE not intend to ever provide any funding to anyone for the purpose of remediating radioactive emissions in spent nuclear fuels, he insisted that it is and will continue to be DOE's policy for the next 40 years to encapsulate and bury every ounce of high-grade nuclear waste material stored in the US underground at Yucca Mountain.

Further, he told us that any attempt to obtain any high-level nuclear waste materials for testing by anyone, including government funded laboratories, would be arrested and jailed without access to legal counsel under the Export Administration Act. I still don't know what the EAA has to do with remediating radioactive emissions, but that is what he said.

In 1999, while Elliott Richardson was Secretary of DOE, NRT was awarded a discretionary grant of \$2,000,000 for the purpose of advancing its test schedule. The work was to have been undertaken in concert with Dr. George Miley, physicist in residence at the University of Illinois at Champaign-Urbana. Dr. Miley's laboratory at the Champaign-Urbana campus was level 2 accredited by DOE, and was therefore acceptable as a test and development site. However, within less than 90 days after the announcement of the grant had been published, pressure from within the Department rose to such extraordinary levels that Secretary Richardson was forced to withdraw the grant, albeit grudgingly.

The only similar technology ever contemporaneously developed in the US for the remediation of radioactive emissions in high-grade nuclear waste materials was developed in the late 1990's by Dr. Paul Brown and his colleagues at World Atomics in Colorado Springs, Colorado. After being granted several patents for the 'Nuclear Spallation Device' he designed, Brown contracted with several Japanese contractors to build three successively powerful prototype versions of his device.

He had them built in Japan because DOE actively intervened more than a dozen times to prevent US companies from building it. The problem with Brown's device was that it was little more than a small, semi-controlled nuclear fission-powered device designed to continuously bombard nuclear waste material targets with a highly charged gamma ray field. Because it was so dangerous to operate, Brown was never able to obtain the necessary State Department or UN transport clearances to have it shipped across international waters into the US for further testing and development.

As you may recall, Dr. Brown was killed shortly thereafter under the most questionable of circumstances, just as the utility of his nuclear spallation technique was about to be publicly demonstrated in Japan.

(End of excerpt)

The following is excerpted from Gary Vesperman's compilation of "Energy Invention Suppression Cases", p 87, www.padrak.com/vesperman.

Paul Brown: Hyper-Cap E-Converter

Paul Brown, Ph.D., had invented this device which Gary Vesperman wrote up for his "Advanced Technologies for Foreign Resort Project" (www.padrak.com/vesperman and <http://www.icestuff.com/~energy21/advantech.htm>).

"Perpetual Battery. The hyper-cap E-converter is a thick quarter-sized battery which would put out .001 watt "forever" for such applications as critical components inside fail-safe computers, cellular telephones, etc. The energy comes from tapping ether fluctuations."

The following is excerpted with permission from "Inventor Paul Brown's Nightmare Story", *Electrifying Times*, Vol. 10, No. 1, www.electrifyingtimes.com. His story originally appeared in Jeane Manning's book "*The Coming Energy Revolution*" www.jeanmanning.com.

Brown invented a novel method for converting natural radioactive decay material into electricity in the form of a battery. In February 1987 the proud inventor and his associates at a private research company in Boise, Idaho, decided it was time to make a public announcement of his discovery.

A series of traumatic events followed. The Idaho state departments of health and finance filed complaints against both the company and Brown. His license for handling radioactive materials was suspended. He began to receive anonymous threats, such as "We will bulldoze your home with your family in it."

Relocating the company to Portland, Oregon, did not stop the troubles. Despite the fact that a 1988 Fortune magazine article commented favorably on the nuclear battery venture, securities fraud charges were filed against Brown and his company. Oregon's finance department investigated, as did the Internal Revenue Service and the Securities and Exchange Commission.

After meeting each challenge, Brown redoubled his efforts to develop his technology, but events worsened. His young wife was assaulted. Even in their home they did not feel safe; it was robbed three times and vandalized on four other occasions. Brown was accused of drug manufacturing and eventually lost control of his company. The Browns' also lost their home. Finally, the pipe bombing of his mother's car in the early 1990s drove Brown to become a recluse.

"I understand now why inventors drop out of society," he said in a 1991 open letter to other new-energy researchers. His advice to them! "Keep a low profile until you have completed your endeavor, be selective in choosing your business partners, protect yourself and your family, and know that the nightmare stories are true." Brown eventually died in a suspicious car accident in April 2002.

Re: Alternative Science: Jim Humble is talking about burning NUCLEAR waste

Quote Posted by Kimberley (here)

You on this tread may find this of interest....

Check out the work of Dr. Paul M. Brown

Paul Brown invented a radioisotope electric power system which is a scientific breakthrough in nuclear power. The battery utilizes the energy given off by decaying radioactive material – converting it directly into a continuous AC electrical current. Unlike conventional nuclear generating devices, the power cell does not rely on a nuclear reaction or chemical process and does not produce radioactive waste products. It uses relatively inert radioactive waste (the same stuff used to irradiate produce) to create a power cell that lasts for the half-life of the material inside (75 years)... thus a 400-volt, 24-amp battery that lasts 75 years and is the size of a soda can. Paul died in a suspicious auto accident in 2001 – quite a convenient death if you ask me. I'd love a battery that lasts 75 years :-), but of course the top of the pyramid does not.

Nevertheless, the snowball has already begun, and cannot be stopped. I'd still be concerned with the whole issue of nuclear energy being used. It's not clean energy.

<http://www.rexresearch.com/nucell/nucell.htm>
<http://www.spiritofmaat.com/archive/feb2/nuclear.htm>
<http://www.nuclearsolutions.com/>

Source: <http://projectavalon.net/forum4/showthread.php?17635-Alternative-Science-Jim-Humble-is-talking-about-burning-NUCLEAR-waste>

Date: 02 May 2002
From: Trevor Osborne <wharmony@iinet.net.au>
To: Gary Vesperman <vman@skylink.net>
CC: Thomas Valone <iri@erols.com>

Subject: Re: Eulogy to Dr. Paul Brown; energy suppression

Hello Gary,

The following script was written by a friend who is quite knowledgeable in nuclear physics, electronics and is also a power systems expert. I sent him a copy of an email you sent out referring to Tom Valone's eulogy to Dr. Paul Brown.

I am certainly no expert in this field and therefore not qualified to comment, but I thought you, or Tom, might like to?

Best regards... Trevor

Hi Trevor,

There are heaps of assumptions in any of these stories and from what I know of co-generation – economics are quite precise about the use of waste heat – because in a lot of situations the heat is not waste – it's part of the process to keep the temperature high enough for the process to be self sustaining and efficient, such as in smelting iron – which does produce enough heat to keep the process going *and* produce molten iron for easy transport. There is 'some' excess but not sufficient for reliable co-generation.

Re: How you got this, Just because there are three sources that come to you doesn't make it any more correct than one. Note: Most people live in suburbia, work 8 hrs a day, have 2 kids, get divorced, do something else when they retire and die – this doesn't make it correct or most appropriate behaviour for us as humans which can have huge capacity. It's also probabilistic the same story does the rounds through the people you know – after all they won't necessarily know you already got the same snippet – it does the 'rounds' after all :)

In fact there are many economic and psychological maxims. One of these is "The majority are mostly/usually wrong"...

There are also huge huge probabilistic problems with nuclear waste management – photoremediation does *not* suggest any way to handle this! I believe the basic approach (although well intentioned) is seriously and dangerously flawed, i.e. "The road to hell is paved with good intentions"...

Imagine a classical mix of isotopes which change – partly due to decay and due to ‘photoremediation’. How does the technique handle chemical interactions when an inert metal suddenly changes to a reactive alkali during nuclear processes etc ?

The cost of containing radioactive gases is considerable and not yet solved and gases are not dense enough to be affected well enough even by many many neutrons *and* it costs heaps to either freeze them or pressure them!

Remember there is no such thing as a pure isotope – in fact nothing is pure – everything (when it comes to materials) is contaminated and especially in respect of nuclear products, this contamination changes by the second.

I could write heaps more about the economics of capital for co-generation and the ongoing maintenance costs. There is an index for this sort of thing which is (for some) a quite complex formula where co-generation has clear economic disadvantages, overall its actually quite simple – depends on ROI. There are some places it is suitable – but even then highly dependent on the capital capacity of the plant (government or private) and also importantly the availability of skilled staff for ongoing maintenance. The ‘input’ effort (meaning cost overall) has to be balanced against the amount (and importantly *reliability*) of the power produced. Co-generation without reliability is of no use to our current consumer expectations in the first world and the third world has neither the capital or skilled labour to make co-generation any sort of compelling enterprise.

There are other intangible factors such as the conspiracy theorists, lovers of myths and intrigue, people's need to edify, etc, etc

Of course it's sad someone dies but this doesn't mean any of their creations are useful or even interesting, doubtless they had a passion for their work and others had as much passion for promoting it.

At this human level, darwinianism seems to be the over-riding paradigm,

Also for the last 10 years or so, there is nothing the US, or “State Department” can do to actually stop 'technology' leaving the country – it's very easy to use email, phone, fax etc to disseminate useful information – but it does need someone out there with a compelling need for exactly what is offered or the good intentions and time of an intermediary to manage towards a clearly defined outcome...

It would be great to get together over a coffee sometime to explore the pros-cons of this, but I am so damn busy this essay is a welcome relief from the rigors of software and hardware development, but I do allow myself these indulgences from time to time ;-)

Rgds
Mike M

At 06:59 PM 23/4/2002 +0800, you wrote:

Hi Mike,

This story is being widely publicised around the internet (I have received it from three different people in the last two days). I was also sent to every major news media in the US and many minor ones (I have a copy of all the addresses). I think it is important that we bear in mind what can happen and to this end we need to take action in a way that will not jeopardise our own safety.

Until recently (advent of the Bush admin) my sources indicated this type of suppression had almost ceased. My gut feeling that may not now be the case.

Trevor

PS. I attended the conference (UN Climate Change Treaty) mentioned below in 1999 and recall Paul Brown receiving the award.

From: Integrity Research Institute, Thomas Valone <iri@erols.com>
To: Gary Vesperman, Trevor Osborne <wharmony@iinet.net.au>
Subject: Re: Eulogy to Dr. Paul Brown; energy suppression
Date: 2 May 2002

Attachment : PhotonReactor.PDF (295k)

Dear Trevor,

I am not sure who Mike M is but he apparently has not read any of Paul Brown's papers nor visited the www.nuclearsolutions.com website. ON-SITE treatment is advocated by NSOL (their ticker name) which DOES solve the nuclear waste management, clearly and simply, while generating electricity. After losing one neutron from a low-energy (10 MeV) treatment, a host of nuclear waste products are converted to short-lived isotopes with half-lives of hours, days, or weeks, as they release energy. There is no danger, as with the government's high energy (ATW) treatment, of activating "inert" material and making it radioactive. Attached is an introductory article.

Sincerely,
Thomas Valone, MA, PE
President
Integrity Research Institute
1220 L St. NW #100-232
Washington, DC 20005
202-452-7674, 800-295-7674
FAX: 301-513-5728
<http://www.integrityresearchinstitute.org>

(from Gary Vesperman <yman@skylink.net>)

Dear Friends,

Below is Tom Valone's eulogy to Dr. Paul Brown. Note that this is the first time I myself have read the full awful story of suppression of Dr. Brown's energy inventions. I already have a 58-page file of stories of suppression of new sources of energy. Some of them are BRUTALLY VICIOUS.

Valone himself has previously reported elsewhere that the United States Government has classified nearly 4000 patents [he was one of their examiners, Trev] relating to new energy technologies, obviously to protect the fossil-fuel industries from competition. Once classified, their inventors can not work on them nor even write or talk about them under penalty of 20 years in jail. I keep seeing reports that the Bush administration is being unusually supportive and protective of the oil, uranium, and coal producers as well

as electric and gas utilities. Doubtless President Bush is not openly supportive of well-intentioned inventors of new energy technologies.

Bob Lantz of Reno, Nevada invented a "Water and Power System" which apparently is a threat to the oil, coal, and centralized electricity generating companies. The feds are accused of railroading Lantz into jail to stop his work. A CIA operative reportedly helped set him up with false evidence. The prosecution reportedly presented 237 documented lies in his case. Lantz was told to trust his appointed public defender who turned out to not even have bothered to read the case material. He needed a public defender because his money had been illegally seized.

Bob Lantz is a 75-year-old mining engineer/inventor/scientist who was awarded a Purple Heart when he was wounded while fighting bravely in World War II. He ran away from home at age 16 to join the Air Force. BTW, the feds took away and then "lost" Mr. Lantz's original photograph album from his military career, and his Purple Heart with accompanying documentation.

He is diabetic to the point of having swollen legs. There is considerable worry that Lantz may not intentionally be receiving full and proper medical treatment in federal prison. His wife, Irene Lantz, has not spent a night apart from her husband during the 42 years of their marriage until the night of February 11th. She is very worried that he may not survive his unjust 55-month stay in a federal prison in Texas nicknamed the "Pine Box".

One of the many things he became interested in was desalinization. His technique used frequencies instead of filters and could produce clean water for much less money than any other technology. With the help of a person that represented himself as associated with the United States State Department, Mr. Lantz was introduced to representatives of the Egyptian government. These representatives traveled to the United States and offered Mr. Lantz 33 million dollars to install his equipment in Egypt. At the very last minute, representatives from the United States State Department stepped in and would not allow Mr. Lantz to deliver his technology outside the United States.

One of the advantages of Mr. Lantz's technology is the seemingly surplus amount of heat generated as a result of the process of separating materials. This heat can be harnessed to generate electricity. The government said this cannot be true, but in case it is true we cannot allow you to export this level of technology. Mr. Lantz refused and continues to refuse to patent the process.

UN Climate Change Treaty organizer Alden Bryant in Berkeley, CA at 510-527-9716 is available to answer questions about the United States Government's VICIOUS suppression of World War II veteran Robert Lantz and his energy inventions. For legal details contact Lloyd Barber at 702-207-2577.

Gary Vesperman

Pathetic, isn't it? We have to fear our own supposedly freedom-loving democratic government. Lantz must be exceedingly disappointed in being so brutally treated by the very government he fought for in WW II.

Gary Vesperman

Paul Brown Euology

From: Gary Vesperman
Date: Monday, April 08, 2002 3:26 PM
Subject: Paul Brown dies in drag race

Dear Friends,

I assume you have heard of Dr. Paul Brown; he is very well known in the nuclear transmutation field. He died in an Idaho street drag race 1:30 a.m. Sunday.

A couple of weeks ago, some Las Vegas friends and I had met with Paul Brown and his company's vice president, Bry Behrmann, to discuss how we could help commercialize Paul's invention of photo-deactivation. His process appears destined to become a fundamentally new form of nuclear-generated electricity using radioactive waste, thorium, uranium, etc as fuel rather than create more of the deadly material. Paul has been trying to raise \$50 million to build a pilot plant to demonstrate that his process actually can work.

Brown's passing is especially untimely because some qualified nuclear experts believe that his process is the key to solving the radioactive waste problem and thereby stopping the Yucca Mountain nuclear waste dump.

From what I remember from reading of the business plan for Nuclear Solutions, Inc., there may be sufficient documentation and other nuclear experts to enable salvaging the technology. However, somebody is still going to have to step forward to be photo-deactivation's new champion.

(I thought it was just immature teenagers who drag race their cars late at night, not 43-year-old nuclear physicists!)

Gary Vesperman

<http://204.228.236.37/story.asp?ID=7081>

From The Idaho Statesman

Meridian man dies in drag race – CEO of Nuclear Solutions raced southeast of Boise

A 43-year-old Meridian man died early Sunday after losing control of the 1972 Mazda he was drag-racing on a remote road southeast of Boise. The Idaho State Police said Paul M. Brown was driving at a high rate of speed when he flew off the side of the Orchard access road near the Boise Stage Stop gas station on Interstate 84.

His maroon and gold RX2 tumbled several times. Brown died at the scene. ISP said he had been racing the driver of a dark-colored, 1970s Chevrolet Nova about 1:28 a.m.

Officers had learned who the driver was by Sunday night, and were tracking that person down for an interview.

The police were on the scene most of Sunday, and they were still investigating the accident late that night.

They didn't release Brown's name for more than 18 hours after the crash.

Paul Maurice Brown was the president and CEO of Nuclear Solutions Inc., which according to the company's Internet site developed technology that both cleaned nuclear waste and generated electric power.

The company is traded on NASDAQ as NSOL, and it's based in Meridian.

(From a holder of shares in Nuclear Solutions)

Paul was somewhat of a legend in Meridian because of the car he had. He put a lot of money and time into making a specially built vehicle that could go from 0 to 200 mph in a quarter mile. It was not unusual for him to drag race in the outskirts of town at night.

News Release

MERIDIAN -- Nuclear Solutions, Inc. (OTCBB:NSOL) regretfully announces the death of Dr. Paul M. Brown.

Dr. Brown was killed on April 7, 2002 in an automobile accident in Boise, Idaho. He developed the idea for the Company's patented photoremediation technology for the remediation of nuclear waste that will now be his legacy. He is survived by his wife and two children.

"Our team is saddened by this tragic loss, however, we remain fully committed to realizing the vision that Dr. Brown inspired us with. His vision holds the promise of safe and economical treatment of nuclear waste and the potential for a new generation of power reactors," said John Dempsey, Executive Vice President and Chief Operating Officer.

"We have assembled a management and scientific team that is competent and fully capable of implementing the technology that Dr. Brown invented as well as our newer acquisitions such as our GHR tritium removal technology," he concluded.

John Dempsey and Patrick Herda, co-founder and Vice President of Business Development will direct the company's activities until a new CEO is appointed by the company's board of directors. Their efforts will be supported by Dr. Qi Ao, Vice President of Research and Development and Adrian Joseph, PhD., Vice President of Special Projects.

Visit:

<http://www.nuclearsolutions.com/>

Future Energy eNews April 22, 2002

Remembering a Genius Energy Inventor, Dr. Paul Brown (1955-2002)

I thought it would be years from now that I would be writing about Paul Brown's amazing life and what his friendship has meant to me. His passing is a great loss to all of us. I first met Paul in 1983 at a Nonconventional Energy Technology Symposium in Georgia where we both were speakers. At that time, we both liked sharing information and did not believe in proprietary secrets. Paul was the most courageous inventor that I have ever known. When he discovered that "The Moray Device and the Hubbard Coil Were Nuclear Batteries" (published in Magnets in Your Future, March, 1987), I was amazed.

I remember having dinner with him in Ottawa in 1988 as he explained all of the historical evidence he had uncovered. This was detective work at its finest. Paul told me about the radiation burns he suffered on his hands as he learned how to carefully work with Strontium 90 and other materials. He also underwent training and certification to obtain the necessary license for handling radioactive materials. When Paul proceeded to improve upon the resonant nuclear battery work and patent it in 1989 (#4,835,433) as an "Apparatus for Direct Convesion of Radioactive Decay Energy to Electrical Energy," I realized the entrepreneur in Paul was now maturing. At thirty years old, Paul had merged his small Nucell company with a publicly trading Peripheral Systems, Inc. and began appearing in Fortune (Dec. 19, 1988), Business Week (Aug. 29, 1988), Hazmat World (Dec., 1989), Nuclear News (Jan., 1990) and even The New York Times (June 24, 1989). Paul also had significant conference presentations at that time such as, "Resonant Nuclear Battery May Aid in Mitigating the Greenhouse Effect" (American Nuclear Society, San Francisco, CA, 1989) and "The Beta Voltaic Effect Applied to Radioisotopic Power Generation" (American Nuclear Society, Nashville, TN, June, 1990).

Little did I know the life-threatening suppression that Paul suffered for inventing an improved, clean source of energy – that was better than any NASA thermoelectric "nuclear" batteries. Every so often a nuclear physicist in the audience would catch on that his battery exceeded the available thermal decay energy, which Paul calculated to include the available angular momentum energy. That is when his 25-year lifespan battery became too much of a good thing for some people. In 1991, Paul explained his disappearance from the business world and public life with a shocking one-page letter he circulated to IECEC speakers through Dr. Pat Bailey. His letter, showing how dangerous this work is, will forever remain etched in my memory (excerpt reprinted below):

"I have been involved with alternate energy since 1978, while still a college student. Over the years I have heard many nightmare stories about people who developed something significant only to be persecuted, harassed, persecuted, and even killed. I was sure that these stories were exaggerated or possibly the result of the inventor's own paranoia or such. Further, I met several inventors whom I felt were their own worst enemies (via fabrications of their imaginations) which confirmed my beliefs.

As time went on, in about 1982, I became involved in work of some significance and received some minor criticism and skepticism that I found to be beneficial as well as practical, but no death threats of any of the other forms of persecution. I built experimental devices, learned things unavailable from books, filed for patents and in general felt very satisfied with my life, society and the scientific system.

However, things began to change, slowly and alarmingly. The more success I had in my endeavors -- the more I began to attract dishonest and greedy people (I know this now but was unaware of it then). My life became more uncomfortable as time went on but I was not sure of the problem.

In 1987 we decided it was time to let the world know what we were working on and the results we were getting. It was a proud time for me. I thought we were doing the right thing. But this was the real beginning of the worst.

Since that February 1987, I or my company have been persecuted by the State Dept. of Health; then the Idaho Dept. of Finance filed a complaint against the company and myself; my license for handling radioactive materials was then suspended for 6 months; I began to receive threats (i.e., "We will bulldoze your home with your family in it."); then the investigation by the Oregon Dept. of Finance; then the tax man; then the Securities and Exchange Commission; my wife was assaulted; I lost control of my company; my home has been robbed three times and vandalized on four other occasions; twice now I have been accused of drug manufacturing; I lost my home; most recently my mother's car was pipe bombed.

With each hardship I strove harder toward successful development of the technologies under my endeavor. But it only seems to get worse.

Someone once said, "Paranoia is only a heightened sense of awareness." He was right! It is hard for the average guy to comprehend these disasters happening to select people. I am here to tell you it is not coincidence. I now understand why some inventors drop out from society. My advice to you is keep a low profile until you have completed your endeavor; be selective in choosing your business partners; protect yourself and your family; know that the nightmare stories are true.

God speed, Good Luck in your endeavors, and never lose The Faith.

Sincerely,
Paul Brown

(Open Letter to All Working on Alternate Energy— November 1, 1991)

It took about four more years before Paul would, as he told me later on, "Stick his head above water to see if it would get cut off." He said that he had completely dropped the business venture in Oregon because his life was more important to him than money. Furthermore, the arrests and convictions that he endured were groundless harassment, according to Paul. My guess at the time was that they were probably intended to discourage him from disturbing the fossil fuel industry, which at that time, the U.S. was going to war to protect. Only with the subsequent encouragement of friends did he later resume his research and start lecturing again, this time on tritium batteries. When I saw Paul at a 1997 conference in Colorado, he was approached by a couple of businessmen who alerted him to the brand new Bell Labs-Lucent Technologies patent #5,642,014 (June 24, 1997). Called a "Self-Powered Device," the Bell inventors had brazenly referenced Paul's public lecture on the tritium battery concept, which they proceeded to patent.

What was also unusual about the application was that it was designed solely for a watch battery that would last 25 years. Instead of going for more powerful designs, that perhaps would disturb major economic controlling interests, Bell Labs chose an almost innocuous application that surely would not displace any existing businesses. To me, this shed a light on the problems Paul suffered in Oregon with "Solving the Worldwide Need for Reliable Cheap Power" as the title of a 1989 article in Business Magazine indicated as his intentions.

In the midst of the tritium research and Paul's inability to buy it in the state where he worked, he accidentally stumbled upon a curious phenomenon in a nuclear handbook. As he looked down a long list of radioactive isotopes which are all made in nuclear reactors, Paul noticed that if he could remove one neutron from their nuclei, he would transmute each of them into a very-short-lived isotope. This discovery made him very excited and for the next few years, Paul started testing this theory. Not only was it true, but the government apparently knew about it right after WW II. (Many scientific labs around the world subsequently confirmed the viability of the photoremediation – Hypercon process.) Why bury nuclear waste and endanger everyone nearby for thousands of years, Paul asked, when he could apply photoremediation (using low-energy X-rays) and generate electricity too? As another company was formed and started to bring this invention to where Nuclear Solutions is today, Paul and his family had to survive a National Security Agency campout at their home for an extended period of time. The NSA kept threatening him and his family with "bringing in the van" if they didn't cooperate. When one young company employee asked an NSA agent what would happen if they just posted the information about nuclear waste treatment on the web in spite of any NSA controls, the agent responded, "We will kill you." (Paul's wife who was there has also confirmed this quote.)

In terror, they could only imagine whether they would live through the interrogation experience or not. It was fortunate, as Paul told me later, that he made phone calls to at least one or more high-level government friends, including one who had connections with the CIA. The intercession between Paul and the NSA, that was facilitated by the third party, was crucial to allowing Paul and his company to continue with their completely peaceful intention of eliminating nuclear waste.

Paul Brown was, and always will be, a hero in my eyes. He was also the first recipient of the "Integrity in Research Award" at our Conference on Future Energy in 1999, which made him very happy. The picture of Paul accepting that award can be found on our institute's <http://users.erols.com/iri/Pauleulogy.htm> website, where we also proudly offer the 200-page "Collected Writings of Paul Brown, Ph.D." as a memorial to his genius. Paul has published extensively on a wide variety of topics including atmospheric electricity, variable reluctance alternators, propellantless propulsion, alternates to mass-gain at light velocities, gravity and residual electric force, besides the nuclear topics mentioned above. Wired magazine produced a great article about Paul Brown in February 1999 called "Nuking Nukes" that is posted at <http://www.wired.com/wired/archive/7.02/mustread.html?pg=19> (and can be emailed, faxed, or printed for free, according to the website).

The company he founded, Nuclear Solutions, www.nuclearsolutions.com has confirmed their intention to carry on Dr. Brown's lifetime of service and discovery. Their main product, clean electricity generation plants utilizing photoremediation of nuclear waste, is well-documented on their website. It is a publicly trading company whose stock will inevitably soar, just as Paul did with all of his achievements.

Keeping the faith,

Thomas Valone, MA, PE
President
Integrity Research Institute
1220 L St. NW #100-232
Washington, DC 20005
202-452-7674, 800-295-7674; FAX: 301-513-5728
<http://www.integrityresearchinstitute.org>

Note: This Future Energy eNews article may be freely copied and reprinted without permission from the author. In fact, it is encouraged.

From: Jackie Brown
To: Gary Vesperman
Subject: Re: Euology to Dr. Paul Brown; energy suppression
Date: Sat, 27 Apr 2002

Hi,
I am the wife of Paul Brown and I just wanted to say that the article written by Tom Valone was very touching! Paul was a great scientist and very dedicated to his work and we hope to continue where he left off! He will be missed deeply!!
Sincerely,
Jackie Brown

Nuclear Solutions Reports Transition Progress

Nuclear Solutions Reports Transition Progress

Updated: Friday, April 19, 2002 01:18 PM ET Printer-friendly version

MERIDIAN, Idaho--(BUSINESS WIRE)--April 19, 2002--Nuclear Solutions, Inc. (OTCBB:NSOL) Executive Vice President and Chief Operating Officer, John Dempsey, issued the following statement addressing transitional issues:

“In order to reassure our shareholders, I thought that it was necessary and appropriate to report on the progress of transition activities at Nuclear Solutions since the untimely death of the CEO and founder Dr. Paul Brown.

“Our immediate priority is to file the 10-KSB annual report to the SEC. This is near completion. We also need to constitute a new Board of Directors, which should be in place within 30 to 60 days. This time interval is necessary to fulfill all of the regulatory requirements required by the SEC. Once this is completed, the board will then appoint a new President and CEO.

“In the interim, our management team will proceed with the implementation activities required to bring our technologies to commercial development.

“Dr. Adrian Joseph, Vice President-Special Projects, will direct the company's GHR project. GHR technology deals with the decontamination of nuclear wastewater bearing tritium and deuterium. Further information can be obtained by referencing our press release of March 6, 2002. Additionally, we will be posting more information about GHR and its environmental potential to our website in the coming weeks.

“Patrick Herda, Vice President of Business Development, is working on a joint venture with another U.S. company to use photo-remediation without heat recovery for the transmutation of specific contaminant isotopes present in certain high-level waste streams. When completed, this effort should result in a faster realization of revenues as compared to the core technology. The implementation of photo-remediation without heat recovery can also be seen as an evolutionary step in the development of the core remediation technology. We do expect to release more information on this pending venture during Q4 of this year

"Dr. Qi Ao, Vice President of Research & Development, is proceeding with the computer simulation efforts required to validate our core technology of photo transmutation of nuclear waste with concurrent heat recovery for power generation. Dr. Ao was at Los Alamos National Laboratory (LANL) April 8th and 9th for meetings with LANL personnel and Dr. Danas Ridicas from C.E.A., which is the French Atomic Energy Commission, headquartered in Sarclay, France. Dr. Ridicas was at LANL to give a seminar titled 'Potential Applications of the photonuclear processes: the renewed interest in electron driven systems.' Dr. Ao is doing a great job fulfilling our commitment to work with Los Alamos personnel and to facilitate international collaboration in the area of photonuclear science.

“We are addressing capital concerns as well. The management team is currently evaluating various funding proposals, which would fulfill our long-term funding requirements. In addition, we also have many necessary corporate housekeeping items to accomplish in the wake of Paul's death and we are proceeding vigorously in completing these tasks.

"We remain confident of the company's ability to pass successfully through this transitional phase. While our situation has changed, our mission has not. Our clear intention is to commercialize GHR and various aspects of photo transmutation as quickly as possible, with our overall goal to be the most expedient path to revenue generation."

DISCLAIMER:

This press release may be deemed to contain forward-looking statements that could affect the financial condition and results of operations of the company and its subsidiaries. Further information on potential factors that could affect financial conditions, results of operations, and expansion projects of the company are included in filings with the U.S. Securities and Exchange Commission.

CONTACT: For Nuclear Solutions, Inc.
For information or due diligence packages
Paul Kuntz, 800/518-1988
paulk@topstock.com
or
Information in German
www.zockstocks.com
<http://www.otcbb-informant.com>

Nuclear Solutions files 10-KSB Annual Report with the SEC

Nuclear Solutions files 10-KSB Annual Report with the SEC

Updated: Tuesday, May 21, 2002 09:19 AM ET Printer-friendly version

WASHINGTON--(BUSINESS WIRE)--May 21, 2002--Nuclear Solutions, Inc. (OTCBB:NSOL) filed its 10-KSB with the Security and Exchange Commission (SEC) on Wednesday May 15, 2002.

John Dempsey, Executive Vice President & COO said, "I am pleased to announce that our 10-KSB for 2001 is filed. The 10KSB for 2001 can be accessed through the SEC EDGAR system. Furthermore, as of Monday May 20, 2002 the "E" was removed and Nuclear Solutions is now listed under the ticker symbol NSOL."

Dempsey continued, "Nuclear Solutions has relocated company operations to Washington, D.C. The new address is 1050 Connecticut Avenue NW, Suite 1000, Washington, DC 20036. The new phone number is 202/772-3133. This change was initiated due to Dr. Paul Brown's death, however the Washington D.C. area is the ideal location for the headquarters because of its proximity to the government entities that have the greatest impact on the company business. The company web site (www.nuclearsolutions.com) will be updated to reflect these changes."

Disclaimer:

This press release may be deemed to contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21B of the Securities Exchange Act of 1934 that could affect the financial condition and results of operations of the company and its subsidiaries. Further information on potential factors that could affect financial conditions, results of operations, and expansion projects of the company are included in filings with the U.S. Securities and Exchange Commission.

CONTACT: For Nuclear Solutions, Inc.
Paul Kuntz, 800/518-1988
paulk@topstock.com

Nuclear Solutions Lost in Ambiguity

(From August 26, 2004 The Blanket – A Journal of Protest & Dissent)

<http://indiamond6.ulib.iupui.edu:81/nuclearambiglarosa.html>

Nuclear Solutions Lost In Ambiguity

Ambiguity: Mordechai Vanunu; a lawyer in Israel representing Dimona employees; two solutions for nuclear waste that give us alternative viable energy; a portable nuclear weapons detection system since 1999; blackmail and extortion; another dead scientist and the closing of the National Lab in Los Alamos

Mary La Rosa • 26 August 2004

While Mordechai Vanunu awaits further reprisals, perhaps further punishments for what he continues to declare proudly his act of good conscience, a dynamic new company in the same country that does not want him but also does not want to allow him to leave, has acquired a contract to clean up some of the nuclear mess for which Vanunu has sacrificed almost 20 years of his life. This nuclear clean up does not begin in the Negev, but will take place in Chernobyl and is projected to be only the beginning of an enormous projected profit as well as long awaited remedy for that which Vanunu has been trying to get our attention and that which his government has denied exists yet alone has ever acknowledged as a radioactive problem.

Similar to Mr Vanunu's ambiguous existence as a 'free' man, and similar to the Israeli government's position on its nuclear weapons count and policy about its count, Israel's nuclear waste follows in much the same ambiguity, or perhaps until this future Plasma-Gasification-Melting process can begin to work an ambiguous miracle at home as well contracts abroad.

Ambiguity is a word that serves political agendas better than it does justice to individual citizens, unless of course you live in a country where you are innocent until proven guilty. Ambiguity in Israel has not afforded Mordechai Vanunu any benefit, either in benefit of doubt for his good conscience or benefit of justice for his completion of eighteen and a half years' retribution, most of which was spent in solitary confinement with ongoing torture provided by an ambiguous prison authority.

Mordechai Vanunu's unique case as a whistleblower in a country that seems not capable of even self scrutiny or criticism, further challenges that government's policies of ambiguity about a variety of legal, moral and ethical issues. But other Israeli citizens also make such challenges and continue to suffer from ambiguity in how a government assumes or will not assume its responsibility in assurances and /or compensation for complete, in depth reportage on public safety and illnesses that have predominated among those who have worked or live(d) near nuclear reactor activities.

Israel's Atomic Energy Commission (AEC) has always denied any negligence or culpability with regards to radiation levels and the hazards of working with nuclear energy. And the AEC in Israel makes very good use of the state's policy of ambiguity by avoiding any sort of inspections while continuing to deny any problems from the past have ever existed. The average citizen is left to wonder about exposure and the official denials, especially as they become ill due to sicknesses associated with radiation.

"The reactor said I did not work in radioactive elements but my medical records show I had uranium in my urine," said one former employee from Dimona.

In 1999, while Mordechai Vanunu was still languishing in his prison cell, a Jerusalem lawyer named Reuven Laster questioned the authority of the state in its denial that any problem exists and began to represent groups of people who worked at the reactor in the early years, fifties, sixties and seventies.

This American born lawyer has a record for championing the environment as well as individuals who suffer from health hazards within the environment. Mr. Laster represents clients who press for accountability of official but ambiguous policies involved in the failure to monitor workers who were specifically active in chemical or radioactive accidents.

Obviously, trying to prove a link between the exposure and the illness has been extremely difficult for any kind of legal procedure and even after a struggle to obtain a review of all the medical records from the reactor during certain periods of time, Mr. Laster found various years 'suspiciously' deleted. Now partner in a larger law firm, this advocate continues to pursue justice for employees who worked at risk at Dimona where exposure to harm seems to have led to cancers and/or an early deaths. The number of clients he represents is growing, but there are those who will never know just and fair compensation, because those in government who have been silent choose to remain silent and without the good conscience required to afford justice to those who have suffered illness and death by ambiguity and silence of government officials. Recent evidence of migratory birds seems to point to the suffering of wild life as well.

In the midst of this dismal guessing about exactly how harmful are old nuclear reactors, comes such bright news and such hope for the world at large that one simply must pause and consider why hasn't there been a celebration in all mainstream medias around the world? One can also only wonder why entire countries and governments do not sell off every other project in order to get some clean up sooner rather than too later. Add to the discovery a way of turning harmful waste products into an energy source other than oil!

A process called PGM, Plasma-Gasification-Melting works the remedy by using plasma (ionized gas) in a reactor in order to melt down the radioactive materials. A fairly new (2002) Israeli company called Environmental Energy Resources, Ltd. (EER) has developed the PGM method for changing nuclear waste into a variety of useful byproducts such as electricity. The contract for the Chernobyl clean-up is spread over 20-25 years with annual gross revenues estimated presently at \$30-35 million. EER is under management of Itschak Shrem, one of Israel's top financial wizards of venture capital and a partner in the premiere investment house, SFK (Shrem, Fudim and Kelner). Shrem has plans to raise money from international sources as well as homeland.

According to Isra Cast Technology News, "The PGM process was originally designed and developed over twenty years ago at the Russian Research Center, 'Kurchatov Institute'. The development and adaptation of the PGM Technology involves active participation of Russian scientists who are among the original developers of this technology."

The process by which to change radioactive waste into something less harmful, however, could NOT have come as revelation to the Institute of Industrial Mathematics in Beersheva Israel, where previous to Environmental Energy Resources, IIM had worked out a deal to lease its technologies to an American nuclear physicist called Dr. Paul M. Brown who had developed a process with similar end results called GHR in 2001. GHR tritium removal technology involves the irradiation of specific radioactive isotopes to force the emission of a neutron, thus producing an isotope of reduced atomic mass.

On February 28th, 2001, Los Alamos National Laboratory also entered into a support contract with Paul Brown's company Nuclear Solutions. In November 14 of 2001 The Corporate Social Responsibility Newswire Service reported, "Japanese Scientists Corroborate Nuclear Waste Remediation Technology Owned by Nuclear Solutions" and confirmed the viability of photonuclear transmutation for nuclear waste

remediation and the development of a photonuclear-based system for transmutation of nuclear waste and safe, clean generation of electricity.

Then in March 14, 2002 Dr. Brown announced that a deal was made with Israel's Institute of Industrial Mathematics that involved the treatment of radioactive water (separate and different from GHR).

“Upon conclusion of the commercialization phase, which is expected to last 12 to 15 months, IIM and NSOL will aggressively pursue the filling of worldwide patents. IIM will own the intellectual property and NSOL will have the exclusive worldwide rights for a period of 20 years.”

Dr. Brown and the team at Nuclear Solutions seemed poised in leading the clean up of nuclear waste and yet the company was troubled financially and Dr. Brown was under personal attack. Tragically on April 7, 2002 Dr. Brown was dead at 47 from a car accident about which there still lurks the previous threats he had received over a period of time just prior to the accident. Dr. Brown's death put an odd tilt to the company's plans for the future and the company took another spiral plunge down. The company AND Dr. Brown appear to have been victims of criminal extortion and racketeering via the machinations of an Egyptian born financial analyst later charged in a nationwide stock swindle that involved FBI agents and FBI computers and who was also under suspicions for having made large amount of stock transactions just prior to 911.

Lynn Wingate, an FBI agent assigned to the bureau's Albuquerque office; Jeffrey Royer, a former Oklahoma City agent who resigned late last year; and short-seller Amr “Tony” Elgindy were among five charged in a securities fraud indictment unsealed in federal court in Brooklyn, N.Y. In exchange for money, the two FBI agents used confidential databases to provide Elgindy and other co-conspirators with information about publicly traded companies, the indictment said. Elgindy then spread negative information about the companies on his web site and to subscribers of his e-mail newsletter, InsideTruth.com, thus bringing down the price of the stock. According to the indictment, an FBI agent searched the agency's confidential National Crime Information Center database and discovered a ‘criminal’ history of a top executive for a company called Nuclear Solutions. The same day, Elgindy began sending e-mails calling the executive ‘a convicted felon’. He then sold the company's stock short.

The indictment accused Messrs. Royer and Elgindy of repeatedly short selling stock. Mr Elgindy is also charged with extortion. There is no mention why a company directly involved with nuclear waste would be highlighted for such an operation as Elgindy had going, but Mr. Elgindy spread info that Dr. Brown was a convicted felon and the stock sold short six times. Mr. Elgindy continued to personally threaten Dr. Brown. But by the time Elgindy and the FBI agents were arrested, Brown was no longer alive to tell a different tale.

Fortunately for Nuclear Solutions, just one month before his death, John Dempsey came on board. Dr. Brown, while still under threat, announced the appointment of John Dempsey. Mr Dempsey was a graduate of the Naval Academy and had served as a commissioned officer onboard nuclear submarines with an area of expertise in nuclear engineering followed by a 21-year old career at Bechtel. Just before his untimely death, Brown made Dempsey executive vice president and chief operating officer.

Did John Dempsey's appointment herald the trouble or anticipate it? How significant was his past at Bechtel?

Since Brown's death, an office in Moscow has been opened. There is a ‘new’ scientist at Nuclear Solutions named Boris Muchnik. He not only replaced Dr. Brown but another original team member, Dr. Qi Ao, as former Vice President of Research and Development. Dr. Muchnik's prior record of technology had less to do with nuclear physics claim and more to do with the invention of recordable and erasable CD and laser

technology. In lauding the rising company, medias such as CNet News have made no mention of Brown and his life long creative effort to solve the problems of nuclear waste and his creation of nuclear solutions.

Meanwhile, the National Labs at Los Alamos, where Dr. Brown had serious relationship, especially in discussing his betavoltaic batteries, has now suspended all activities since it is in the throes of a security scandal proving how negligent and lax the lab has been with regards to equipment gone missing, credit card bills and now more recently, non-existent but missing disks and the unauthorized presence of international scientists allowed access to materials of high-level security concerns. In other words, the National Lab at Los Alamos, dealing in particular with nuclear energy and weaponry has placed US national security at grave risk before, during and after the 911 attacks via careless that merited its closing and reassessment.

Most of Dr. Brown's life and creative talent had a practical focus in the present and dealt almost exclusively with the recycling of nuclear waste and including radioactive water remediation. But it is astounding that he also created a portable detection system for nuclear weapons. This particular invention was created well before his death but only now is being featured as important industry.

Since 1999, he and his work was known to the First International Conference On Free Energy that the US Department of State hosts in Washington, DC.

However, he simply could not get the backing, nor depend upon a government to protect him from FBI computers and extortion. Questions remain but will probably fade fast into the first couple of million dollars in profit that Nuclear Solutions potentially will be earning in the near future. The company will probably do every bit as well as its Israeli counterpart, EER, even if it did not get a Chernobyl contract. After all we do not need Vanunu's commitment to tell us all that there seems to be enough dangerous nuclear waste for everyone to make money.

Dr. Paul Brown's commitment to solutions for a better environment remains a life's work lost in the ambiguity of business deals and political intrigue.

Jerusalem lawyer Reuven Laster's ongoing advocacy for the environment and victims' rights struggles against the persistent ambiguity presented by a government that lacks moral and ethical concerns about its citizens' well being.

Mordechai Vanunu's good conscience and less than free life continues to be currently threatened by ambiguity. Despite the advocacy of faithful supporters in Israel and the international community at large, Vanunu remains under restrictions meant to keep 20-year-old policies and wrongs camouflaged as present security risks.

“I have no more secrets to tell” ..but YOU do!, YOU do! seems to keep coming from Vanunu.

Without structure and scrupulous guidance, ambiguity in government and business practice does NOT protect the innocent but seems rather willfully in place with specific intent to provide legal shield for all sorts of injustices and immoral and unethical acts.

Ambiguity about nuclear weapons reflects unaccountability and irresponsibility not exclusive to Israel's government; it reflects the previous and ongoing potential disaster of an ambiguous nuclear presence and most recently it has led another country rushing into war without as much regard for human life as company contracts.

Mary La Rosa is a librarian and artist living in ambiguity 20 miles from NYC

Paul Brown's Patents

US Patent No: 6,118,204 Layered metal foil semiconductor power device
Issued Sep 12, 2000

Abstract

The present invention is a power cell for directly converting ionizing radiation into electrical energy. The invented isotopic electric converter provides an electrical power source that includes an electronegative material layered in a semiconductor, to form a first region that has a high density of conduction electrons, and an electropositive material also layered in the semiconductor material to form a second region with a high density of holes. Said N-layers region and P-layers region are separated by a neutral zone of semiconductor material doped with a radioactive isotope, such as, but not limited to, tritium. No junction is formed between the N and P layers regions. Rather, the potential gradient across the neutral zone is provided by the difference between the work functions of the electronegative and electropositive electrodes. Electrical contacts are affixed to the respective regions of the first and second type conductivity which become the anode and cathode of the cell, respectively. Beta particles emitted by the tritium generate electron-hole pairs within the neutral zone, which are swept away by the potential gradient between the first and second regions, thereby producing an electric current.

Source: <http://www.patentbuddy.com/Patent/6118204#sthash.fJPqxIoZ.dpuf>

US Patent No: 6,238,812 Isotopic semiconductor batteries
Issued May 29, 2001

Abstract

A semiconductor battery that utilizes radioactive decay processes to produce electrical power by direct electrical current generation from these decay products. These batteries have extremely long half-lives. Each decay can produce on the order of 1,500,000 free electrons and 1,500,000 ions per each radioactive decay, so there is a tremendous multiplication factor for current generation. Production of these batteries by semiconductor processes greatly reduces battery cost compared to existing batteries that utilize radioactive decays. The battery comprises a n-type semiconductor layer, a radioactive semiconductor layer sandwiched between two adjacent layers of semiconductor material not containing radioactive material, and a p-type semiconductor layer.

Source: <http://www.patentbuddy.com/Patent/6238812#sthash.bbbllbpJ.dpuf>

US Patent No: 6,137,073 Enrichment method for radioactive isotopes
Issued Oct 24, 2000

Abstract

In the method of this invention, a radioactive isotope, for example, U.sup.238, is placed within a region. High-energy electrons or high-energy photons in the form of X-rays, gamma rays, or laser excitation are applied to the region. This energy is absorbed by the nucleus of the isotope, placing the nucleus in an excited state. Upon relaxation, the nucleus ejects a neutron, or neutrons, through the gamma-neutron reaction, resulting in a product isotope, namely U.sup.235.

Source: <http://www.patentbuddy.com/Patent/6137073#sthash.WpB53CIJ.dpuf>

Cost Breakdown of \$50 Million Pilot Photo-Remediation Plant

From: Gary Vesperman
To: (Deleted)
Date: Friday, March 29, 2002
Subject: Breakdown of \$50M for pilot plant

(Deleted),
From page 17 of the business plan for Nuclear Solutions, Inc.:
The cost breakdown of a 10-ton per year pilot photo-transmutation plant is:

Engineering – \$4M to \$7M.
Only one \$5M six-foot 1.2 megawatt accelerator from Japan's KEK Accelerator.
Reaction vessel – \$10M based on Canadian "slowpoke reactor".
Heat recovery system – \$20M based on estimate of \$1 per watt at 20 megawatts.
Building – \$5M based on power industry estimates.
Materials handling – \$8M based on logistics tools used in Hanford.

A full-sized plant would have 4 accelerators in a circular array around the reaction vessel 90 degrees apart. It should be safe to assume that some of these costs will decrease as experience is gained building photo-transmutation plants – one for every one of the world's 300-plus reactors plus nuclear ship support facilities, existing waste processing and storage facilities, old bombs, etc.

Gary Vesperman

From: Gary Vesperman
To: (Deleted)
Date: Thursday, March 28, 2002
Subject: Can you justify \$50M into Brown's photo-transmutation?

(Deleted),
(Deleted), three other people, and I are in the middle of doing due diligence on Paul Brown's method of generating electricity with nuclear energy called photo-transmutation. So far it has been holding up to our questions and research with mixed results. I just got via Fedex from Idaho yesterday the business plan of Nuclear Solutions, Inc. The business plan has a fair amount of miscellaneous documents. However, as a convincing organized concise selling tool to investors, it has some shortcomings.

To summarize my understanding, light-water reactors use neutrons to fission uranium-235 or plutonium atoms in a self-sustaining reaction as you know. Photo-transmutation uses a gamma ray to enter the nucleus of a fissile or radioactive atom to cause it to eject a neutron.

The resulting new isotope either is stable or has a much shorter half-life.

A six-foot electron accelerator generates the gamma rays. Four of them would be placed 90 degrees apart around the reactor vessel. Inside the vessel is either spent fuel rods moved directly from a light-water reactor, uranium, thorium, or radioactive waste. The vessel is filled with heavy water (deuterium oxide) to keep them cool enough so they don't melt from decay heat until their radioactivity is gone. There is no operating hazard as there is with light-water reactors since if there is a problem, the accelerators can be immediately shut off.

The vessel's temperature is 650 degrees which is a nice temperature for generating steam through heat exchangers and then used for driving a turbine-generator. Light-water reactors operate at a lower efficiency of 33% because of their lower temperature of 550 degrees.

The accelerators do require 1.2 megawatts each for a total of 4.8 megawatts. They are kind of an industrial-sized X-ray generator. But there is a substantial power gain since the vessel produces conservatively 80 megawatts of heat.

Supposedly, the basic claim is that photo-transmutation is a fundamentally new form of nuclear power that is safer, cleaner, and cheaper than current nuclear power. Instead of creating radioactive waste, photo-transmutation uses radioactive waste as fuel producing only usable high-grade heat and inert material.

The Russians, Japanese, and French are claimed to have all endorsed photo-transmutation. The DOE is expected to endorse photo-transmutation when the process is verified after Los Alamos National Laboratory runs existing data through their Monte Carlo nuclear weapons simulation software.

You may be personally interested that during our meeting Saturday with Paul Brown and his vice-president Bry Behrmann, Paul told us that the Monte Carlo code is so accurate that the effects of an atomic or hydrogen bomb explosion can be predicted with an amazing 1 per cent precision. So it is no longer necessary to physically test bombs.

Paul said during our meeting last Saturday that the photo-transmutation reactor vessel uses gas cooling the same way as a breeder reactor. Yet his business plan shows a diagram with spent fuel rods in a circular containment vessel filled with heavy water. Can you explain the discrepancy?

Search terms on google.com I would try are "International Fission Fuels", "Nuclear Solutions, Inc.", and photo-transmutation.

One of the problems of light-water reactors is the bombardment neutron of the steel walls of their containment vessel causes the steel to eventually become brittle and weak. How will photo-transmutation containment vessels stand up to what appears to be an even greater rate of neutron bombardment?

I don't understand (deleted)'s statement "...a disaster of monumental proportions just waiting for a place to happen." Photo-transmutation seems to be much safer than light-water reactors. Is (deleted) talking about a highly pressurized photo-transmutation containment vessel ready to burst when something fails or leaks? At least photo-transmutation supposedly reduces the inventory of radioactive materials compared with the increase of radioactive waste in light-water reactors.

Paul Brown is asking for \$50 million to build a pilot plant. Do you feel that would be a solid investment?

(Truncated)

Gary Vesperman

From: (energy researcher)

To: Gary Vesperman

Subject: RE: Radioactive waste can now be neutralized

Date: Fri, 18 Jan 2002

Gary:

Please be careful about this...Paul Brown's stuff may or may not work...it is so dangerous in its practice and concept that the DOE will not allow the devices being manufactured in Taiwan and Japan, which operate with high-intensity gamma bombardment beams, into the US. The prototype has never worked...in fact, it has never even been turned on. The problem with this device is that it is really a low-grade continuously operating fissionable nuclear device...the target material is contained in a heavily shielded containment vessel and bombarded with high-intensity gamma rays...the neutron emissions from this thing are so prodigious that it has to be operated at considerable distance robotically...it is a disaster of monumental proportions just waiting for a place to happen.

This is the essence of the nuclear spallation strategy developed by Brown and his conventional physics compatriots from the high-temperature gas-cooled nuclear reactor community...this is their bastardized hybrid integration, which uses all the technologies arising from 40 years of failed fission research to develop extremely high pressures, temperatures and heavy ion emissions to bombard nuclear waste materials...they took a page from the Low-Energy Nuclear Transmutation (LENT) book, realized that unless they could somehow steal the thunder from this very promising new technology, they would eventually be obsoleted by it...and Brown's rolling bomb shell is the result.

It doesn't work and should not be allowed to operate anywhere because it is not safe, at any speed.

From: (now retired university professor)

To : Gary Vesperman

Subject : Re: Radioactive waste can now be neutralized

Date : Fri, 18 Jan 2002

Hi Gary,

I wouldn't get too excited about this system yet. It would seem to be still in the 'computer modeling' stage with no actual system having been built or designed. The emphasis seems to be on getting rich from licensing the technology rather than on solving the problem of nuclear waste.

All that they have shown is that it may be possible to divide the nucleus of a radioactive element by hitting it with an extremely energetic photon. Then you would have two or more radioactive elements. The benefit being that they would probably have very short half-lives. You would get the same amount of radiation released as from the original element, but over a much shorter time. So, instead of a dim glow for millions of years, you would get a very bright glow for a few months (years?) the intense radiation could be absorbed to generate heat (boil water) and then generate electricity. The question remains as to whether this is an energy source or an energy sink.

I don't fully understand the process – not much information has been released. Unless you could guarantee breaking the larger nucleus into parts that did not decay by releasing neutrons, there would still seem to be a problem with residual radioactivity caused by the absorption of neutrons by surrounding materials and by the absorption of neutrons by the original material creating trans-uranium elements. (very nasty) You have not really solved the problem of radioactive waste, just changed it a bit.

The whole process could be quite hazardous to the environment and to anyone in the vicinity. At this time it seems to be just a mathematical curiosity.

----- different subject -----

I could see something like using radioactive waste for making concrete – say a 55-gal drum. Then glaze the outside of the concrete to seal it. Then, instead of dumping it into the ocean, insulate and shield it and add lots of thermocouples to generate electricity. Perhaps put a phosphor and photovoltaic cells right next to the material. Such a device would not provide a lot of electricity, but perhaps could provide enough to run a home for a very long time. A solution to the shielding might be to bury it several feet underground. The biggest problem with such a device is that the efficiencies of thermocouples and photovoltaic cells have not gone past the single digit percentages.

----- different subject -----

I have mixed feelings about President Bush getting the hydrogen fuel cell automobile initiative. That may solve some air pollution problems in large cities, but will not help the energy crunch in the least. There needs to be more research into increasing the efficiency of photovoltaics, thermocouples, internal combustion engines, and in developing alcohol fueled fuel cells. There have been some promising experiments with organic fuel cell membranes. All the time we need to keep the overall energy efficiency in mind. We need to develop sources of energy that actually produce a positive amount of energy – not sources like nuclear power that are energy sinks – that is, they require more energy to mine and refine the ore and build and dismantle the plant than the amount of energy produced during the life of the plant. solar power, wind power, tidal power, hydroelectric power, etc. are all good – especially when used to drive efficient devices.

Another change that must be made is to get away from centralized power generation and move to devices that can power single homes or businesses. We have seen too many instances where large, centralized utilities have failed (or are easy targets for terrorists) More decentralized systems are needed. The problem is that they will not be very popular since they will spell the end to public utilities. I still have a dream of someday designing a totally self-sufficient house – no connections to power, water, sewer – generate power locally, recycle water, use sewage for fertilizer or to generate methane for heat and electricity. Some lessons can be learned from the biosphere experiments, but more work needs to be done.

Senator Harry Reid is told about Paul Brown's Photo-Transmutation Technology

From: Gary Vesperman

To: (Deleted)

Date: Monday, March 25, 2002 7:08 PM

Subject: I met Senator Reid today

Near my house is a Great Harvest Bread Store where I like to buy their fresh bread which doesn't contain hydrogenated oil. Hydrogenated oil causes myocardial infarction of the heart.

This afternoon I was in there buying a loaf of bread when in walks Senator Harry Reid and his wife. We have met before so we recognized each other. I told him about Paul's photo-transmutation technology. Of course he was glad to hear that with it we could stop Yucca Mountain. I emphasized to him that I had just started investigating it with a few guys.

After we finish doing our due diligence in a few weeks, I asked him how we should then proceed working with him. Senator Reid was enthused and said to contact Marge in his Las Vegas office.

Gary Vesperman

Neutralizing Nuclear Waste Using Applied Physics

Paul Brown, Ph.D.

Nuclear Solutions LLC.

20100 E. 32nd Avenue Parkway, Suite 185, Aurora, CO 80011 (303) 5749697; (303) 574-9699 FAX;

<http://www.nucsol.com>

(Paul Brown is deceased, and Nuclear Solutions LLC no longer exists)

Introduction

Nuclear Solutions LLC has developed a process for neutralizing radioactive waste products whereby gamma radiation (x-rays) is used to induce nuclear transformations that change the normal half-life of radioisotopes, usually measured in thousands of years to a half-life measured in days, simply by using applied nuclear physics. This means that the radioactive waste products decay into non-radioactive stable elements in a matter of days. Patents are now pending.

Nuclear Waste (Fission Products)

The two fission products of principal concern because of their substantial thermal impact on the repository as opposed to posing a health risk are Sr-90 and Cs-137. These two radionuclides are dominant contributors to the heat released by spent fuel at least for the first several decades. Cs-137 is also a major source of penetrating radiation emitted by spent fuel. The two fission products of principal concern because of their potential contribution to health risk are Tc-99 and I-129. They are of principal concern because they are long-lived, produced in significant amounts in the fission process, generally soluble under geologic conditions, and migrate relatively quickly under common ground water conditions.

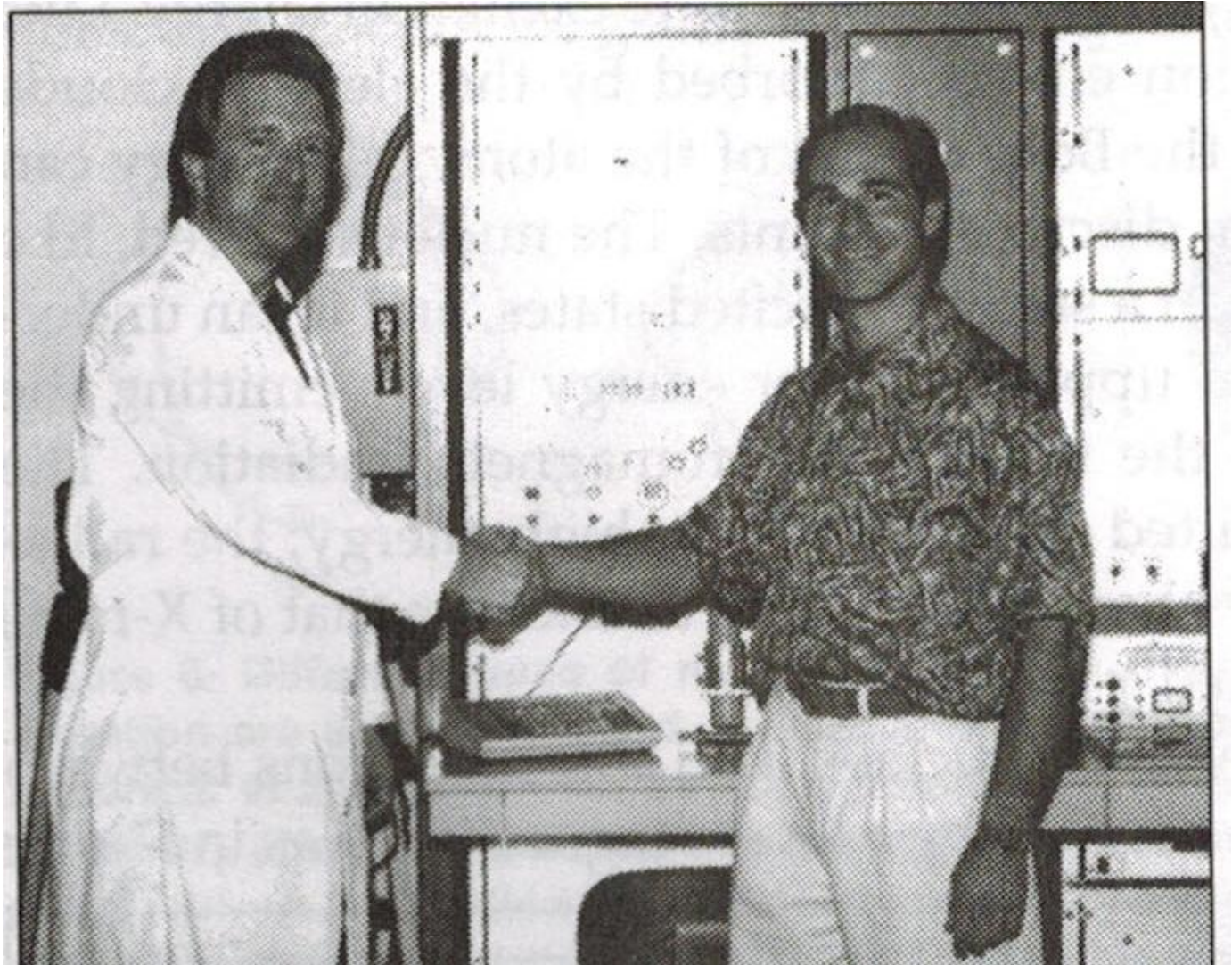
The long-term toxicity of spent fuel is dominated by the actinides such as Np-237, U-234, U-236, Pu-239, Pu-240, and Pu-242. However, the long-term risk is dominated in most scenarios by I-129 and Tc-99 because they are typically soluble and mobile in ground water pathways. By being relatively insoluble under most conditions, the actinides are not mobile. So despite their high toxicity they contribute very little to the long-term exposure risk in scenarios where ground water transport is important.¹

Nuclear Physics

The nuclear charge is equal to $+Ze$, where Z is a whole number called the atomic number of the atom. The nuclear charge arises from the presence of Z protons in the nucleus. Atoms and nuclei are named according to their Z -values. For hydrogen, $Z=1$; for helium, $Z=2$; and so on. The mass number A is equal to the total number of particles, of protons and neutrons (collectively called nucleons), in the nucleus. Of the A nucleons in the nucleus, Z are protons and the rest, $N=A-Z$, are neutrons. N is called the neutron number. In much of physics and practically the whole of chemistry, Z is far more significant than A (or N). This is because most of the ordinary properties of matter are due to the clouds of electrons outside the nuclei. In nuclear science, on the other hand, the situation is entirely different. A ranks equal in importance with Z , and its value must be added to the chemical symbol.

¹ *Nuclear Wastes: Technologies for Separation and Transmutation*, National Research Council, National Academy Press, Washington, DC, 1996, p. 26.

Just as nuclides having the same Z-value are classified together as isotopes, as are those with the same A-values (but different Z values) classified together as 'isobars', and those with the same N-values as 'isotones'. Thus Ar-40 and Ca-40 are isobars, and Si-30, P-31 and S-32 are isotones (with N=16). Particles such as electrons and nucleons which obey the Pauli exclusion principle are called fermions and are said to follow Fermi-Dirac statistics. Those not so limited are called bosons and are said to follow Bose-Einstein statistics. Even-A nuclei are bosons, and odd-A nuclei are fermions.



David Samuel, President of Nuclear Solutions (right), congratulates Dr. Brown after successful transmutation of cesium.

All attempts to form a picture of the nucleus today are based on the idea that it is composed of protons and neutrons (Figure 1). The nucleus is much smaller than the atom. Roughly, the ratio of their diameters is as 1:1000. The actual size is given sufficiently well by the formula $R=1.4A^{1/3}$, where R is the radius in fermis (10^{-13} cm). All nuclei have the same average density – however large they may be. In SI units the density has the enormous value of 2×10^{17} kg/cm³.

Nuclei have a dense central core, which is nearly homogenous, surrounded by an outer layer in which the density tapers to zero. The outer layer is about 2.4 fermis thick.

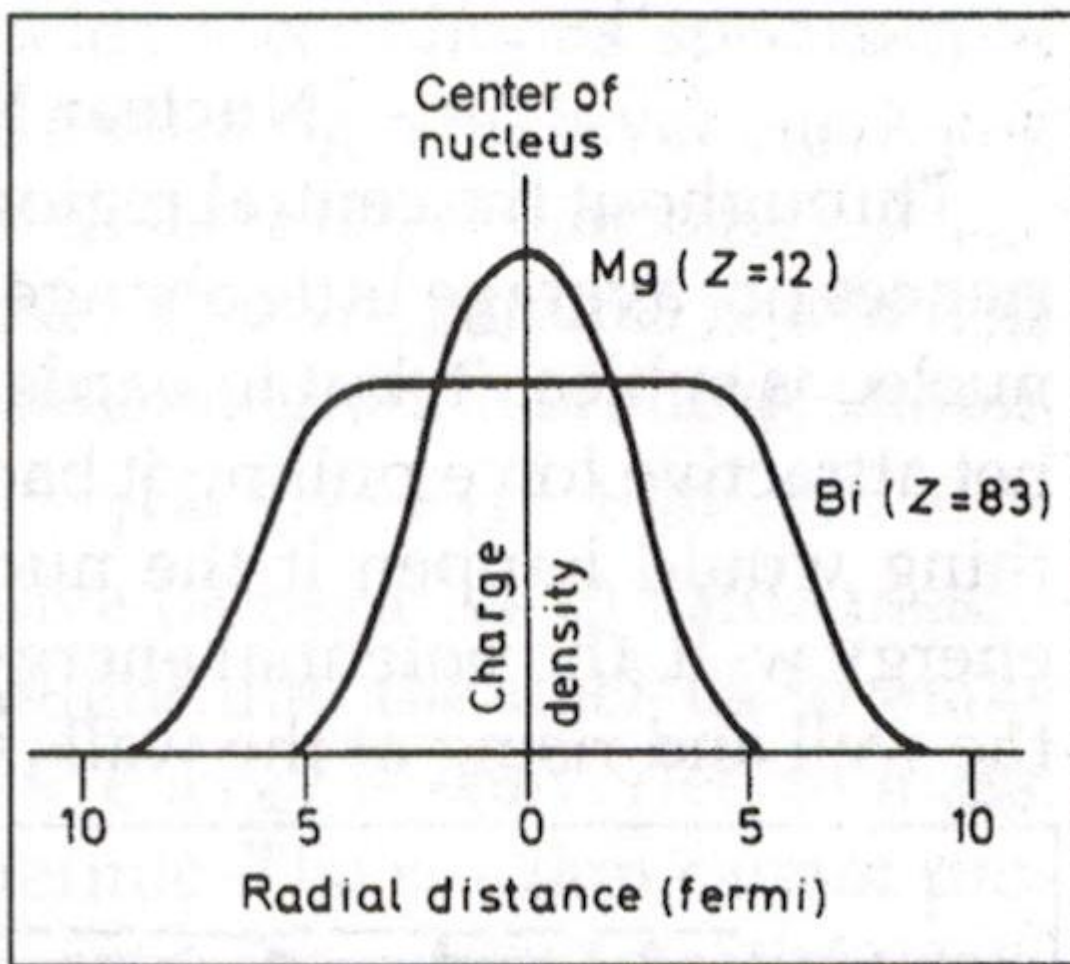


Figure 1. The distribution of charge in a small and large nucleus.
In the latter there is a central core of constant density and a diffuse outer region.

Radioactive Decay

In radioactive decay, nuclei change spontaneously in the direction of greater stability, losing energy in the process.

Types of Radioactive Decay:

1. α -decay, in which the nucleus emits an alpha particle, e.g., $\text{U-238} \rightarrow \text{Th-234} + \text{He-4}$.
2. β^- -decay, in which the nucleus emits an electron, e.g., $\text{P-32} \rightarrow \text{S-32} + \beta^-$. An electron emitted from the nucleus is known as a beta particle.
3. β^+ -decay, in which the nucleus emits a positron, e.g., $\text{F-18} \rightarrow \text{O-18} + \beta^+$.
4. EC-decay (electron capture decay), in which the nucleus captures an electron from the electron cloud of the atom, e.g., $\text{Mn-54} + e^- \rightarrow \text{Cr-54}$.
5. ITs (isomeric transitions), in which the nucleus undergoes a transition from an upper to a lower energy state, e.g., $\text{Br-80} \rightarrow \text{Br-80} + \gamma$.
6. SF (spontaneous fission), in which the nucleus divides into two roughly equal parts (fission fragments) plus about two neutrons, e.g., Cf-254 .

β^- , β^+ , and EC decay are often grouped together under the general heading of beta decay.

Each radioactive species undergoes decay at a characteristic rate, in the sense that a certain proportion of the nuclei in a large assemblage decay in a given time interval. If there are N atoms, the rate is $-dN/dt$, and

this is proportional to N , such that $dN/dt = \lambda N$. The constant λ is known as the disintegration constant. A convenient indication of the decay rate is the half-life T , which is the period of time during which one-half of the nuclei in a large assembly decay. T is related to λ by the equation $\lambda T = \ln 2 = 0.693$.

A *stability* line may be drawn through the middle of the band of stable nuclides and is represented by the following equation $N - Z = ZA^{2/3}/60$. No odd- Z element has more than two stable isotopes, whereas even- Z elements can have any number up to 10. An odd- A element may be either even Z , odd N or odd Z and even N . In odd- A nuclei, there is one unpaired nucleon. Many of the properties of odd- A nuclei are believed to stem from the single unpaired nucleon.

Nuclear Modeling

Throughout the central region of the nucleus a nucleon experiences on average little change in the forces to which the other nucleons subject it, but towards the boundaries it experiences a net attractive force pulling it back towards the center. The same thing would happen if the nucleon moved inside a potential energy well, the potential energy being constant at the center of the well and rising at the walls (Figure 2).

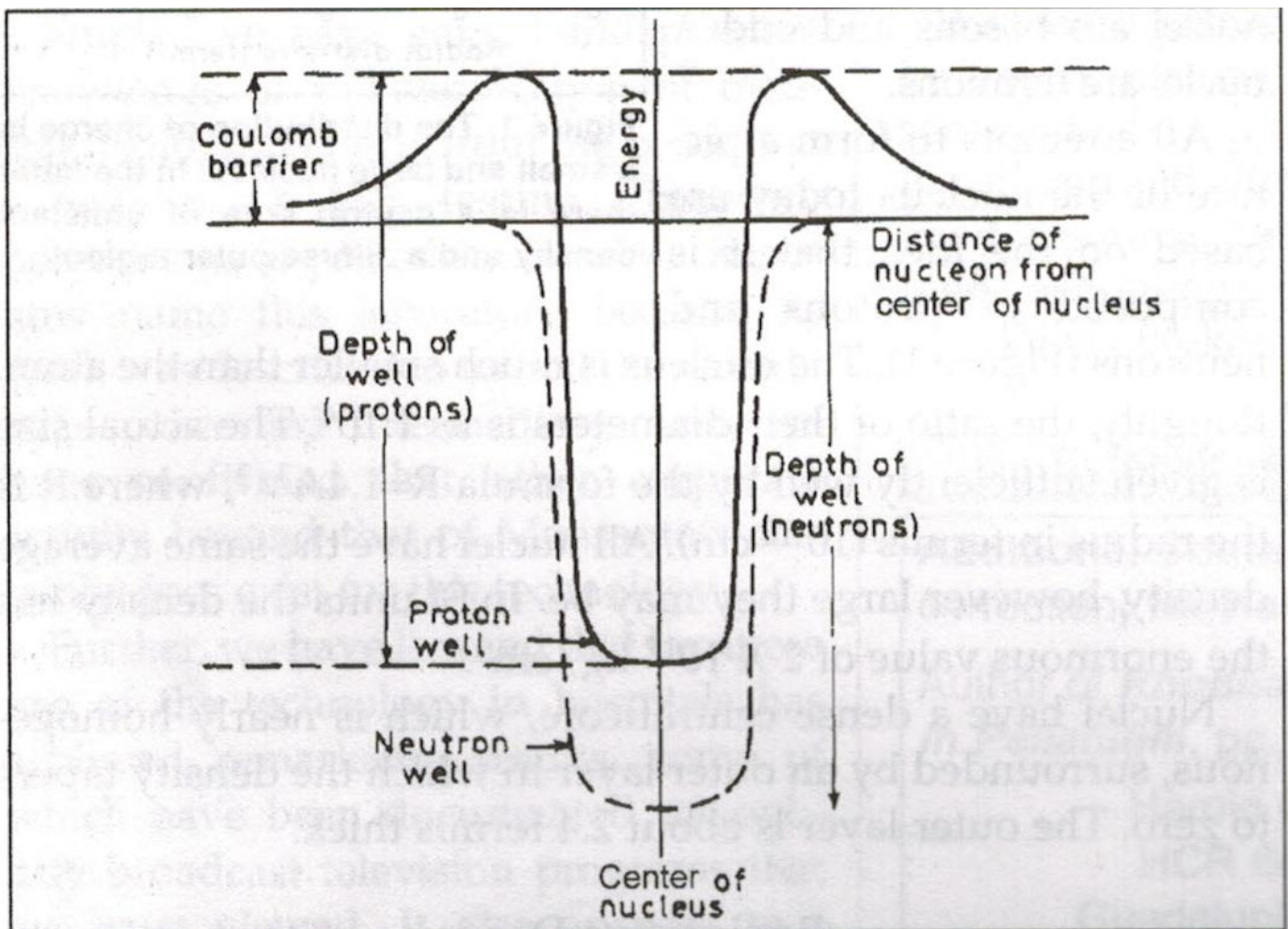


Figure 2. The nuclear potential well and the Coulomb barrier.

For some purposes it is possible to assume that the nucleus can be represented by such a well, and it turns out that a well about 40 MeV deep and of about the same diameter as the nucleus itself has suitable properties.

For protons the well is surrounded by a rim. This is because a proton approaching the nucleus is repelled electrostatically, until the moment when it actually touches the nuclear surface. Once it makes contact, it is attracted and falls into the well. The rim is known as the Coulomb barrier. Its height is given by the energy required to bring the proton up to the nuclear surface, i.e., by Ze^2/R (e = electronic charge, R = nuclear radius). For heavy nuclei such as uranium the barrier is about 10 MeV high. In the general case of an ion of charge $+ze$ and radius r incident on the nucleus the height of the barrier is $Zze^2/(R+r)$.

The concept of the nuclear potential well can be applied both to particles entering or leaving the nucleus, as they do in nuclear reactions, and to nucleons inside the nucleus.

Consideration of the movement of nucleons inside the potential well leads to the shell model of the nucleus. It is assumed that the nucleons move independently inside the well and that their movements are quantized like those of the electrons in the atom. It proves remarkably successful in accounting for properties of individual nuclei, in both their ground state and excited states. It is particularly successful with odd- A nuclides, in which there is a single unpaired nucleon.

The core excitation model of the nucleus is a model involving electromagnetic properties of the nucleus or the weak-coupling model. This is a model devised for the description of low lying states of odd- A nuclei, which tries to relate such properties to those of the odd particle and the even-even core. In other words, a state of an odd- A nucleus with an angular momentum J is written as

$$\psi(J) = \sum A_{Jc} \phi(J_c, j; J)$$

Here $\phi(J_c, j; J)$ is a state in which the core carries an angular momentum J_c and the odd particle is in the state j .

It is important to note that, formulated in this way, there is no assumption about the *mechanism* which leads to the various core-states. These could be collective vibrations, or single particle excitations, or quasiparticle excitations, or anything else. The essential ingredient that goes into this model is the assumption of a weak coupling between the odd particle and the rest of the nucleus. Weak, that is, in comparison with the interactions involved in the core itself.

Nuclear Reactions (Transmutations Through Radiochemistry)

When neutrons, protons, γ -rays and other kinds of nuclear projectiles impinge on atomic nuclei, they may initiate processes of nuclear change. Such processes are called nuclear reactions. The reactions of γ -rays, known as photodisintegrations, are restricted largely to scattering and the emission of single nucleons, i.e., (γ, γ) , (γ, n) and (γ, p) reactions, owing to the limitations on the energies available. For the common low-energy reactions, the changes in Z and A for the target nucleus are as follows (Figure 3):

In a (γ, n) reaction neither the γ -ray nor the neutron has a Coulomb barrier to surmount, so reaction sets in sharply as soon as the threshold energy is reached. Beyond the maximum, competition from the $(\gamma, 2n)$, $(\gamma, 3n)$, etc., reactions becomes important; the total cross-section for all the $(\gamma, 3n)$ reactions falls to a few millibarns.

	$A-3$	$A-2$	$A-1$	A	$A+1$	$A+2$	$A+3$
$Z+2$						$\alpha, 2n$	α, n
$Z+1$				p, n $d, 2n$	p, γ d, n		α, p
Z			$n, 2n$ γ, n	n, n p, p etc.	n, γ d, p		
$Z-1$	p, α	d, α	γ, p	n, p			
$Z-2$	n, α						

Figure 3. The emission of single nucleons in (γ, n) and (γ, p) reactions requires an excitation energy of about 8 MeV. In this region the levels overlap and an exact energy match is not needed for absorption of the γ -ray.

Over and above its binding energy in its lowest energy state (the ground state), a nucleus can acquire excitation energy. Like the atomic excitation energy absorbed by the electron clouds and familiar from the Bohr model of the atom, this energy can only be acquired in discrete amounts. The nucleus indeed, like the atom, can exist in a series of excited states, and it can undergo transitions from upper to lower energy levels emitting the surplus energy in the form of electromagnetic radiation. The energy quanta emitted are of relatively high energy; the radiation is thus of very short wavelength, as short as that of X-rays, or shorter. it is called γ -radiation.

The energy levels of a nucleus, and the transitions between them, are often represented by a level diagram such as in Figure 4, for Mg-26:

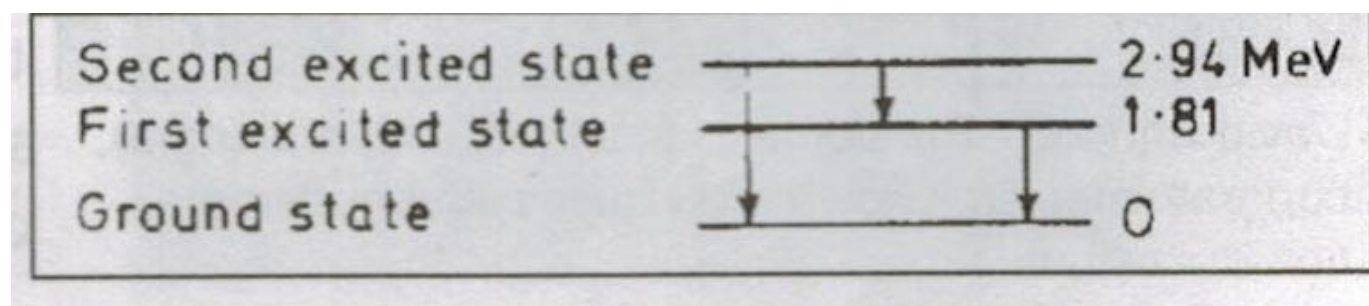


Figure 4. Mg-26 energy level diagram

Aside from the lightest nuclei, nuclear binding energies are roughly proportional to nuclear masses (Figure 5). It is therefore convenient to consider the binding energy per nucleon.² It is rather important to note that radioactive nuclei tend to have lower binding energies per nucleon than stable nuclei.

² McKay, H., *Principles of Radiochemistry*, CRC Press, 1971.

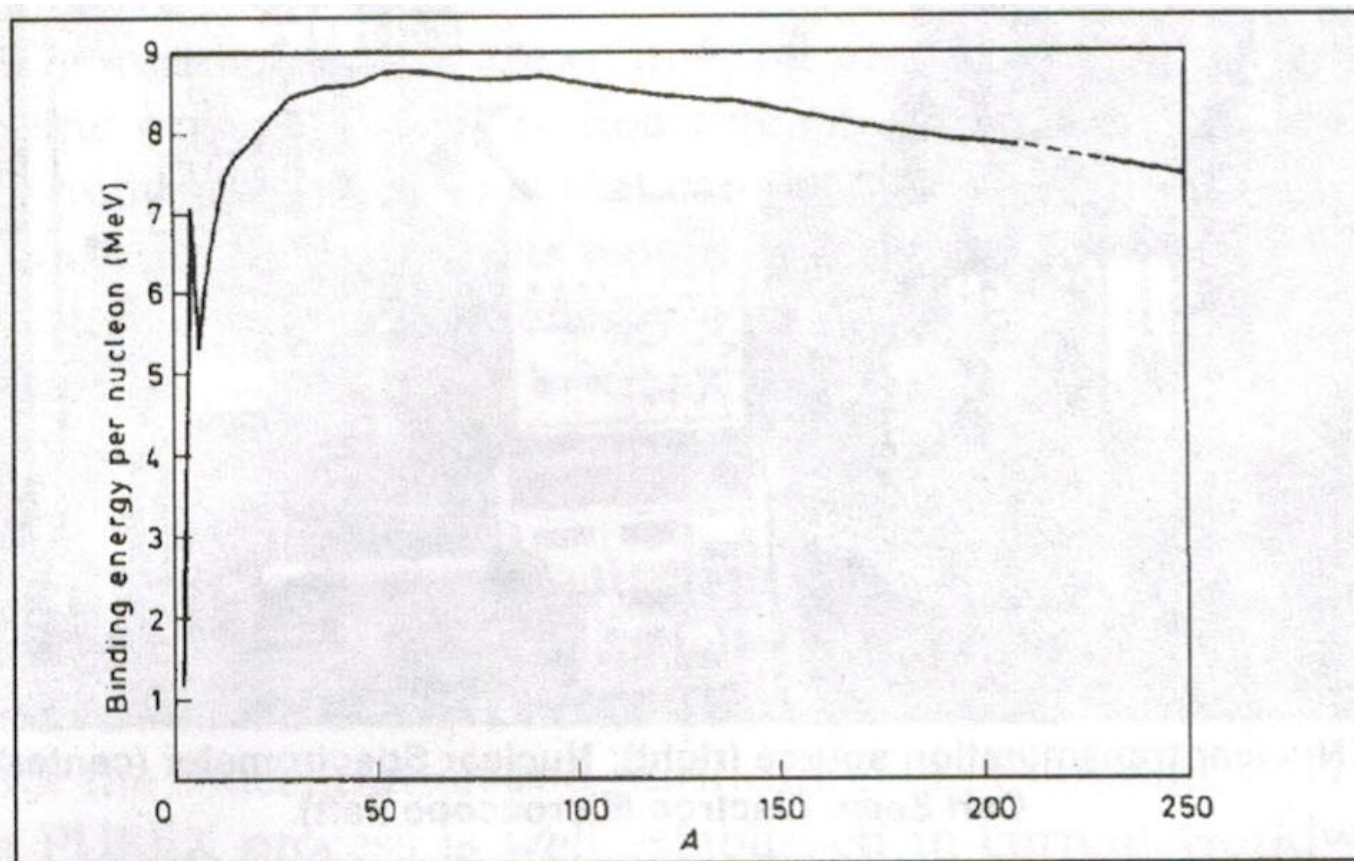


Figure 5. Smoothed binding energy curve for stable nuclei.
Binding energy per nucleon as a function of A.

The first nuclear reaction induced by photons was discovered by Chadwick and Goldhaber in 1934³: the photodisintegration of the deuteron. They used the high-energy γ 's from a radiothorium source and were able to deduce a fairly accurate value for the neutron mass from their measurement of the energy of the protons produced. The only nuclide other than deuterium with low enough threshold (neutron-binding energy) to permit photodisintegration by naturally occurring gamma rays is Be-9.

Giant Resonance

Reactions between nuclei and low- and medium-energy photons are dominated by what is known as a giant resonance: in all nuclei the excitation function for photon absorption (not just for a specific reaction) goes through a broad maximum a few million electron volts wide. The energy of the resonance peak varies smoothly with A, decreasing from about 24 MeV at 0-16 to about 13 MeV at Bi-209. Peak cross sections are 100-300 mb.

This giant-resonance absorption is ascribed to the excitation of dipole vibrations of all the protons against all the neutrons in the nucleus⁴, the protons and neutrons separately behaving as compressible fluids. This model makes some fairly simple predictions about the magnitude and A-dependence of the resonance that are quite well borne out by the experimental data: the integrated cross sections under the resonance peaks are given to good approximation by $0.06NZ^2/A$ MeV b, and the peak energies can be approximately represented by $aA^{-1/3}$ ⁵.

³ "A Nuclear Photoeffect: Disintegration of the Deuteron by γ Rays," *Nature*, No. 134, p. 237, 1934.

⁴ Goldhaber, M. and Teller, E., "On Nuclear Dipole Vibrations," *Phys. Rev.*, No. 74, p. 1046, 1948.

⁵ Friedlander, *et al.*, Nuclear and Radiochemistry, John Wiley & Sons, NY

The energy of the dipole resonance is so low that mostly rather simple processes, such as (γ, n) , (γ, p) , $(\gamma, 2n)$, and photofission reactions, take place in the giant-resonance region (Figure 6). The competition between these processes is governed by the usual statistical considerations of compound-nucleus de-excitation, so that neutron emission usually dominates.

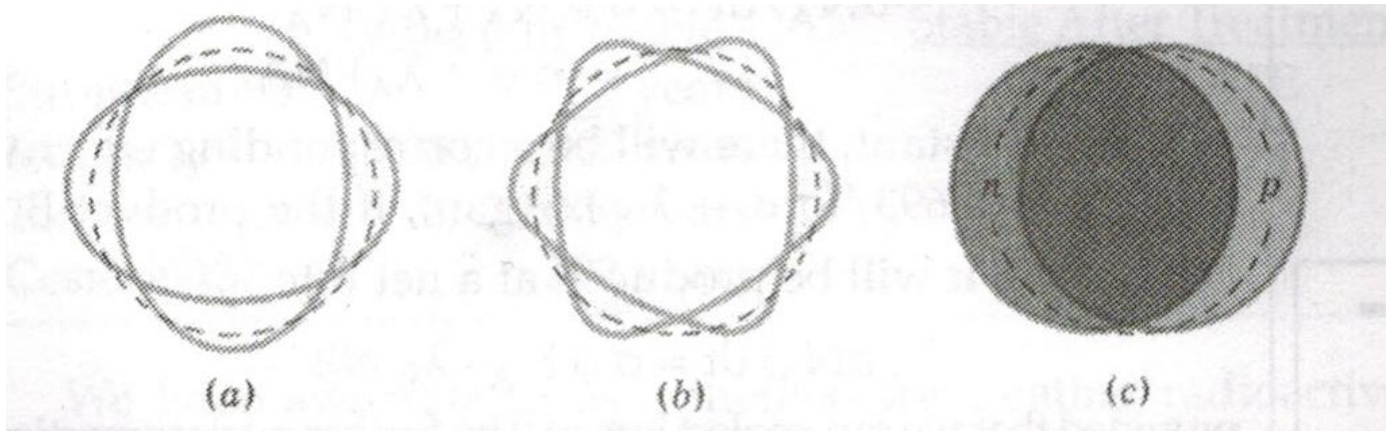


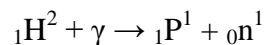
Figure 6. Different types of nuclear vibrations. The two extremes of the vibration are shown by solid curves, and the midpoint of the vibration, a spherical shape, is shown by the dashed line.

All figures have rotational symmetry about a horizontal axis through the center. (a) $\gamma = 2$ vibration (2^+ state); (b) $\gamma = 3$ vibration (3^- state); in (a) and (b) the neutrons and protons move together, (c) $\gamma = 1$ (1^- state), in which the neutrons and protons move in opposite directions. At one extreme of the vibration, the neutrons are displaced to the left and the protons are displaced to the right as shown, while at the other extreme of the vibration their positions are reversed.

Photodisintegration

Atomic nuclei have been disintegrated by high-energy photons (Figure 7). The process is called photodisintegration. These can be gamma rays of one energy (gamma rays are naturally occurring while X-rays are man-made but both are photons) or gamma rays from a source which yields a continuous spectrum of energies, including a high-voltage X-ray tube as well as from a betatron.

The best known gamma reaction is the photodisintegration of the deuteron,



If the Q of a reaction is negative (A negative Q value means that kinetic energy must be brought into the nucleus to make the reaction proceed. This kinetic energy is converted to mass. Such a reaction is called endothermic. The reaction cannot proceed until the photon brings in enough energy to satisfy conservation of energy. This means that the cross section for a gamma reaction is 0 until the energy of the projectile is at least equal to Q . The energy of the projectile for which the reaction first has a nonzero cross section is called the 'threshold energy' for the reaction. The threshold of the reaction is that energy of the gamma ray which is just sufficient to break the proton-neutron bond; i.e., the gamma ray must deliver an energy equal to or greater than the binding energy of the system.

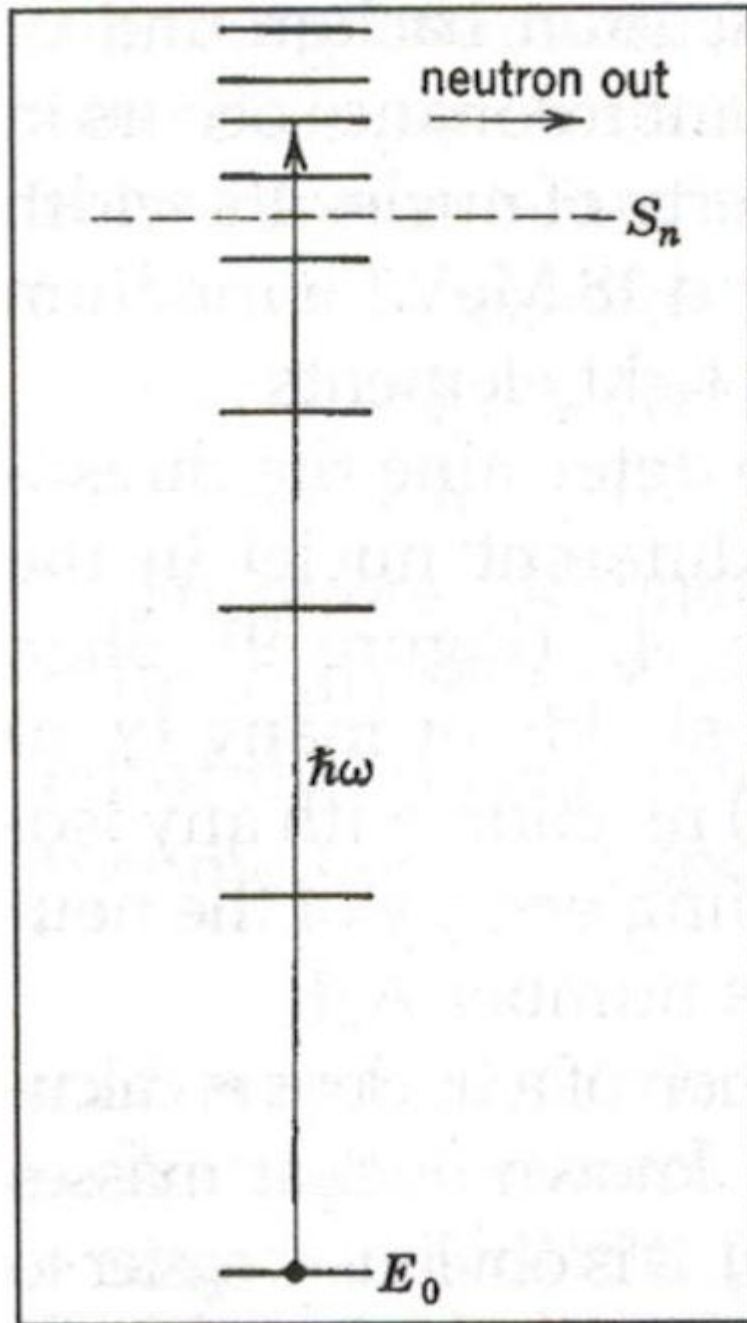


Figure 7. Schematic picture of the photonuclear effect with emission of a neutron (the (γ, n) reaction).

Photodisintegration usually gives rise to neutron emission, i.e., to a (γ, n) reaction by the nuclei which have been raised to excited states by the absorption of these photons (Figure 8). The energy of the gamma ray for which neutrons are first observed to be ejected is the binding energy of the neutron. The (γ, n) cross section becomes very large for most nuclei, for gamma energies between 10 and 20 MeV. This effect, called the 'giant resonance', is responsible for much of the neutron background of high-energy gamma ray machines. The giant resonance occurs in all nuclei and is viewed as a general property of nuclei. Its width is 3-10 MeV and it is located between 13 and 18 MeV for medium and heavy elements and near 20 MeV for light elements.

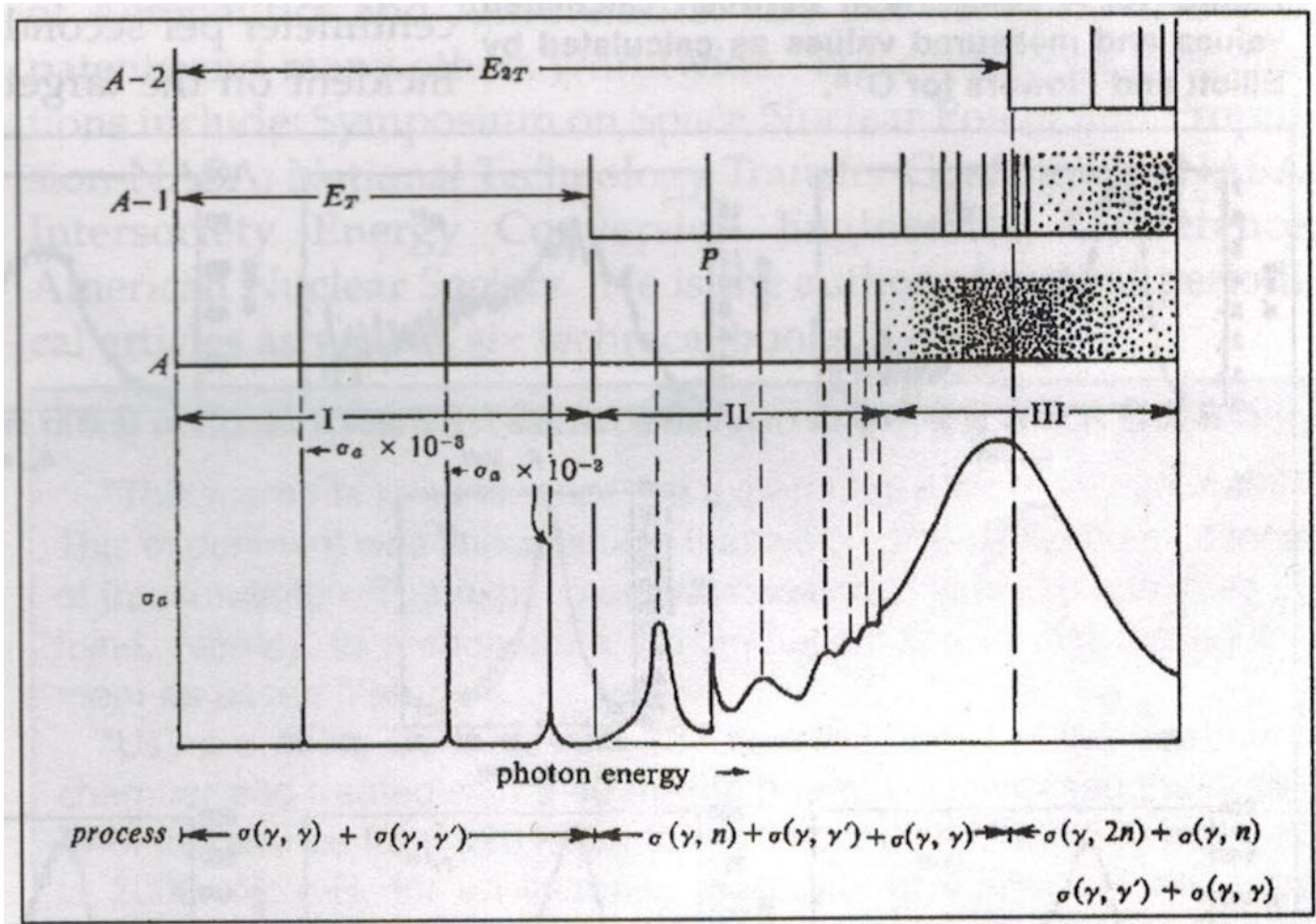


Figure 8. The photon absorption cross section for an idealized nucleus. Region I is that part of the energy scale below the particle thresholds where absorption is into discrete energy levels. Region II is the energy range above the binding energy where structure may still exist in the absorption cross section. In region III the absorption cross section is smooth. The processes that can take place are indicated along abscissa; $\sigma(\gamma, n)$ here stands for the cross section for nuclear emission. The energy levels in the nucleus A, A-1, and A-2 are illustrated at the top of the diagram. The binding energies for one and two particles are designated by E_T and E_{2T} . The level P_1 in A-1 represents a parent of the ground state of nucleus A5.⁶

⁶ Segre, E., *Nuclei and Particles*, 1965.

Reaction	Threshold (MeV)
$D(\gamma, n)$	2.22
$Pt^{195}(\gamma, n)$	6.13
$Bi^{209}(\gamma, n)$	7.39
$Au^{197}(\gamma, n)$	8.05
$Cu^{63}(\gamma, n)$	10.8
$C^{12}(\gamma, \gamma)$	15.1

Figure 9. The neutron binding energies are taken from V. Ashby and H. Catron, UCRL 5419.

Baldwin and Koch (1945) were able to determine the threshold for photodisintegration of several different nuclei in the range of atomic numbers $Z = 6$ to $Z = 47$ (Figure 9). Sher, Halpern, and Mann determined the thresholds of many (γ, n) reactions. The threshold value of the (γ, n) reaction with any isotope of mass number A will give the binding energy of the neutron in the nucleus of the isotope of mass number $A-1$.

The energy necessary for photodisintegration of a nucleus is calculated from known nuclear masses (Figure 10). It is obviously easier to remove one particle than several from the nucleus. As a result we find that E_γ must be >5 MeV for photodisintegration of heavier nuclei. For $10 < E_\gamma < 40$ MeV the photon wavelength is comparable to the nuclear vibrational motions (so-called dipole vibrations, because the neutrons and protons are assumed to vibrate in separate groups). This is known as the giant resonance region, because the total cross section for heavier nuclides goes up to hundreds of millibarns. For higher E_γ , nucleons may be expelled, the main reactions being (γ, n) , $(\gamma, 2n)$ and (γ, np) in descending importance.⁷

⁷ Choppin, G. and Rydberg, J., *Nuclear Chemistry Theory and Applications*, Pergamon Press.
Brown's Radioactivity Neutralization Method

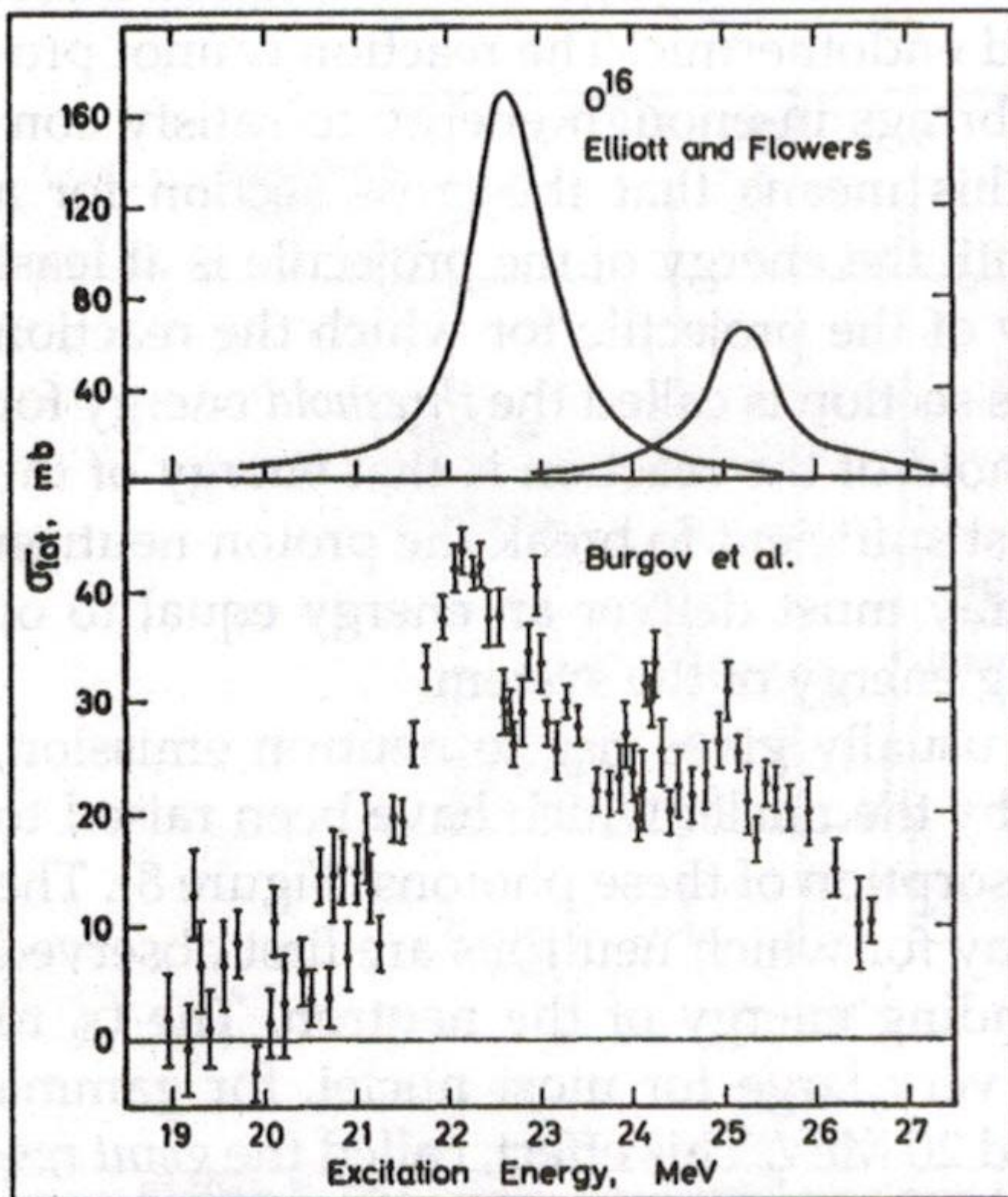


Figure 10. A comparison between calculated values and measured values as calculated by Elliott and Flowers for O^{16} .

Flux and Cross-Section

The number of photons per square centimeter per second incident on the target is called the 'flux'. When a target is exposed to a flux of photons, the number of nuclei reacting is proportional to the flux, and to the number, N , of target atoms. Then $R = \sigma \phi N$, where R is the reaction yield and σ is a constant characteristic of the nuclear reaction in question. σ has the dimensions of an area, and is therefore usually called the cross section of the reaction. We can picture each target atom as a disc of area σ , with reaction occurring every time an incident photon strikes the disc. In some circumstances σ is indeed equal to the physical cross section of the nucleus. Tables and graphs of photonuclear cross sections exist and may be used to calculate reaction yields. In such tables σ is usually expressed in barns or millibarns, one barn being 10^{-28} m^2 .

Cross sections vary with the energy of the incident photon, and the tables usually indicate this variation (Figure 11). Where there is a threshold energy, σ is zero below the threshold, and rises to positive values above the threshold. The relation between cross section and energy is called the excitation function of the process.

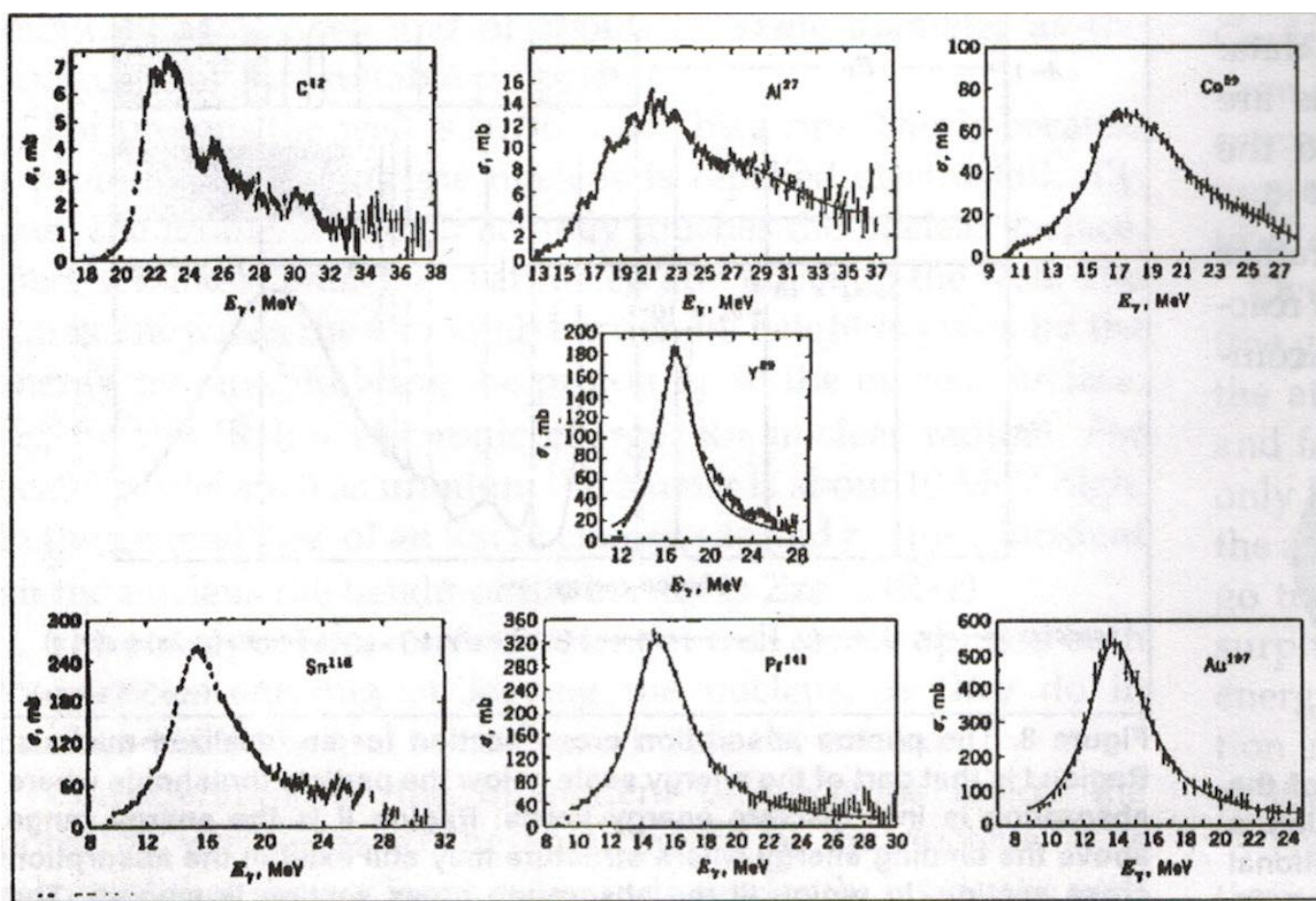


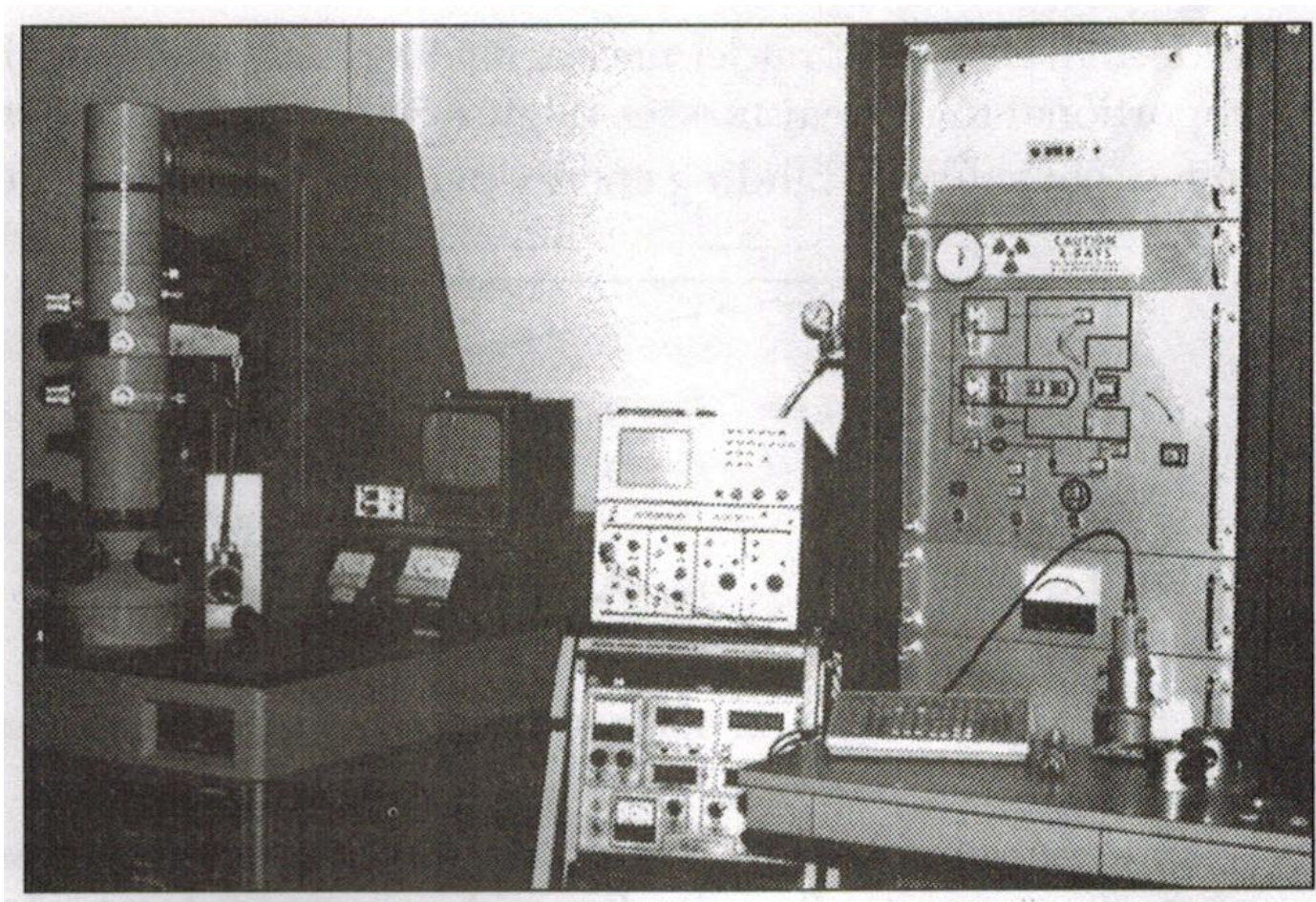
Figure 11. Cross section for reactions induced by gamma rays vs. their energy E_γ in various nuclei.

Actually these data include only reactions in which neutrons are emitted, for example,

(γ, n) , $(\gamma, 2n)$, (γ, pn) , but these account for nearly all the reactions in most cases.

Note that these cross sections are dominated by resonance due to the 1^- state vibration.⁸

⁸ B. Cohen, *Concepts of Nuclear Physics*, McGraw Hill, 1971.



Nuclear transmutation source (right); Nuclear Spectrometer (center);
Carl Zeiss Electron Microscope (left).

Reaction Rate:

For a photonuclear reaction in which a species A is converted into a species B: $A \rightarrow B$. If the cross-section of this reaction is σ , then nuclei of A are destroyed (burnt out) at a rate $\sigma \phi N_A$, while those of B are produced at this same rate:

$$R = -dN_A/dt = dN_B/dt = \sigma \phi N_A$$

This equation is of the same form as that for radioactive decay of A to B, but with $\sigma \phi$, in place of the disintegration constant λ . There is indeed an extensive analogy between the kinetics of radioactive decay, and kinetics in a constant flux of nuclear photons, and the equations concerned are closely similar.

If the target species A is radioactive, then both nuclear reaction and decay contribute to its disappearance. The rate of loss is the sum of the two terms:

$$\begin{aligned} -dN_A/dt &= \sigma \phi N_A + \lambda_A N_A \\ &= (\sigma \phi + \lambda_A) N_A \end{aligned}$$

If ϕ is constant, there will be a corresponding effective half-life of $0.693/(\sigma \phi + \lambda_A)$. Again, if the product B is radioactive it will be produced at a net rate:

$$dN_B/dt = \sigma \phi N_A - \lambda_B N_B$$

provided that we can neglect loss of B by further nuclear reaction.

Waste Management

The goal of transmutation for waste management purposes is to convert a long-lived radionuclide that is potentially troublesome at a waste disposal site to a shorter-lived or stable nuclide by exposing the troublesome nuclide to a high flux for a sustained time. This has the effect of reducing the long-term toxicity of the waste because most of the waste constituents would then decay to a nonradioactive nuclide in a short time.

Chemical processes are an integral part of any transmutation scheme to separate the radioactive components of the wastes into high purity fractions that can then be made into transmutation targets. Such targets would be irradiated in a flux having sufficient intensity and energy such that the radionuclides in the targets would either be transmuted or fissioned into stable elements or isotopes with substantially shorter half-lives at an acceptable rate.

At present, there are only four industrially demonstrated separations processes applicable to reactor wastes meeting the needs of transmutation. These processes are designed primarily for the concentration and purification of plutonium, but only the PUREX process is well established in current worldwide use. In the past, the British have used a solvent extraction process called BUTEX, the French have used ion exchange, and there have been a number of ion exchange processes that have had limited production use in the isolation of minor actinides.

Several potentially applicable separations processes based on new solvents, such as the TRUEX-CMPO process, and new ion exchange materials are in various conceptual or laboratory scale development stages. Such advanced aqueous processes have been proposed to achieve high decontamination factors but have not been demonstrated at the full engineering pilot-plant level.

A commercial waste transmutation facility would require head-end treatment of spent reactor fuel to chop and dissolve the fuel, followed by separation of the transuranics and selected fission products. Either aqueous or nonaqueous processes may be used for the initial separations. The well-established PUREX process may be used for this separations step. This would be followed by an aqueous separations process using advanced technology such as the TRUEX process. A full scale separations system may be designed with high confidence for overall separations process losses of less than 0.1%.

Solid metals may be separated by pyrochemical process. Pyrochemical processes might require less capital expense than aqueous ones because the volume of shielded space can be smaller as well as the reduction in the size of the plant and equipment needed.

Conclusion

By introducing energy to the nucleus greater than the binding energy, we can initiate a nuclear reaction that results in a radiochemical transmutation. By proper design, these reactions may be used to transmute long-lived radioactive waste products into short-lived and manageable products.

Examples of Transmutation After Treatment

Isotope	Normal Time Required <u>To Become Stable</u>	Time to Decay to <u>Stable After Treatment</u>
Strontium-90	291 years	IMMEDIATE
Iodine-129	1,700,000,000 years	IMMEDIATE
Technetium-99	2,120,000 years	43 days
Cesium-137	302 years	130 days

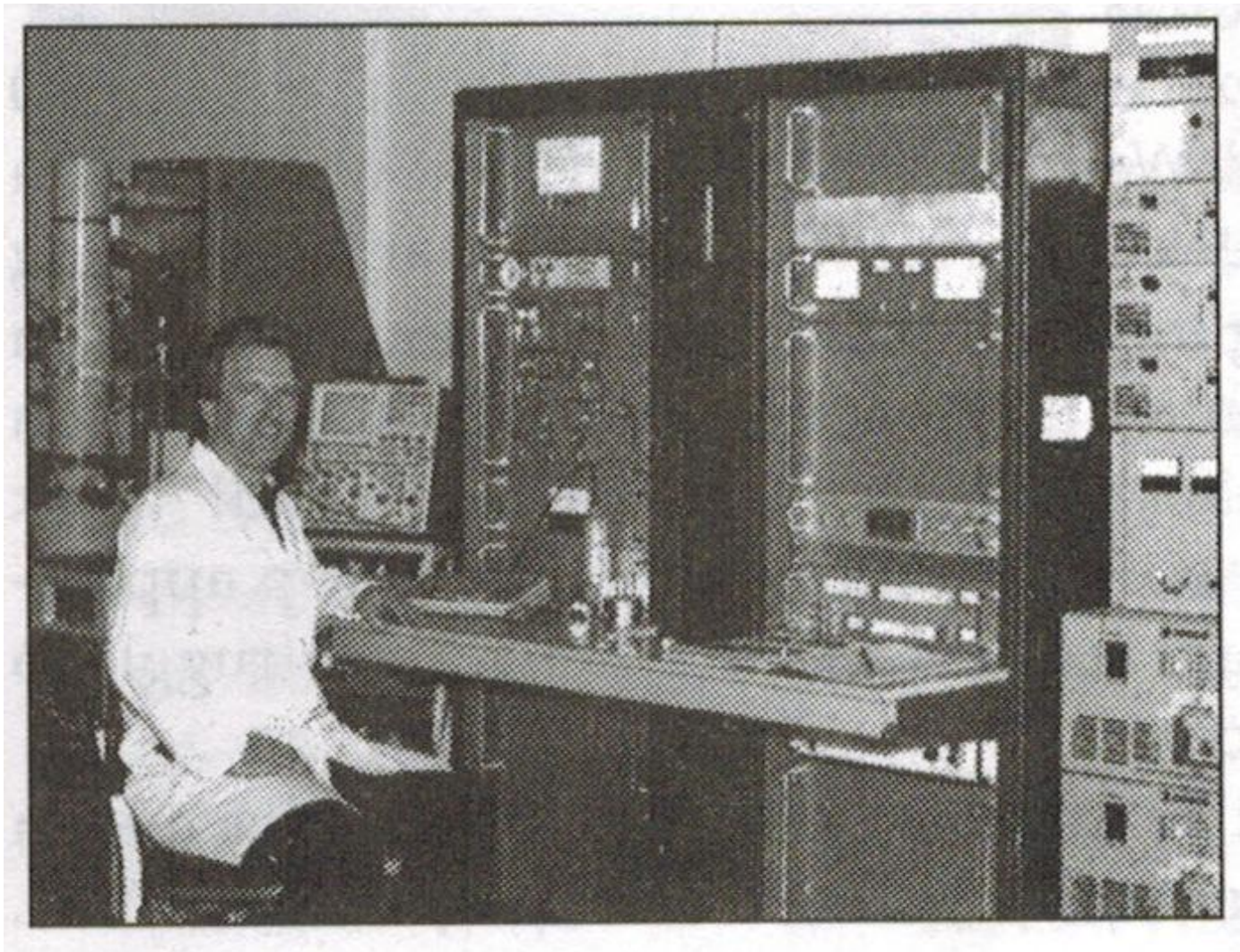
We have available to us a method for treating radioactive waste products in such a way that leaves the half-life manageable. This process is available to us now, without development of new technologies. The treated waste products, due to their inherently short half-lives, become heat sources. These heat sources may be utilized in conversion systems for producing electrical power, i.e., for powering the treatment equipment itself. There is also the neutron flux produced as a waste product of the treatment process. This neutron flux may be used for activation as well as neutron-transmutation of radioactive waste products, such as,

$\text{Tc-99} + n \rightarrow \text{Tc-100 (16 seconds)} \rightarrow \beta + \text{Ru-100 (stable)}$

$\text{I-129} + n \rightarrow \text{I-130 (12.4 hours)} \rightarrow \beta + \text{Xe-130 (stable)}$

$\text{I-127} + n \rightarrow \text{I-128 (25 minutes)} \rightarrow \beta \text{ Xe-128 (stable)}$

Therefore, all that remains is to apply this technique. It should also be noted that application of this process should boost the nuclear power industry by providing a cheap, effective method for disposal of the reactor waste products.



Dr. Brown at the controls of the nuclear transmutation system. Nuclear reactions are induced causing neutron emission resulting in stable or short-lived radioisotopes.

Dr. Brown was well known for his contributions to isotopic generator research, especially related to direct energy conversion. He was a research scientist with more than 15 years experience at public and private research facilities. He was a member of several professional societies including The American Nuclear Society, and the American Institute of Aeronautics and Astronautics. Dr. Brown held five U.S. patents and many others worldwide. His conference presentations include: Symposium on Space Nuclear Power and Propulsion – NASA; National Technology Transfer Conference – NASA; Intersociety Energy Conversion Engineering Conference; American Nuclear Society. He was the author of several periodical articles as well as six technical books.

The following report was received from Dr. Paul Brown:

This memo is to summarize the experiment run on July 20, 1998. This experiment was successful in that we clearly displayed evidence of transmutation. The experiment was designed with two purposes in mind, namely, to demonstrate transmutation and to test the equipment as assembled.

"Using a micro-Curie cesium-137 source, placed in the treatment chamber and treated with a 40-mAmp beam, we increased the activity of this source from 220 kcpm to 1000 kcpm, and from 500 micro-R to 2000 micro-R, for an increase in activity of 450%. We are now monitoring the decay scheme of the source which appears to be following the predicted 13-day half-life.

"The beam flux density was on the order of 2×10^{15} photons/cm²-sec. The equipment appears to function well. Beam current is sufficient.

"This testing was qualitative and successful. Next we will run a series of quantitative tests to determine treatment rates as a function of beam intensity and beam current for various radioisotopes."

Paul Brown, July 22, 1998

Source: *Infinite Energy* Volume 4, Issue 21, August-September 1998 pp 9-13

Transmutation of Nuclear Waste Products Using Giant Dipole Resonant Gamma Rays

Paul Brown, Ph.D.

Nuclear Solutions, LLC.

20100 E. 32nd Avenue Parkway, Suite 185, Aurora, CO 80011 (303) 574-9697; (303) 574-9699 FAX;
<http://www.nucsol.com>

(Paul Brown is deceased, and Nuclear Solutions, LLC, no longer exists)

Editor's Note: Dr. Paul Brown's work on a novel form of nuclear waste remediation that employs gamma rays was the object of an *Infinite Energy* feature story in the previous issue (*IE* No. 21). This proposed and patent-applied-for technology does not rely on new principles of physics, rather ones that were apparently simply overlooked in their applicability to nuclear waste treatment. In his talk at our Cold Fusion and New Energy Symposium on October 11, 1998, Dr. Brown continued to develop his ideas and presented some emerging experimental support for his process. —EFM.

Introduction

The single most important challenge facing the nuclear field (commercial and defense) is what to do with the nuclear waste. The Nuclear Waste Policy Act of 1982 commits the United States to geologic isolation as the best long-term solution for the final disposition of waste. However, after all these years and billions of dollars, there remain numerous questions concerning our ability to develop full reliance on a geologic solution to the waste management problem. Concepts such as the separation and transmutation of nuclear wastes that either eliminate or reduce their radioactive inventories are recognized alternatives. These alternatives have been studied for many years with the primary focus upon neutron absorption produced by a nuclear reactor or particle accelerator. However, these technologies are limited due to the high costs involved as well as the application of yet to be developed technology. Many believe that nuclear energy is not an acceptable option until its waste products can be disposed of in a demonstrably acceptable manner.⁹

Because there are potentially useful amounts of plutonium, uranium and rare metals in light-water reactor spent fuel, there is justification in considering light-water reactor spent fuel as an energy and materials resource rather than waste. Spent fuel reprocessing is applied in many countries to recover the reusable uranium fuel and reduce the volume of waste products.

A facility for reprocessing commercial reactor fuel operated at West Valley, New York, for a short period, and two large commercial reprocessing facilities had been constructed at Barnwell, North Carolina and Morris, Illinois, but not operated. The reprocessing of commercial reactor fuel was discontinued in the United States in the mid-70's. However, several nations, notably France, the United Kingdom, Russia, and Japan, continue to pursue reprocessing for limited recycle of plutonium into light-water reactors and for support of their ongoing breeder reactor development programs.

The high-level radioactive wastes produced during reprocessing of spent nuclear fuels contain long-lived radionuclides such as the fission products Sr-90 and Cs-137 as well as numerous actinides. The management of high-level waste is one of the most important problems in the nuclear industry. The dominant approach for high-level waste disposal is geological storage, and the studies for geological storage are proceeding in many countries. The transmutation of long-lived nuclides in high-level nuclear waste to stable or short-lived nuclides by stimulating nuclear reactions is a desirable alternative approach for the reduction of high-level nuclear waste. Several transmutation methods have been studied using neutron-induced reactions from fission reactors and D-T fusion reactor blankets, and proton reactions using proton accelerators.

Photonuclear reactions induced by gamma ray absorption by the nucleus, do not suffer the shortcomings of neutron reactions. Simply stated, the process is gamma irradiation with energies greater than the binding energy of the neutron to the nucleus. That is, a gamma photon of an energy equal to or greater than the binding energy which comes close to the nucleus is absorbed through giant dipole resonance resulting in the emission of a neutron.¹⁰ This well known nuclear reaction has dramatic application to waste remediation as evidenced by Table 1.

Table 1

H-3 (γ, n)	H-2 (stable)
C-14 (γ, n)	C-13 (stable)
Y-90 (γ, n)	Y-89 (stable)
Ni-63 (γ, n)	Ni-62 (stable)
Kr-85 (γ, n)	Kr-84 (stable)

⁹ National Research Council, *Nuclear Wastes Technologies for Separations and Transmutation*, National Academy Press, 1996.

¹⁰ Brown, P. "Neutralizing Nuclear Waste Using Applied Physics," *Infinite Energy*, Vol. 4, No. 21, p. 9-13.

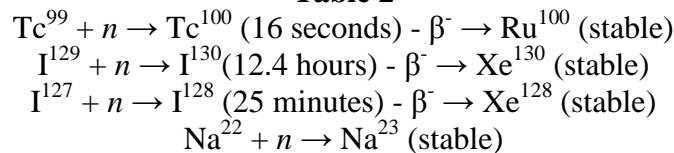
Co-60 (γ, n) Co-59 (stable)
 Tl-204 (γ, n) Tl-203 (stable)
 Sr-90 ($\gamma, 2n$) Sr-88 (stable)
 Bi-210 (γ, n) Bi-209 (stable)
 Tl-204 (γ, n) Tl-203 (stable)
 Ba-133 (γ, n) Ba-132 (stable)
 Pb-210 ($\gamma, 2n$) Pb-208 (stable)
 Sr-90 (γ, n) Sr-89 (50 day half-life) - $\beta^- \rightarrow$ Y-89 (stable)
 Tc-99 ($\gamma, 3n$) Tc-96 (4.3 day half-life) - $\beta^- \rightarrow$ Ru-96 (stable)
 I-129 (γ, n) I-128 (25 minute half-life) - $\beta^- \rightarrow$ Xe-128 (stable)
 Cs-137 (γ, n) Cs-136 (13 day half-life) - $\beta^- \rightarrow$ Ba-136 (stable)
 Fe-60 (γ, n) Fe-59 (44.5 day half-life) - $\beta^- \rightarrow$ Co-59 (stable)
 Pb-210 (γ, n) Pb-209 (3.25 hour half-life) - $\beta^- \rightarrow$ Bi-209 (stable)

where n is a neutron, and β^- is an electron.

There are about 300 different radioactive species generated by the operation of a nuclear reactor, primarily as a result of neutron capture and neutron-induced fission. The adverse impact of the various radionuclides varies because of the differences in the chemical behavior in the body of, and the radiations emitted by, the radionuclides. The risk focus of the radionuclides is related to waste disposal in a geologic repository. The most common release and exposure mechanisms from a repository involve ground water contacting the waste form followed by slow dissolution, transport of radionuclides to the accessible environment, distribution in the biosphere, and eventual uptake from food and water. Although hundreds of isotopes are present in spent fuel or wastes derived from them, only a few of them are important for disposal. These four isotopes Cs-137, Sr-90, I-129 and Tc-99 are the primary focus of concern for light-water reactor spent fuel, i.e., nuclear waste, due to their excess heat, groundwater solubility, or health risk.

The neutrons produced by the (γ, n) processing may in turn be used for neutron transmutation by the processes detailed in Table 2. For many fission products the neutron capture cross sections in a thermal spectrum can give substantial transmutation rates. The transmutation of Tc-99 is characteristically much more effective in a thermal neutron spectrum, generally due to higher neutron capture cross section at lower energies.

Table 2



The systematics of the giant dipole resonance, which characterizes the absorption of electromagnetic radiation by nuclei in the energy range from about 5 to 30 MeV, have been of interest since the discovery of the giant resonance itself. Over the years, the photoneutron cross sections for many nuclei have been measured with monoenergetic photons in numerous laboratories. All these data are presented in the Atomic Data Nuclear Data Tables (B. Berman and S. Dietrich). For most cases studied, the agreement is remarkably good.

The classical description of the dipole photon absorption process predicts that for spherical nuclei the total photon-absorption cross section is characterized by the Lorentz line shape,

$$\sigma(E\gamma) = \sigma_m / [1 + (E\gamma^2 - E_m^2)^2 / E\gamma^2 \Gamma^2]$$

where σ_m is the peak cross section, E_m is the resonance energy, and Γ is the full width at half maximum. For deformed (spheroidal) nuclei, the collective picture predicts a splitting of the giant resonance into two components – corresponding to oscillations parallel and perpendicular to the nuclear axis of symmetry.

For medium and heavy nuclei, the Coulomb barrier inhibits the emission of charged particles at giant-resonance energies, and the photon-scattering cross section is always small above the (γ, n) threshold; therefore, the total photoneutron cross section is a good approximation to the total photon-absorption cross section.

The intrinsic quadrupole moment Q_0 for a deformed nucleus can be computed from the expression,

$$Q_0 = 2/5 Z R^2 \varepsilon = 2/5 Z R^2 (\eta - 1) \eta^{-2/3}$$

Where the nuclear radius $R = R_0 A^{1/3}$, Z and A are the atomic number and atomic weight, respectively, ε is the nuclear eccentricity, and the parameter η is the ratio of the major axis to the minor axis (for the prolate nucleus) given by the formula,

$$E_m(2)/E_m(1) = 0.911\eta + 0.089,$$

where $E_m(1)$ and $E_m(2)$ are the lower and higher resonance energies of a two-component Lorentz-curve fit to the giant resonance.¹¹

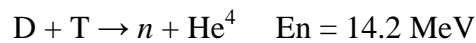
One of the important factors for the transmutations study is the transmutation rate. It is expressed as follows,

$$\lambda = N \int \sigma(E) \Phi(E) dE = N \sigma_{av} \int \Phi(E) dE$$

where N is the number of target nuclides, $\sigma(E)$ is the excitation function of the relevant nuclear reaction, $\Phi(E)$ is the particle flux density, and σ_{av} is the average cross section. In order to estimate the transmutation rate, it is indispensable to know the accurate excitation function or average cross section.

Experimental Procedure

The source of gamma-radiation for these experiments used Compton-scattered gamma rays from the reaction $\text{Ni-58 } (n, \gamma) \rightarrow \text{Ni-59}$ as a source of γ -rays (gamma rays) which presents an overall resolution of 3% in the range of 10 MeV. A sealed tube neutron generator is used, wherein ions are generated using a Penning ion source and accelerated through a potential difference to strike a titanium metal tritide target producing the D-T reaction



Neutrons produced from the tube are emitted isotropically with a maximum yield of 10^{11} neutrons/second. The neutron flux delivered to the water-cooled nickel converter is 10^9 neutrons/cm²/second. The sample irradiation chamber was placed 30 cm downstream from the nickel converter and was water cooled constantly. The photon-energy resolution of the beam varies less than 300 keV at 10 MeV and 70 microamperes.

¹¹ Berman, B. et al., "Photoneutron Cross Sections for As-75, Ag-107 and Cs-133," Phys. Rev. Vol. 177, 4, p. 1745-1754.

Bremsstrahlung gamma photons may be produced by any other suitable manner such as an electron linear accelerator – such high-energy X-ray machines are commercially available. The tagged photon facility at the Nuclear Physics Laboratory of the University of Illinois produces monoenergetic tagged gammas by the bremsstrahlung monochromator method in the energy range of 11 to 16 MeV with an energy resolution of 80 to 120 keV, and a beam current of the order of 10^6 photons per second. Continuous spectrum bremsstrahlung may be utilized; however, this is not as efficient nor does it have the tuneability of a monochromatic source.

All samples were mounted on a pure Ge detector having a relative efficiency of 31.2% and their γ -rays were counted for 4,000 to 160,000 seconds with a Canberra multichannel pulse height analyzer.

Results

Figure 1 shows an example of the X-ray spectrum resulting from the (γ, n) transmutation of the Cs-137 sample. Here we see three small but distinct photo-peaks of 340.6 keV, 818.5 keV and 1048.1 keV which are γ -rays from Cs-136 nuclei which were produced in the target. The half-lives of these peaks agree with the reference value of 13.1 days to within 5%. This figure also shows a photo-peak of 667.7 keV γ -rays emitted from Cs-132 nuclei reacted from the Cs-133 (γ, n) reaction in the same way as Cs-136 and decayed with the half-life of 6.47 days. The 661.7 keV γ -ray is due to the Cs-137 still present. All other photo-peaks are γ -rays from natural radioisotopes such as K-40 and Bi-214.

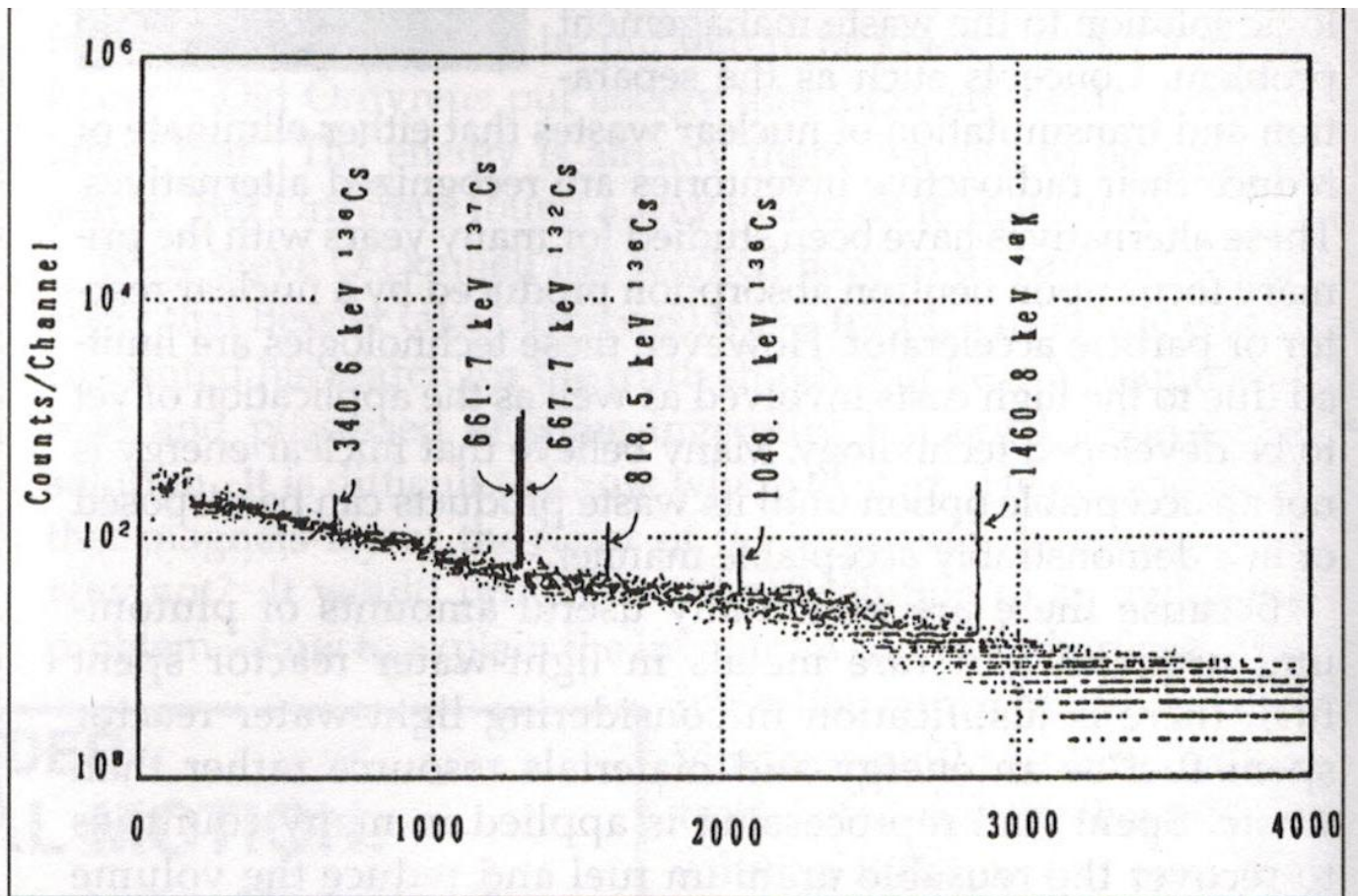


Figure 1. Cs-137(γ, n) product analysis

It is quite difficult to measure the very weak Sr-89 and Cs-136 activities produced from Sr-90(γ,n) and Cs-137(γ,n) reactions under intense Sr-90 and Cs-137 target activities, respectively, and moreover there is no possible chemical separation method of Sr-89 from Sr-90 and Cs-136 from Cs-137. The Cs-136 atom decays to stable Ba-136 with a half-life of 13.1 days – which is a much shorter half-life than the 30.2 years of the Cs-137 atom.

Mixed Waste

All work to date has been performed on chemically pure isotope samples. However, real world applications for nuclear waste reduction will require the treatment of mixed waste products to keep costs down. We have theoretically examined the treatment of mixed waste products and conclude that such treatment is possible. The reasoning for such a conclusion is fairly straight-forward.

The (γ,n) threshold for the radioactive isotopes is generally (see Table 3) between 6 and 9 MeV, while the (γ,n) threshold for the stable elements is generally between 15 and 30 MeV. This means that by using a gamma beam with a mean energy lower than 15 MeV would not result in (γ,n) activation of stable isotopes. Further, most of the isotopes present in mixed waste become stable or short lived through the (γ,n) reaction. A quick review of Table 1 shows that the (γ,n) process applies directly to the well known radioisotopes. Now, it is realized that some gamma activation does result, as it does with any high-energy X-ray source, but this activation is also short lived.

Table 3

Nuclide	Reaction	G,N	G,2N	Maximum	Maximum	Integrated
		Threshold	Threshold	Energy	Cross Section	Cross Section
		(MeV)	(MeV)	(MeV)	(mB)	(mB)
Cs-133	G,N	9.0	16.2	15.31	321	1828
Cs-137	G,N	8.0	-	13.0	360	-
Sr-90	G,N	-	-	15.8	194	1311
1-127	G,N	9.1	16.2	14.9	252	1601

What remains to be done is the analysis of mixed waste samples, followed by prediction of the resultant products, and if acceptable, then actual testing of (γ,n) on such a mixed waste sample.

Conclusion

Application of the photo-remediation method would affect the design and long-term performance of nuclear repositories if not eliminate the need all together. This would provide for the selected recovery of fission products from spent fuel. The waste going to the repository would have less thermal power, would contain a reduced quantity of certain isotopes, occupy less volume, and could be incorporated in waste forms with good integrity. Reduction of the decay heat present in the waste product would also allow the repository's capacity to be increased, thereby eliminating or postponing the need for a second repository.

We have seen the application of the (γ,n) reaction to Cs-137 yields the predicted results, and presented this data herein. The average cross section of Cs-137 (γ,n) is about 10 to 20% larger than that of Cs-133 (γ,n) or about 360 mB; the threshold energy for (γ,n) is 8 MeV with a peak at 11 MeV and a maximum energy of 13 MeV. This data will be very useful in the evaluation of the transmutation studies using photonuclear reactions.

Application of this method to transmute nuclear waste products is a viable method for reducing the volume of nuclear waste. The solution of the nuclear waste problem also makes nuclear power a viable option.

Las Vegas energy expert Robert Nelson found and emailed to Gary Vesperman the following patent by Paul Brown:

US2002169351 Remediation of Radioactive Waste by Stimulated Radioactive Decay
Paul Brown

Disclosed is a radioactive waste treatment process for transmuting long-lived radioisotopes into short-lived radioisotopes through applied nuclear physics. Nuclear reactions, specifically of the (gamma, n) type, also known as photo-disintegration, are utilized to accomplish this transmutation from troublesome, long-lived radioactive waste isotope(s) of given atomic mass to shorter-lived or stable materials of lower atomic mass, by exposing the troublesome isotopes to a high energy photon flux for a sustained time. Generally speaking, the target nucleus of the radioisotope(s) to be treated is irradiated by gamma photons of an energy greater than the binding energy of the neutron in the target nucleus. This causes the irradiated nucleus to absorb the gamma rays, thereby placing the nucleus in an excited state. Upon relaxation, the nucleus ejects a neutron through the (gamma, n) reaction, thereby transmuting the element to an isotope of lower atomic mass and shorter half-life.

The Photon Reactor: Producing Power by Burning Nuclear Waste

By Paul M. Brown

Summary

A linear accelerator, preferably of the monochromatic type, accelerates electrons which are directed onto a high Z target such as tungsten to generate gamma rays about 9 MeV, which are directed onto the fuel material such as U-238 which results in the (γ, f) reaction, thus releasing about 200 MeV. A reactor built according to this principle requiring an accelerator driven by 1 MW will develop about 20 MW of power. The reaction is not self-sustaining and stops when the beam is turned off. This accelerator driven reactor may be used to 'burn up' spent fuel from fission reactors, if simply operated at 10 MeV. The photo-fission results in typical spent fuel waste products such as Cs-137 and Sr-90, which undergo photodisintegration by the (γ, n) reaction resulting in shortlived or stable products. Chemical separation of the spent fuel isotopes is not necessary. Of course, more than one accelerator may be used to drive the reactor to higher power levels and speed up the burn-up process. The fact that the reaction is not self-sustaining is a safety feature allowing immediate shutdown in the event of a problem.

Introduction

The nuclear fission of heavy elements following the absorption of electromagnetic radiation – photofission – was first predicted by Bohr and Wheeler¹² in their famous 1939 paper. Haxby, Shoupp, Stephens, and Wells (1941) were the first to produce fission with gamma rays.

A survey of the literature indicates that photonuclear reaction studies in actinide nuclei have been the pursuit of several laboratories during the last forty years, using several types of gamma sources. The main objective of these studies has been to obtain nuclear information at excitation energies in the region of the giant dipole resonance and in the region of low energy, near the photofission and photoneutron thresholds. Bowman,¹³ using a quasi-monochromatic photon beam obtained from the annihilation in flight of monochromatic positrons, was the first to observe the characteristic splitting of the giant dipole resonance and of a fissile nucleus into two components, a phenomenon observed for other permanently

¹² Bohr, N. and Wheeler, J. 1939. *Physics Review*, 56, 426.

deformed nuclei as well.¹⁴ However, they found that the photon-induced Γ_n/Γ_f ratio was strongly energy dependent, a result in complete disagreement with data obtained from neutron-induced fission, bremsstrahlung-induced fission, and charge-particle-induced fission.¹⁵

It is well-known that at neutron number $N=90$ a sharp change in the nuclear surface properties occurs. The resulting transition from equilibrium spherical to prolate nuclear shape leads to a change in the nuclear optical anisotropy and, consequently, in the shape of the giant resonance in the photoabsorption cross section as shown in Figure 1. Since many nuclear properties depend similarly on the proton and neutron numbers, it is reasonable to expect that analogous transition effects should be observed for $Z=90$ nuclei as well, which will lead to the evolution of their photoabsorption cross section shape.¹⁶ This giant-resonance absorption is ascribed to the excitation of dipole vibrations of all the protons against all the neutrons in the nucleus, the protons and neutrons separately behaving as compressible fluids. This model makes some fairly simple predictions about the magnitude and A -dependence of the resonance that are quite well borne out by the experimental data: the integrated cross sections under the resonance peaks are given to good approximation by $0.06NZ/A$ MeV b, and the peak energies can be approximately represented by $aA^{-1/3}$.

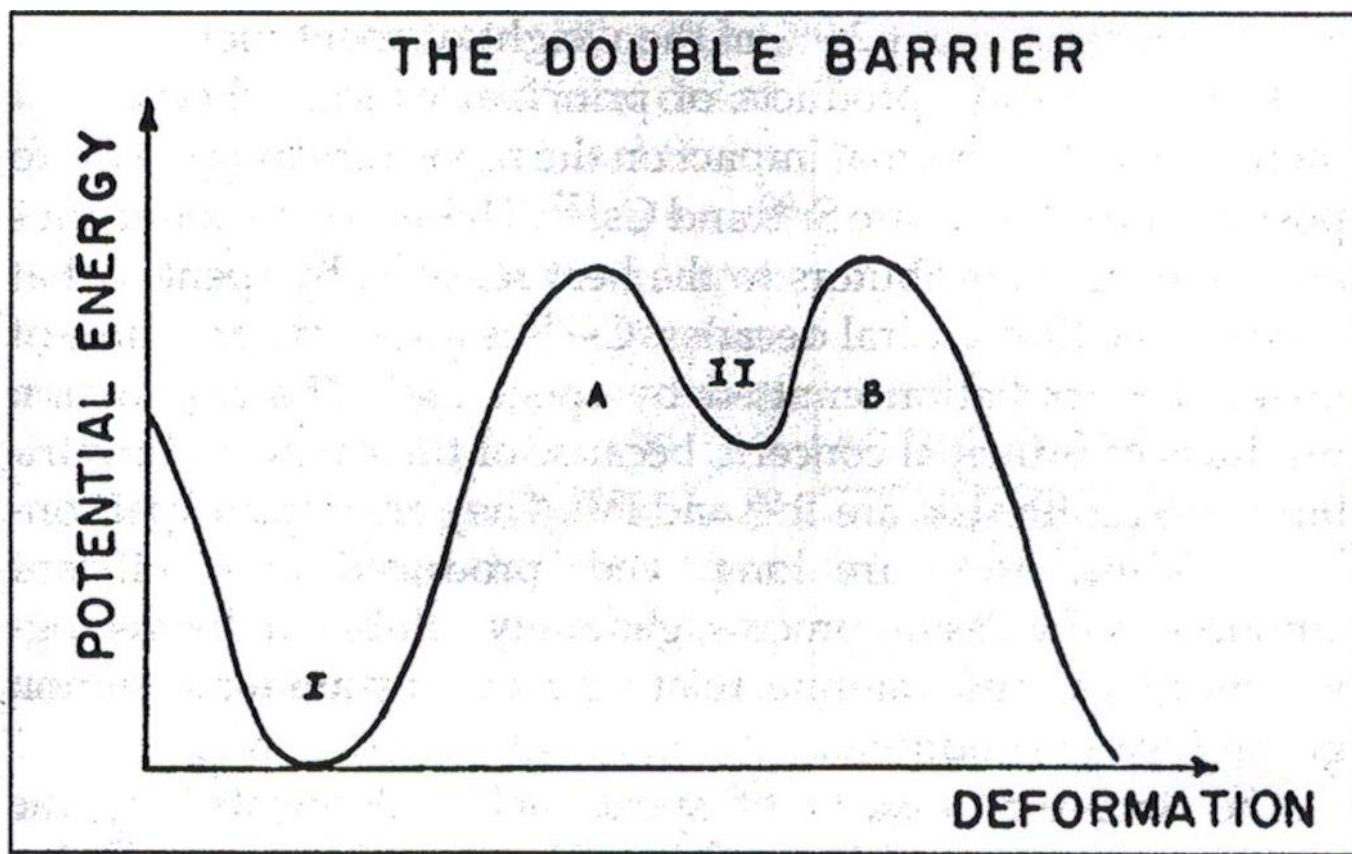


Figure 1. The characteristic double-humped curve typical of strongly deformed nuclei.

¹³ Bowman, C. 1964. *Physics Review*, 133, B676.

¹⁴ Bergere, R. et al. 1968. *Nuclear Physics*, A121, 463.

¹⁵ Veyssiere, A. 1973. "A Study of the Photofission and Photoneutron Processes in the Giant Dipole Resonance of Th-232, U-238, and Np-237," *Journal of Nuclear Physics*, A199, 45, 7301.

¹⁶ Gurevich, G. et al. 1976. "Giant Resonance in the Total Photoabsorption Cross Section of $Z = 90$ Nuclei," *Nuclear Physics*, A273, 326-340.

The energy of the dipole resonance is so low that mostly rather simple processes – such as (γ, n) and photofission reactions – take place in the giant-resonance region. The competition between these processes is governed by the usual statistical considerations of compound-nucleus de-excitation, so that neutron emission usually dominates.

The characteristics of the giant dipole resonance for the actinide nuclei are of particular interest. For such high-Z, high-Coulomb barrier nuclei, the total photon-absorption cross section is equal to the sum of the photoneutron and photofission cross sections. The total photoneutron cross section is the sum of the following reaction cross sections,

$$\sigma(\gamma, n_{\text{tot}}) = \sigma(\gamma, n) + 2\sigma(\gamma, 2n) + \nu\sigma(\gamma, f) \quad (1)$$

where ν is the neutron multiplicity of a fission event. The total neutron production cross section is then,

$$\sigma_{\gamma, N} = \sigma_{\gamma, n} + \nu\sigma_{\gamma, f} \quad (2)$$

The competition between neutron emission and fission may be expressed,

$$\Gamma_n/\Gamma_f (E) = \sigma(\gamma, n)/\sigma(\gamma, f) (E). \quad (3)$$

The value for Γ_n/Γ_f decreases exponentially with the fissility of the nuclei.¹⁷ The theoretical expression for Γ_n/Γ_f which explains this behavior for the neutron emission and fission competition is derived from the Constant Nuclear Temperature for the level density, and is expressed

$$\Gamma_n/\Gamma_f = 2 TA^{2/3}/10 \exp \{ (Ef' - Bn')/T \} \quad (4)$$

where $(Ef' - Bn')$ are the effective thresholds for the respective photonuclear processes, and T is the nuclear temperature.

The fact that more than one neutron is emitted per fission in the fission of such isotopes as Th-232, U-233, U-235, U-238, and Pu-239 leads to the possibility of a chain reaction in a mass of fissionable material. Whether the chain reaction remains steady, builds up, or dies down depends upon the competition between the production of neutrons through fission and the loss of neutrons through a variety of processes such as non-fission capture of neutrons, primarily (n, γ) reactions in the system, and the leakage of neutrons through the surface of the system.

Energy is released at the rate of 200 MeV per fission of one atom or about 23×10^6 kilowatt-hours per fission of one kilogram of U-235. The fission fragments carry off 82% of the energy in the form of kinetic energy. Prompt neutrons carry off another 2.5%, prompt gammas carry off 3.5%, beta decay accounts for 4%, delayed gammas account for 3%, and neutrinos carry off the remaining 5%. The neutrinos and their energy are lost, since the probability of interaction with neutrinos is so small. Some fission also occurs as a fast neutron strikes a U-238 atom. Also, as the fuel is burned plutonium is produced, and by the end of a fuel cycle – eighteen months of operation – 35% of the energy is actually coming from the fission of Pu-239 atoms. About 80% of the neutron absorption in U-235 results in fission; the other 20% are (n, γ) reactions.

¹⁷ Cesar, M. et al. 1992. "Photoneutron Cross Sections of Pu-239 Using Neutron Capture Gamma Rays, Near Threshold," *Physica Scripta*, 47.

Once a fission chain reaction is started, the *effective multiplication factor* k_e will determine whether the chain reaction will continue at a steady rate, increase, or decrease. The effective multiplication factor is defined as *the ratio of the rate of production of neutrons, P, to the combined rate of absorption, A, and the rate of leakage, L, of neutrons*, or $k_e = P/A+L$. The term *absorption* includes all types of absorption, such as those which produce fission and those which produce (n, γ) processes in the material of the reactor. The fission chain reaction will be critical or steady when $k_e = 1$, it will be building up or *supercritical* when $k_e > 1$, and it will be dying down or *subcritical* when $k_e < 1$.

If F is the rate at which fission processes occur, and if ν is the average number of neutrons emitted per fission, then $P = \nu F$. Then we may write $k_e = P/A+L$ as $k_e = \nu F/A+L$ from which we get

$$k_e = \nu(F/A)[1/1+(L/A)]. \quad (5)$$

The ratio F/A depends upon the amount of fissionable and nonfissionable material and on their cross sections for fission and neutron capture. The ratio L/A depends upon the ability of the reactor to contain and absorb neutrons before they can escape through the surface. As the size of a reactor decreases, the rate of neutron leakage through the surface increases, and the rate of neutron absorption decreases, so that L/A increases and approaches infinity, and hence in the limit k_e approaches zero. As the size of the reactor increases, L/A decreases toward zero, and k_e increases toward the limiting value $\nu F/A$. Hence if the composition of the reactor is such that $\nu F/A > 1$, then there is some size of this reactor for which $k_e = 1$; for this size, the reactor is critical. This size is called the critical size, and the mass of fissionable material at this size is called the critical mass. The region containing the fissionable material is called the reactor core. The core may be surrounded by nonfissionable material capable of reflecting neutrons back into the core; in such a case, both the critical size and the critical mass are reduced. On the other hand, if there is an insufficient amount of fissionable material or an excess of absorbing material in the reactor core so that $\nu F/A < 1$, then there is no size for which a steady chain reaction can occur irrespective of whether or not a reflector is used. Pure natural uranium, no matter how large the amount, cannot support a chain reaction, that is $\nu F/A < 1$. Titterton (1950) found that the average kinetic energy released in the photofission of Th-232 is about 0.8 of that released in the slow-neutron fission of U-235 or about 160 MeV.

Table 1. Thermal Neutron Cross Sections for Uranium

<u>Process</u>	<u>Cross Section (Barns)</u>		
	<u>U-235</u>	<u>U-238</u>	<u>U-natural</u>
Fission	549	0	3.92
n-Capture	101	2.80	3.5
Scattering	8.2	8.2	8.2

Table 2. Fission Threshold Energy of Select Isotopes

<u>NUCLIDE</u>	<u>PHOTOFISSION</u>	<u>NEUTRON-FISSION</u>
	<u>THRESHOLD (MeV)</u>	<u>THRESHOLD (MeV)</u>
Am-241	6.0	—
Am-242	—	6.4
Th-232	5.8	1.3
Np-237	5.6	0.4
Np-238	—	6.0
U-233	5.7	0.025
U-234	6.0	0.4
U-235	5.3	0.025
U-236	—	0.8
U-237	—	6.3

U-238	5.8	1.2
Pu-239	5.8	0.025

The Nuclear Waste Problem

A typical 1000 MWe PWR reactor operating at 75% capacity generates about twenty-one tons of spent fuel at a burn-up of 43 GWd/t. The twenty-one tons of spent fuel – contained inside 42 PWR fuel elements with a total volume of about 11 m³ – will have produced an electric energy of about 6.6 TWh (6.6 billion kWh). This same energy output corresponds to the burning of two million tons of coal in a conventional power plant giving rise to 120,000 tons of ashes, 5.4 million tons of CO₂, and 50,000 tons of SO₂.

Spent fuel consists of uranium which accounts for about 96% of the spent fuel removed from commercial nuclear reactors. In the case of light water reactors (the type most commonly used), the spent fuel contains 0.90% U-235, whereas natural uranium contains only 0.70% of this isotope. Plutonium constitutes about 1% of the weight of spent fuel. It is fissile, which means that it can be used as fuel in nuclear reactors. The minor actinides constitute about 0.1% of the weight of spent fuel. They consist of about 50% Np, 47% Am, and 3% Cm, which are very radiotoxic. The fission products – iodine, technetium, neodymium, zirconium, molybdenum, cerium, cesium, ruthenium, palladium, etc. – constitute about 2.9% of the weight of spent fuel.

The two fission products of principal concern, because of their substantial thermal impact on the repository as opposed to posing a health risk, are Sr-90 and Cs-137. These two radionuclides are dominant contributors to the heat released by spent fuel at least for the first several decades. Cs-137 is also a major source of penetrating radiation emitted by spent fuel. The two fission products of principal concern, because of their potential contribution to health risk, are Tc-99 and I-129. They are of principal concern because they are long-lived, produced in significant amounts in the fission process, generally soluble under geologic conditions, and migrate relatively quickly under common ground water conditions.

The long-term toxicity of spent fuel is dominated by the actinides such as Np-237, U-234, U-236, and Pu-239, Pu-240, and Pu-242. The transmutation of long-lived nuclides in high-level radioactive waste to stable or short-lived nuclides by stimulating nuclear reactions is a desirable alternative approach for the reduction of high-level waste.

There are about three hundred different radioactive species generated by the operation of a nuclear reactor, primarily as a result of neutron capture and neutron-induced fission. The adverse impact of the various radionuclides varies because of the differences in the chemical behavior in the body of, and the radiation emitted by, the radionuclides. The risk focus of the radionuclides is related to waste disposal in a geologic repository. The most common release and exposure mechanisms from a repository involve ground water contacting the waste form followed by slow dissolution, transport of radionuclides to the accessible environment, distribution in the biosphere, and eventual uptake from food and water. Although hundreds of isotopes are present in spent fuel or wastes derived from them, only a few of them are important for disposal. These four isotopes – Cs-137, Sr-90, I-129, and Tc-99 – are the primary focus of concern for light-water reactor spent fuel, i.e., nuclear waste due to their excess heat, groundwater solubility, or health risk.

The management of spent fuel should ensure that the biosphere is protected under economically acceptable conditions without entailing unfavorable short-term consequences and the public must be convinced of the effectiveness of the methods. Since the spent fuel contains very long-lived radionuclides, some protection is required for at least one hundred thousand years. Two means are possible:

1. We can wait for the natural decay of the radioactive elements by isolating them physically from the biosphere by installing successive barriers at a suitable depth in the ground. This strategy is called deep geological disposal;
2. We can make use of nuclear reactions that will transmute the very long-lived wastes into less radioactive or shorter-lived products. This strategy is called transmutation.¹⁸

The problem with storing nuclear waste below ground is that there is no material that will outlast its radioactive contents, and radioactive wastes continuously produce heat, hydrogen, and helium outgassing, as well as other labile products.

The nuclear industry with the federal government have spent more than \$6 billion in development of the Yucca Mountain, Nevada site where they plan to store 77,000 metric tons of high-level radioactive waste. A June 29, 1992 earthquake of 5.9 magnitude on the Richter scale caused \$1 million in damage to a Department of Energy building six miles from the proposed Yucca Mountain site. Department of Energy scientists were rattled to discover that the epicenter of the quake was twelve miles from the proposed dump site.

In 1991, mining experts reported that a deep underground salt chamber (Waste Isolation Pilot Plant, or WIPP) in the New Mexico desert designated for the first United States tests of permanent radioactive waste disposal would probably collapse years before the tests could be completed. The WIPP facility was to start accepting waste in January 1999.

There are some one hundred fourteen nuclear reactors in the United States and about four hundred commercial nuclear power plants in operation around the world including about one hundred twenty GWe nuclear electric capacity in Western Europe and forty-five GWe operational in the ex-USSR and Eastern European countries. In the United States alone, we have accumulated thirty-four thousand tons of nuclear waste. The current United States production rate of high-level waste – primarily spent fuel – is three thousand tons per year. The average commercial power plant puts sixty used fuel assemblies into ‘temporary’ storage each year and is expected to do so until the year 2000 when the waste is to be transferred to the Department of Energy. This does not include low-level wastes such as gloves, filters, tools, clothing, etc. that come from nuclear power plants, research centers, and hospitals that use radioactive materials. There are about one hundred thousand United States facilities that use radioactive materials. They produce 1.6 million cubic feet of low-level waste each year.

Table 3. Fissionabilities

<u>Nucleus</u>	Z^2/A	$\sigma_{\text{int}}(\gamma, F)/\sigma_{\text{int}}(\gamma, \text{tot})$	I_n/I_f
Th-232	34.91	0.11	15
U-238	35.56	0.30	39
U-236	35.86	0.46	2.1
U-235	36.02	0.62	1.4
U-234	36.17	0.68	0.99
U-233	36.33	0.81	0.49
Np-237	36.49	0.60	0.68
Pu-239	36.97	0.74	0.62

¹⁸ Brown, P. 1998. "Neutralizing Nuclear Waste Using Applied Physics," *Infinite Energy*, Vol. 4, Issue 21, pp 9-13.

Current projected costs of the United States Environmental Management Program are about \$7.5 billion per year. Paper studies currently account for about 20% of the Environmental Restoration budget. According to the Baseline Environmental Management Report, the total clean-up cost of the nuclear weapons program is \$230 billion over a seventy-five year period, including the \$50 billion projected Hanford clean-up.

The Solution: Sub-critical Accelerator Driven Reactor

The photon reactor is a method and means for producing nuclear energy from heavy elements but not fissile elements. The reaction is not driven by the well-known self-sustained, chain-reaction of U-235, rather by an accelerator. The fuel for this type of accelerator driven reactor may be the spent fuel from fission reactors. The mechanism by which nuclear energy is released from non-fissile material is known as photofission, wherein a photon or gamma is introduced greater than the photofission threshold energy resulting in fission of the target nucleus. For instance, with U-238 the threshold of photofission is about 6 MeV and results in fission of the U-238 nucleus releasing about 200 MeV. Patents are currently pending.

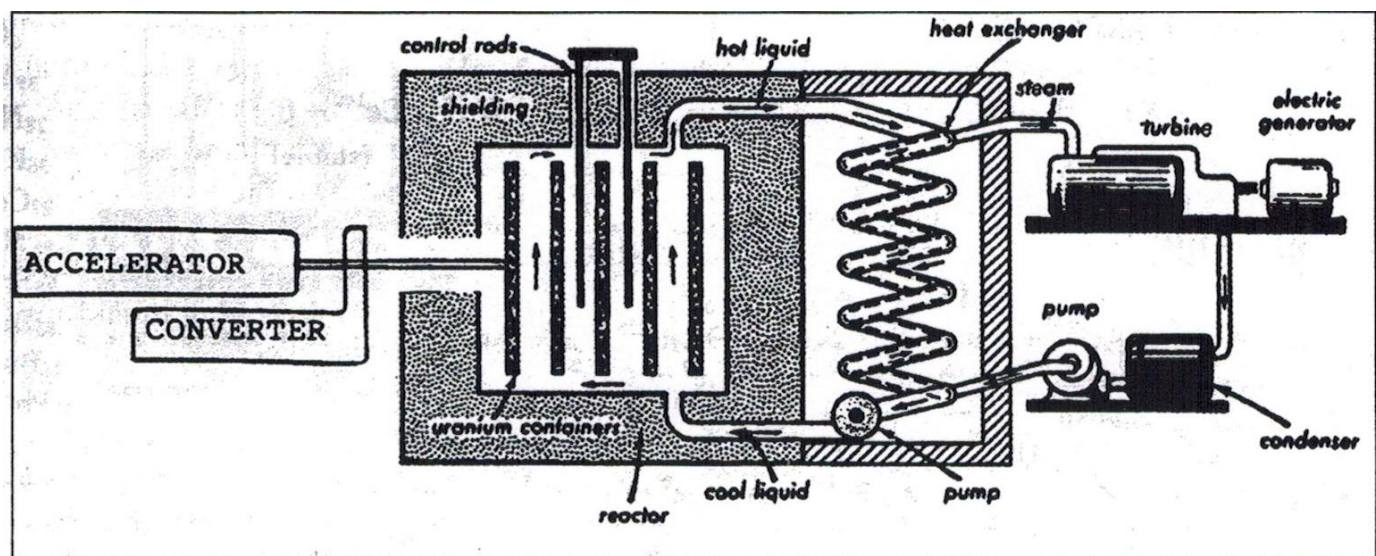


Figure 2. The accelerator driven reactor schematic.

A linear accelerator, preferably of the monochromatic type, accelerates electrons which are directed onto a high Z target, such as tungsten, to generate gamma rays of an energy about 10 MeV, which are directed onto the fuel material such as U-238, resulting in the (γ, f) reaction, thus releasing about 200 MeV. A reactor, built according to this principle requiring an accelerator driven by 1 MW, will develop about 20 MW of power. The reaction is not self-sustaining and stops when the beam is turned off. This accelerator driven reactor may be used to 'burn up' spent fuel from fission reactors if simply operated at 10 MeV. The photofission results in typical spent fuel waste products such as Cs-137 and Sr-90 which undergo photodisintegration by the (γ, n) reaction, resulting in short-lived or stable products. Chemical separations of the spent fuel isotopes are not necessary. Of course, more than one accelerator may be used to drive the reactor to higher power levels and speed up the burn up process. Ideally, four spaced accelerators would require about 4.8 MW of power to run, resulting in about 100 MW from the reactor.

Reactions in the Accelerator Driven Reactor

It is important to note that although the reactor is sub-critical and driven by gamma rays, the neutrons produced still induce both fast and slow neutron fission just as in any conventional reactor. These neutron reactions result in additional energy output, thereby increasing the input/output ratio from 1/20, a value determined by the design.

Figure 3 shows the photonuclear cross sectional data obtained by Veyssier¹⁹ for U-238. Notice that the total photonuclear cross sections all have about the same peak cross section value. The maximum cross sections are all about 0.5b and all are about 6 MeV wide; this appears to hold true for all the actinides. The photoabsorption cross section falls sharply above the $(\gamma, 2N)$ and (γ, nf) peaks, as is the case for essentially all medium and heavy nuclei as provided by the examples in Figure 4.

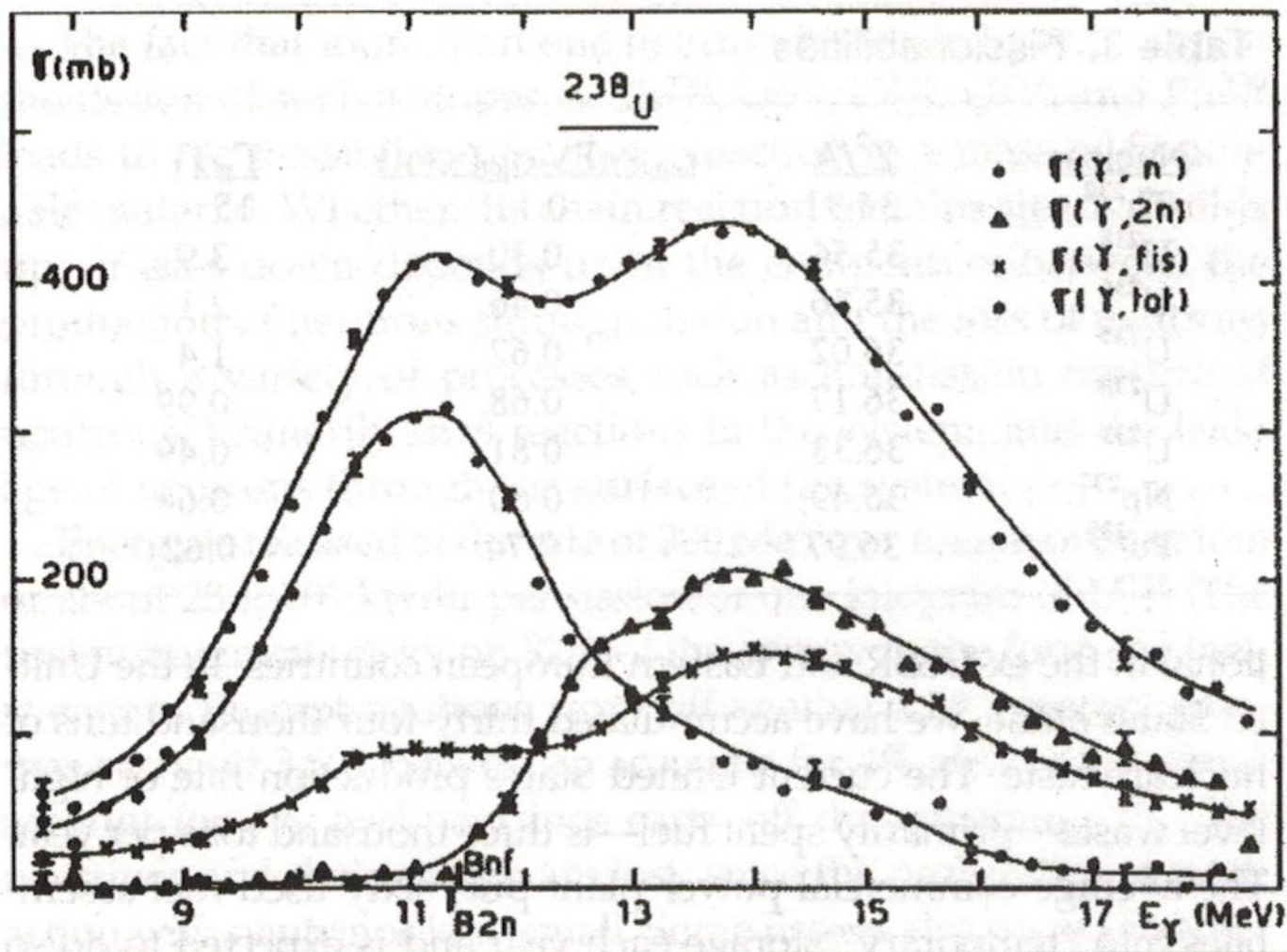


Figure. 3. Partial and total photonuclear cross sections (γ, n) , $(\gamma, 2n)$, (γ, f) , and (γ, tot) for U-238.

¹⁹ Veyssiere, A. 1973. "A Study of the Photofission and Photoneutron Processes in the Giant Dipole Resonance of Th-232, U-238, and Np-237," *Journal of Nuclear Physics*, A199, 45, 7301.

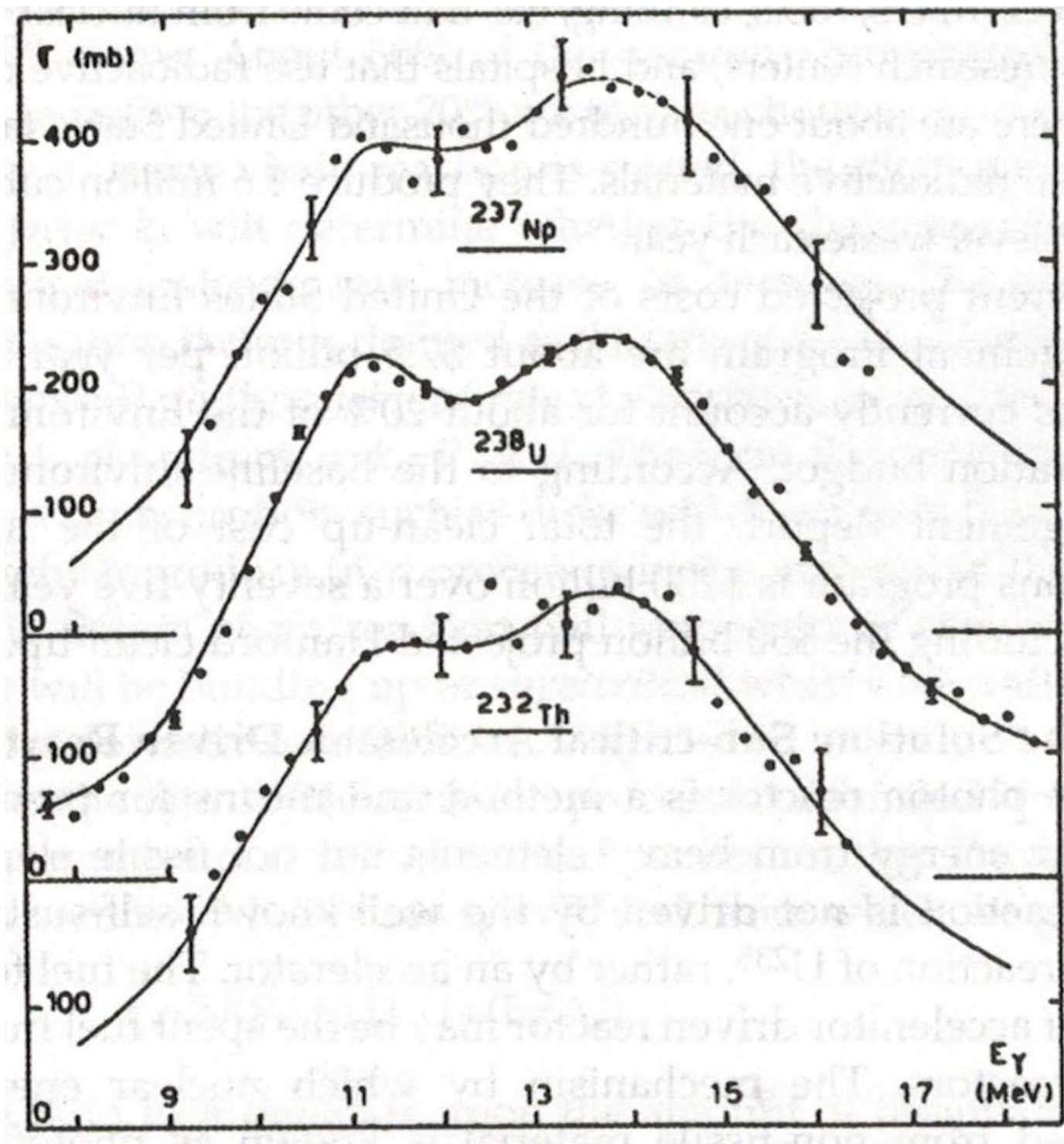


Figure 4. Total photonuclear cross sections for Th-232, U-238, and Np-237

The thermal fissionable nuclides include Np-238, Pa-232, Pu-239, Pu-241, Th-227, U-231, U-233, and U-235. All those nuclides fissionable by thermal neutrons are, of course, also fissionable by fast neutrons. In addition, there are several nuclides such as U-238, Th-232, Pa-231, and Np-237 which are fissionable by neutrons having energies of about 1 MeV.

Looking at Figures 3 through 5 we see that at 10 MeV the (γ, n) reaction is about three times the (γ, f) reaction. Table 4 lists several (γ, n) reactions that result in the neutralization or burn-up of the radioisotope

resulting in stable, non-radioactive products. The reactions that occur within the accelerator driven reactor are too numerous to list but the most important reactions are shown in Table 4.²⁰

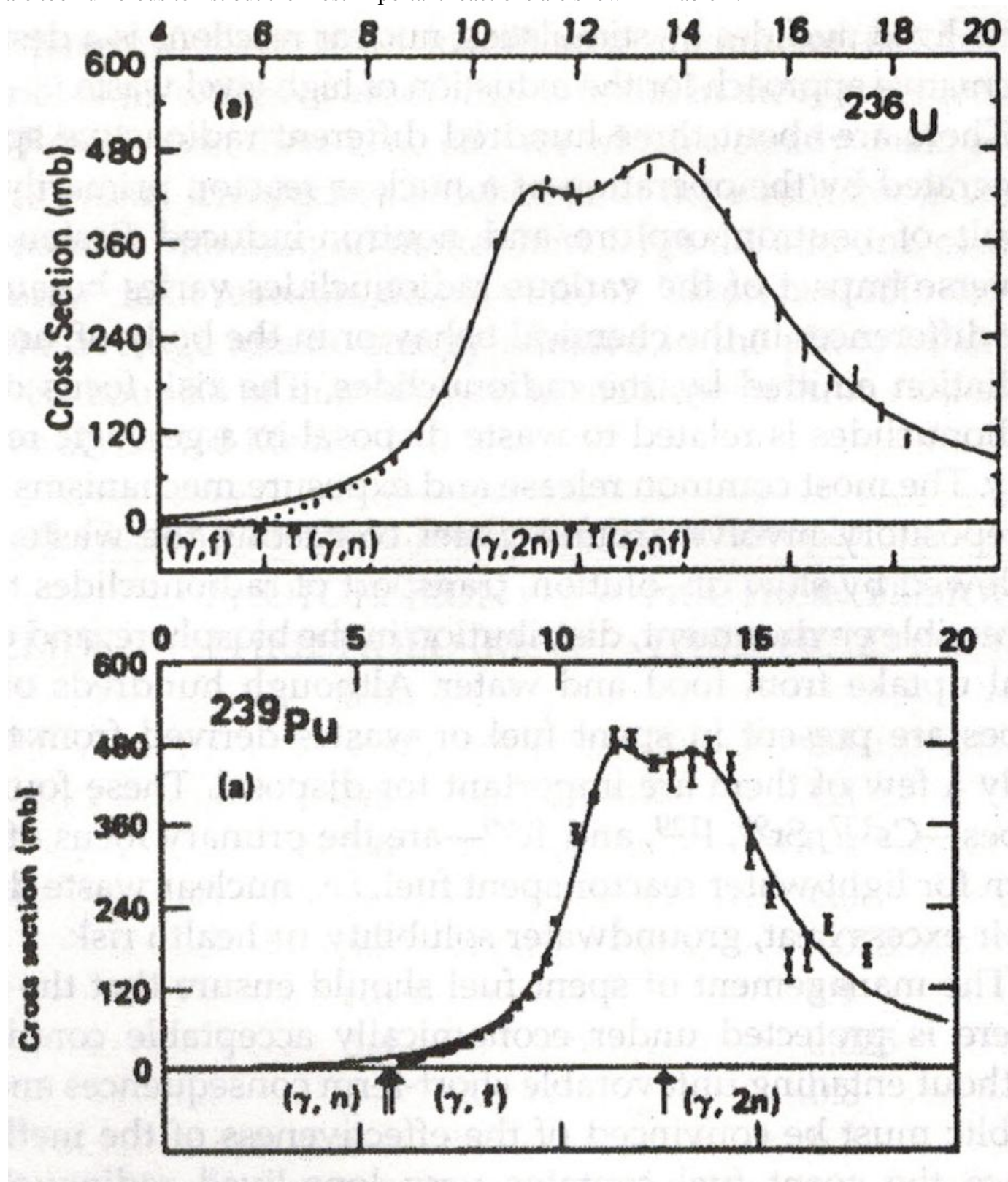


Figure 5. Total photonuclear cross section for U-236 and Pu-239

²⁰ Brown, P. 1999. "Transmutation of Nuclear Waste Products Using Giant Dipole Resonant Gamma Rays," *Infinite Energy*, Vol. 4, 23, pp 44-46.

Table 4. Relevant Reactions in Photon Driven Reactor

PhotoFission Reactions:	Neutron Enrichment:
$(\gamma, f): \text{U}^{238}, \text{Th}^{232}, \text{Pa}^{231}, \text{Np}^{237}, \text{Np}^{238}, \text{Pa}^{232}, \text{Pu}^{239}, \text{Pu}^{241}, \text{Th}^{227}, \text{U}^{231}, \text{U}^{233}, \text{U}^{235}$	$\text{U}^{238} + \text{n}^1 \rightarrow \text{U}^{234} + \text{n}^1 \rightarrow \text{U}^{235} + \gamma$ $\text{Th}^{232} + \text{n}^1 \rightarrow \text{Th}^{233} + \gamma \rightarrow \text{Pa}^{233} + \beta^- \rightarrow \text{U}^{233} + \beta^-$
Fission Reactions: (just one of many)	(γ, n) Neutralization:
$\text{U}^{235} + \text{n}^1 \rightarrow \text{Sr}^{94} + \text{Xe}^{140} + 2 \text{n}^1$ $\text{Sr}^{94} \rightarrow \text{Y}^{94} + \beta^- \rightarrow \text{Zr}^{94} + \beta^- \text{ (stable)}$ $\text{Xe}^{140} \rightarrow \text{Cs}^{140} + \beta^- \rightarrow \text{Ba}^{140} + \beta^- \rightarrow \text{La}^{140} + \beta^- \rightarrow \text{Ce}^{140} + \beta^- \text{ (stable)}$	$\text{H}^3 + \gamma \rightarrow \text{H}^2 + \text{n}^1 \text{ (stable)}$ $\text{C}^{14} + \gamma \rightarrow \text{C}^{13} + \text{n}^1 \text{ (stable)}$ $\text{Y}^{90} + \gamma \rightarrow \text{Y}^{89} + \text{n}^1 \text{ (stable)}$ $\text{Ni}^{63} + \gamma \rightarrow \text{Ni}^{62} + \text{n}^1 \text{ (stable)}$ $\text{Kr}^{85} + \gamma \rightarrow \text{Kr}^{84} + \text{n}^1 \text{ (stable)}$ $\text{Co}^{60} + \gamma \rightarrow \text{Co}^{59} + \text{n}^1 \text{ (stable)}$ $\text{Ti}^{204} + \gamma \rightarrow \text{Ti}^{203} + \text{n}^1 \text{ (stable)}$ $\text{Sr}^{90} + \gamma \rightarrow \text{Sr}^{88} + 2 \text{n}^1 \text{ (stable)}$ $\text{Bi}^{210} + \gamma \rightarrow \text{Bi}^{209} + \text{n}^1 \text{ (stable)}$ $\text{Ba}^{133} + \gamma \rightarrow \text{Ba}^{132} + \text{n}^1 \text{ (stable)}$ $\text{Pb}^{210} + \gamma \rightarrow \text{Pb}^{208} + 2 \text{n}^1 \text{ (stable)}$ $\text{Sr}^{90} + \gamma \rightarrow \text{Sr}^{89} + \text{n}^1 \rightarrow \text{Y}^{89} + \beta^- \text{ (stable)}$ $\text{I}^{129} + \gamma \rightarrow \text{I}^{128} + \text{n}^1 \rightarrow \text{Xe}^{128} + \beta^- \text{ (stable)}$ $\text{Cs}^{137} + \gamma \rightarrow \text{Cs}^{136} + \text{n}^1 \rightarrow \text{Ba}^{136} + \beta^- \text{ (stable)}$ $\text{Fe}^{60} + \gamma \rightarrow \text{Fe}^{59} + \text{n}^1 \rightarrow \text{Co}^{59} + \beta^- \text{ (stable)}$ $\text{Pb}^{210} + \gamma \rightarrow \text{Pb}^{209} + \text{n}^1 \rightarrow \text{Bi}^{209} + \beta^- \text{ (stable)}$
(γ, n) Enrichment:	
$\text{U}^{236} + \gamma \rightarrow \text{U}^{235} + \text{n}^1$ $\text{U}^{238} + \gamma \rightarrow \text{U}^{236} + 2 \text{n}^1 + \gamma \rightarrow \text{U}^{235} + \text{n}^1$ $\text{Am}^{241} + \gamma \rightarrow \text{Am}^{240} + \text{n}^1 + .1 \text{e}^0 \rightarrow \text{Pu}^{240}$ $\text{Np}^{237} + \gamma \rightarrow \text{Np}^{235} + 2 \text{n}^1 + .1 \text{e}^0 \rightarrow \text{U}^{235}$ $\text{U}^{238} + \gamma \rightarrow \text{U}^{237} + \text{n}^1 + \gamma \rightarrow \text{U}^{236} + \text{n}^1 + \gamma \rightarrow \text{U}^{235} + \text{n}^1$ $\text{Pu}^{238} + \gamma \rightarrow \text{Pu}^{236} + 2 \text{n}^1 + \gamma \rightarrow \text{Pu}^{235} + \text{n}^1 + .1 \text{e}^0 \rightarrow \text{Np}^{235} + .1 \text{e}^0 \rightarrow \text{U}^{235}$ $\text{U}^{238} + \gamma \rightarrow \text{U}^{237} + \text{n}^1 \rightarrow \text{Np}^{237} + \beta^- + \gamma \rightarrow \text{Np}^{235} + 2 \text{n}^1 + .1 \text{e}^0 \rightarrow \text{U}^{235}$ $\text{Pu}^{239} + \gamma \rightarrow \text{Pu}^{237} + 2 \text{n}^1 + \gamma \rightarrow \text{Pu}^{235} + 2 \text{n}^1 + .1 \text{e}^0 \rightarrow \text{Np}^{235} + .1 \text{e}^0 \rightarrow \text{U}^{235}$ $\text{Pu}^{239} + \gamma \rightarrow \text{U}^{235} + \alpha$	

In a (γ, n) reaction neither the γ -ray nor the neutron has a Coulomb barrier to surmount, so reaction sets in sharply as soon as the threshold energy is reached.²¹

For many fission products the neutron capture cross sections in a thermal spectrum can give substantial transmutation rates. The transmutation of Tc-99 is characteristically much more effective in a thermal neutron spectrum, generally due to higher neutron capture cross section at lower energies.

The systematics of the giant dipole resonance, which characterizes the absorption of electromagnetic radiation by nuclei in the energy range from about 5 to 30 MeV, have been of interest since the discovery of the giant resonance itself. Over the years, the photoneutron cross sections for many nuclei have been measured with monoenergetic photons in numerous laboratories. All these data are presented in the Atomic Data Nuclear Data Tables. For most cases studied, the agreement is remarkably good.

The Accelerator

The high-energy X-ray machine requires a high-power, low-energy (10 MeV) electron linac to produce the gamma rays to drive the reactions in the reactor. Current technology suggests the use of a traveling wave resonant ring (TWRR) accelerator energized by two 1.2-MW continuous wave (CM L-band klystrons (1249 MHz RF) to produce an electron beam with an energy of 10 MeV and a current of 100 mA. The average beam power is 200 kW→1 MW for the duty factor 20→100%. At full beam loading the accelerator is 65% efficient and is operable at room temperature.

The TWRR was selected to enhance the threshold current of beam break-up and to get high accelerator efficiency that results from the low value of attenuation constant and high field multiplication factor which are permitted only with TWRR. The advantages of using TWRR rather than a standing wave accelerator guide are simplicity of cavity structure, larger aperture size, ease of fabrication, and easy mechanical separation from the recirculating wave guide. All these things make it easy to handle under a high radiation field.

²¹ Brown, P. 1998. "Solving the Nuclear Waste Problem Through Applied Physics," *Journal of New Energy*, 3, 2/3, 38-46.

The klystrons are driven by 90 KVDC power supply to produce 1.2 MW RF with the efficiency of more than 65%. The 1.2 MW RF power is fed into four TWRR through two 3-db directional couplers.

The injector consists of a 200 KVDC electron gun, two magnetic lenses, an RF chopper, a chopper slit, a prebuncher, and a buncher. A peak current of 400 mA with beam energy of 200 KeV is required for the electron gun from the chopper and the buncher system design.

The accelerator section consists of seven accelerator guides. Each unit of accelerator section forms a TWRR. Each of the accelerator guides, of which the length is 1.2 m, contains 13 $2\pi/3$ mode cavities and two coupling cavities. All accelerator guides are constant gradient structure types under the condition of 100 mA beam loading. A straight waveguide was used instead of a phase shifter.

The first klystron energizes a buncher and three accelerator guides while the second klystron energizes the remaining four accelerator guides. The RF power fed into the buncher and each accelerator guide are 220 to 250 KW, respectively. Table 5 summarizes the characteristics of the 1 MW beam linac used at PNC.

Beam Flux Requirements

Calculations show that efficient (γ, n) incineration of Cs-137 and Sr-90 requires a gamma flux of only 10^{18} $\gamma/\text{cm}^2\text{sec}$ to accelerate the time of decay by 180 times.²²

The number of nuclei (γ, n) reacting during the irradiation can be determined by the following differential equation:

$$\frac{dN_i}{dt} = -(\lambda_i + \sigma_i\phi) N_i + \sum_{j \neq i}^{N_a} (\lambda_{ji} + \sigma_{ji}\phi) N_j, \quad (6)$$

$$i = 1, 2, \dots, N_a$$

where

- N_i = number of the i th nucleus,
- λ_i = decay constant of the i th nucleus,
- σ_i = total photonuclear cross section of the i th nucleus
- λ_{ji} = decay constant from the j th nucleus transmuting to the i th one,
- ϕ = γ -ray flux,
- N_a = number of nuclei considered in the model.

Using the matrix representation, Equation (6) is written as follows:

$$\frac{d\mathbf{N}}{dt} = \mathbf{A} \cdot \mathbf{N}, \quad (7)$$

where $-(\lambda_i + \sigma_i\phi)$ ($i = j$)
 $A_{ji} = \{ \lambda_{ji} + \sigma_{ji}\phi \mid i \neq j$

The matrix of the nuclei \mathbf{N} at the time $t = \Delta t$ can be obtained by the Taylor's expansion:

$$\mathbf{N}(t + \Delta t) = \mathbf{N}(t) + \sum_{r=1}^{(\infty)} \frac{(\Delta t)^r}{r!} \frac{d^r \mathbf{N}^{(n)}(t)}{dt^r}, \quad (8)$$

where $d\mathbf{N}^{(n)}(t)/dt$ is the r th derivative of $\mathbf{N}(t)$,

²² Matsumoto, T. 1988. "Calculation of Gamma Ray Incineration of Sr-90 and Cs-137," *Nucl. Instru. & Methods in Phys. Res.*, A268, 234-243.

Combining Equations (7) and (8), we can obtain $N(t+t)$ as follows:

$$N(t + \Delta t) = N(t) + (\Delta t) \sum_{r=1}^r A^r N(t). \quad (9)$$

The matrix A contains two kinds of data: the decay constants and the photonuclear cross sections.

Figure 7 shows the products produced by photofission of U-238 by 10 MeV x-rays.²³ The U-238 itself may be used as both the gamma converter and the target. That is, eliminate a separate electron-to-gamma converter and use the target material itself as the x-ray source. The advantage here is the recovery of the heat normally dissipated in the converter, which is on the order of 70% of the beam energy.²⁴

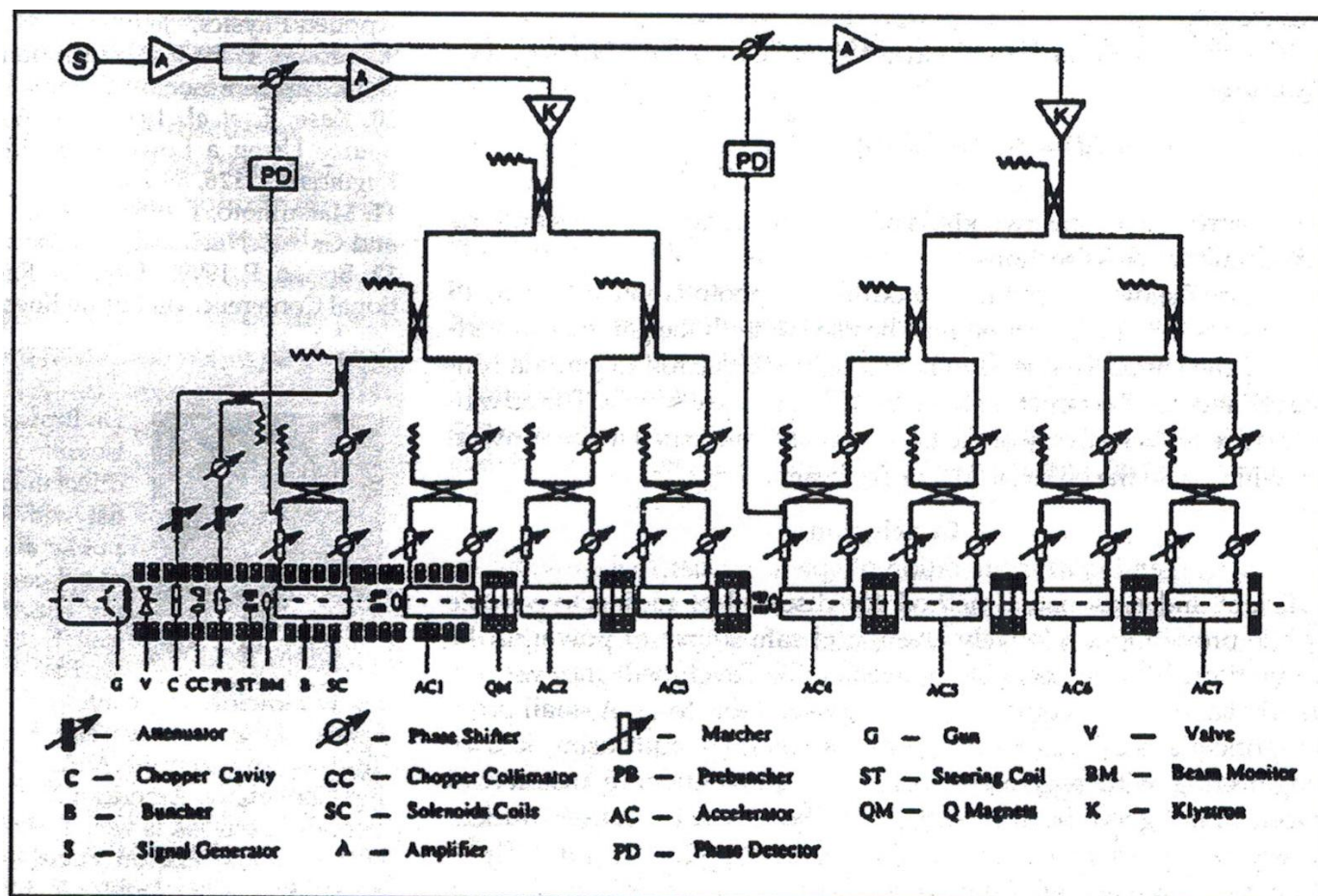


Figure 6. Schematic layout of CW electron linac.²⁵

²³ Kase, T. et al. 1997. "An Assessment of the Continuous Neutron Source Using a Low-Energy Electron Accelerator," *Nuclear Science & Engineering*, 126, 59-70.

²⁴ Brown, P. 1999. "Effective Radioactive Waste Remediation," International Conference on Future Energy, April 29-May 1, Bethesda, Maryland.

²⁵ Kase, T. et al. 1997. "An Assessment of the Continuous Neutron Source Using a Low-Energy Electron Accelerator," *Nuclear Science & Engineering*, 126, 59-70.

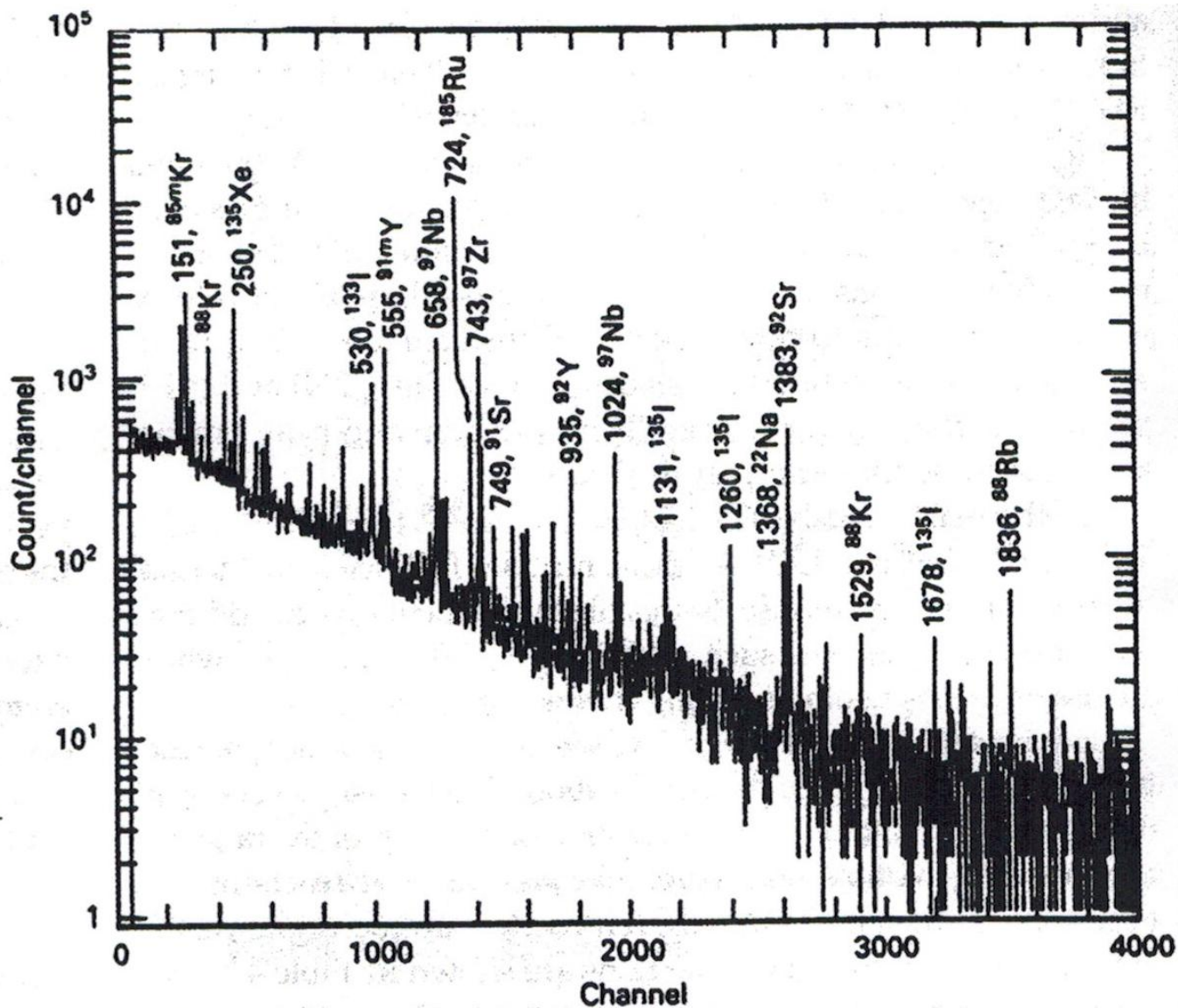


Figure 7. Products produced by photofission of U-238 target with 10 MeV photons.

Table 5. Accelerator Specifications²⁶

General

Operation Mode	Continuous Wave
Energy	10 MeV
Beam Current	100 mAmp
Total Length	18 meters
Normal Emittance	50% mm mrad
Energy Spread	1%

Accelerator Section

Type	Traveling Wave Constant-Gradient
Mode	$2\pi/3$
Frequency	1249.135 MHz
Gain (max)	1.4 MV/m to 2.0 MV/m
Number of Accelerator Guides	7

Resonant Ring

Transmission (no load)	0.946
Transmission (load)	0.850
Multiplication (no load)	3.0
Multiplication (load)	2.0

Klystron

Number of klystrons	2
Power	1.2 MW
Beam Voltage	90 KV
Micro-Perveance	0.8
Gain	50 dB
Efficiency	65%
Modulation	Modulating Anode

Conclusion

The (γ, f) and (γ, n) incineration of spent nuclear fuel provides an efficient and reasonable method for disposal of radioactive waste while providing a relatively cheap and safe source of power at the same time. No new technology needs to be developed since we currently have all the required technology available to us. A small proof-of-principle accelerator-driven reactor could be built using known engineering with reasonable assurance and confidence that it will work as designed. Such a reactor may be fueled by current nuclear waste stockpiles, spent nuclear fuel, natural U-238, or natural Th-232. Matsumoto ran the calculations to show it is theoretically feasible. Kase ran the feasibility experiment that provided proof of feasibility on the laboratory scale. Safety is high, fuel is cheap and abundant. Now all that remains is to apply the technology and build an experimental accelerator-driven reactor.

About the Author

Dr. Brown was well-known for his contributions to isotopic generator research, especially related to direct energy conversion. He was a research scientist with more than fifteen years experience at public and private research facilities. He was a member of several professional societies including The American Nuclear Society and the American Institute of Aeronautics and Astronautics. Dr. Brown held five U.S. patents and many others worldwide. His conference presentations included Symposium on Space Nuclear Power and Propulsion-NASA; National Technology Transfer Conference-NASA Intersociety Energy Conversion Engineering Conference; American Nuclear Society.

²⁶ Kase, T. et al. 1997. "An Assessment of the Continuous Neutron Source Using a Low-Energy Electron Accelerator," *Nuclear Science & Engineering*, 126, 59-70.

He was the author of several periodical articles as well as six technical books. International Fission Fuels, Inc., 20100 E. 32nd Avenue Parkw. Suite 185, Aurora, Colorado 80011, Ph: (303) 574-9697; FAX: (303)57 9699; e-mail: brown@nucsol.com.

Sources: *Infinite Energy* Volume 5, Issue 27, September/October 1999 pp 59-64.
<http://www.meridian-int-res.com/Energy/PhotonReactor.pdf>.

Wilhelm Reich's Oranur Effect Method can Denaturize Radiation Sources

From: James DeMeo
To: Gary Vesperman
CC: Andrew Michrowski
Subject: Re: PACE - 9 methods of neutralizing radioactivity; my list has 27
Date: Mon, 17 Jun 2002

Dear Gary Vesperman,
Another method not mentioned in your list of radioactivity neutralization methods is the 'oranur effect' method of Wilhelm Reich, who found that radiation sources could be denaturized (rendered less toxic) with a corresponding observation of variations in decay-rate 'constants'. We have been publishing materials related to this phenomenon for years, including long-distance atmospheric, geophysical and biological effects from underground nuclear bomb tests – all of which speaks to an unusual life-energetic property at work in radioactive decay processes.

See these links for brief discussions: <http://www.orgonelab.org/oranur.htm> and
<http://www.orgonelab.org/cart/PDF/UnusualNuclearEffects.pdf>.

There's more on this issue, but the basic findings are covered in the booklet described below, which itself carries many citations along similar lines.

Regards,
James DeMeo, Ph.D.
Director, Orgone Biophysical Research Lab

*** UNUSUAL LONG-DISTANCE ATMOSPHERIC, BIOLOGICAL AND GEOPHYSICAL EFFECTS FROM UNDERGROUND NUCLEAR BOMB TESTS AND NUCLEAR POWER PLANT ACCIDENTS: Suppressed Scientific Evidence.** Reprints of scholarly articles and reports from back issues of *Pulse of the Planet* journal, by Katagiri, Whiteford, Kato, DeMeo and Nagy, addressing this important issue. Documents the reality of what Reich called "oranur" as observed by eye-witnesses to nuclear accidents, as well as phenomena which can only be explained by the existence of a radiation-irritated atmospheric/planetary energy continuum. An essential tool for anyone concerned about nuclear issues. 40 pp.

In his March 17, 2014 email to Gary Vesperman, James Demeo reports:

The specifics of denaturizing radiation sources with Reich's oranur effects method would be in Reich's book "The Oranur Experiment", which has never been republished in full. However, a big part of it is found within his "Selected Writings".

He never set out to ‘detoxify atomic radiation’, but by the oranur experiment stumbled onto new properties of radioactive material, showing large variations in radioactive decay rates, with a change in the nature of the radioactive material into something more benign or even life-positive. Reich was the one who coined the phrase ‘Atoms for Peace’, which later was used by the AEC for their atomic energy reactor program.

The oranur experiment has never been fully replicated by anyone, as there are hazards involved – very large bursts of radiation which can be stimulated during such investigations. I speak about this in the intro to the “Unusual Nuclear Effects” booklet, observations which were made at every major atomic reactor accident. But a few, including myself, have replicated aspects of his findings in a more controlled laboratory environment. The basic theme of which is, that the life-energy field (call it cosmic ether if you wish) surrounding the radioactive material is an active agent in radioactive decay processes.

By another example, Peter Sturrock at Stanford has discovered variations in decay-rate processes matching the sunspot numbers. Reich made a similar discovery decades earlier, as a part of his discovery of oranur.

“In a time of universal deceit, telling the truth is a revolutionary act.” – George Orwell

New book: “In Defense of Wilhelm Reich: Opposing the 80-Years' War of Defamatory Slander Against One of the 20th Century's Most Brilliant Physicians and Natural Scientists”, by James DeMeo
<http://www.amazon.com/Defense-Wilhelm-Reich-Mainstream-Defamatory/dp/0980231671>

Ramsar in Iran has Earth’s Highest Natural Background Radiation

Ramsar, Iran lies on the coast of the Caspian Sea. At the 2006 census, its population was 31,659.

Ramsar's Talesh Mahalleh district is the most radioactive inhabited area known in the world – due to nearby hot springs and building materials originating from them. A combined population of 2000 residents from this district and other high radiation neighbourhoods receive an average radiation dose of 10 mGy per year, ten times more than the ICRP recommended limit for exposure to the public from artificial sources. Record levels were found in a house where the effective radiation dose due to external radiation was 131 mSv/a, and the committed dose from radon was 72 mSv/a. This unique case is over 80 times higher than the world average background radiation.

The prevailing model of radiation-induced cancer posits that the risk rises linearly with dose at a rate of 5% per Sv. If this linear no-threshold model is correct, it should be possible to observe an increased incidence of cancer in Ramsar through careful long-term studies currently underway. Early anecdotal evidence from local doctors and preliminary cytogenetic studies suggested that there may be no such harmful effect, and possibly even a radioadaptive effect. More recent epidemiological data show a slightly reduced lung cancer rate and non-significantly elevated morbidity, but the small size of the population (only 1800 inhabitants in the high-background areas) will require a longer monitoring period to draw definitive conclusions. Furthermore, there are questions regarding possible non-cancer effects of the radiation background. An Iranian study has shown that people in the area have a significantly higher expression of CD69 gene and also a higher incidence of stable and unstable chromosomal aberrations. Chromosomal aberrations have been found in other studies and a possible elevation of female infertility has been reported.

Radiation hormesis was not observed in a study that also recommended that Ramsar does not provide justification to relax existing regulatory dose limits. Pending further study, the potential health risks have moved scientists to call for relocation of the residents and regulatory control of new construction.

The radioactivity is due to the local geology. Underground water dissolves radium in uraniferous igneous rock and carries it to the surface through at least nine known hot springs. These are used as spas by locals and tourists. Some of the radium precipitates into travertine, a form of limestone, and the rest diffuses into the soil, where it is absorbed by crops and mixes with drinking water. Residents have unknowingly used the radioactive limestone as a building material for their homes. The stone irradiates the inhabitants and generates radon gas which promotes lung cancer. Crops contribute 72 $\mu\text{Sv}/\text{yr}$ to a critical group of 50 residents.

Source: http://en.wikipedia.org/wiki/Ramsar,_Mazandaran

Will Fukushima be Worse than Chernobyl?

March 24, 2011

The Public Has a Right to Know

Will Fukushima Be Worse Than Chernobyl?

by Dr. Janette Sherman, MD

A little over six months ago I wrote: “Given profound weather effects (earthquakes, floods, tsunamis, etc.), human fallibility, and military conflicts, many believe that it only a matter of time before there is another nuclear catastrophe. Nuclear fallout knows no state or national boundaries, and will contribute to increase in illnesses, decrease in intelligence, and instability throughout the world. The economic costs of radioactive pollution and care of contaminated citizens are staggering. No country can maintain itself if its citizens are economically, intellectually, politically, and socially impoverished.”

[My submission was rejected... too alarmist?]

While 25 years separates the sites and the events that led to the catastrophes at Fukushima and Chernobyl, the effects will be very similar – and will remain so for years to decades to centuries.

After Chernobyl, there was a delay in collecting and releasing information. The nuclear industry and many governments are reluctant to alarm the public, but the public has a right to know what the risks are and if possible to avoid – as much as possible – those risks.

The science of radiobiology is not new. When we know the identity of a radioisotope, we can predict how it will interact with living matter – human, animal or plant. Decades of research have confirmed that radioisotopes become deposited in various parts of living systems.

In humans, I-131 and I-129 concentrate in the thyroid, Cs-137 in soft tissue, and Sr-90 in teeth and bones. Key to understanding effects is the difference between external and internal radiation. While external radiation, as from x-rays, neutron, gamma and cosmic rays can harm and kill, internal radiation (alpha and beta particles) when absorbed by ingestion and inhalation, releases damaging energy in direct contact with tissues and cells.

There is serious concern for the workers at the Fukushima plant, because of their proximity to the disabled reactors and to the fuel rods that have lost their protective cover of water. Some of the Fukushima workers, as with the ‘liquidators’ at Chernobyl are exposed to dangerous levels of gamma and neutron radiation.

Those who were not in close proximity to those sources of radiation will be spared some of the intense exposure, but will not escape the exposure from radionuclides that emit alpha and beta particles, as well as gamma radiation. These enter the bodies of humans by inhalation and ingestion of food and water.

Of the Chernobyl ‘liquidators’ the young and healthy men and women who worked to stop the fires and to contain the release of radioactivity from Chernobyl, by 2005, some 125,000 of the estimated total of 830,000 were dead (15%) mostly from circulatory, blood diseases and malignancies.

Children born to liquidator families were seriously affected with birth defects and thyroid diseases, including cancer, and loss of intellect. But other children, based upon the research of multiple researchers, it is estimated that in the heavily contaminated areas of Belarus only 20% of children are considered healthy, placing an enormous burden upon governmental resources to provide medical care and education for those affected.

Many pro-nuclear critics have downplayed the risks from Chernobyl attributing concerns to ‘radio-phobia’, but documentation of disease is not limited to the human population. With few exceptions, animal and plant systems that were studied demonstrated structural abnormalities in offspring, loss of tolerance and viability, and genetic changes. Wild animals and plants did not drink alcohol, smoke or worry about compensation. When a radiation release occurs we do not know in advance the part of the biosphere it will contaminate, the animals, plants, and people that will be affected, nor the amount or duration of harm. In many cases, damage is random, depending upon the health, age, and status of development and the amount, kind, and variety of radioactive contamination that reaches humans, animals and plants.

For this reason, open and transparent data must be collected and maintained for all biological systems – human, animal, plant. We must have international support of research on the consequences of the Fukushima and support of Chernobyl research must continue in order to mitigate the ongoing and increasing damage. Access to information must be transparent and open to all, across all borders. The WHO must sever its cooperation with the IAEA, in place since 1959, and assume independent responsibility in support of international health.

Given the emerging problems from the Fukushima nuclear plants and the continuing and known problems caused by the Chernobyl catastrophe, we must ask ourselves: Before we commit ourselves to economic and technologic support of nuclear energy, who, what and where are we willing to sacrifice and for how long?

Janette D. Sherman, M. D. is the author of Life’s Delicate Balance: Causes and Prevention of Breast Cancer and Chemical Exposure and Disease, and is a specialist in internal medicine and toxicology. She edited the book Chernobyl: Consequences of the Catastrophe for People and Nature, written by A. V. Yablokov, V. B., Nesterenko and A. V. Nesterenko, published by the New York Academy of Sciences in 2009. Her primary interest is the prevention of illness through public education. She can be reached at: toxdoc.js@verizon.net and www.janettesherman.com.

Source: <http://www.counterpunch.org/2011/03/24/will-fukushima-be-worse-than-chernobyl/>

Gamma Sponges, Glow Boys, Suicide Squads, Jumpers, Bio-Robots and Liquidators: It’s All the Same...

From: Nikoli McCracken

To: Gary Vesperman <garyvesperman@yahoo.com>

Sent: April 3, 2011

Subject: Fw: Gamma sponges, glow boys, suicide squads, jumpers, bio-robots and liquidators: It's all the same...

Gary, I just got this in at the same time as your message. Lengthy, and with several films to watch. I'm going to watch the videos tomorrow, when my eyes aren't so tired. Did you get the news that two of the workers (I would bet they were among the ones that got radiation burns on their feet) have died?

From: Ace Hoffman

To: Recipient list suppressed

Sent: April 03, 2011

Subject: Gamma sponges, glow boys, suicide squads, jumpers, bio-robots and liquidators: It's all the same...

Dear Readers,

They call them 'gamma sponges' and 'glow boys'. The teams are called 'suicide squads'.

Richard "Rich Rad" Meserve, former Chairman of the U.S. Nuclear Regulatory Commission – and now head of a mindless Washington pro-nuclear lobbying think-tank – calls them "jumpers" as if it were something fun to do. Or perhaps he considers the job healthy exercise. The suits are certainly very heavy, the work arduous, tedious, and dangerous.

Everyone learned to call them 'liquidators' after Chernobyl, but there, they called themselves 'bio-robots'.

Why? Because they had to replace the robots that didn't work, on account of the fancy electronics that don't work in highly radioactive environments. That's true today, too.

Their job? In Chernobyl it was to do things like: Heave sand and lead from a helicopter. For a total time over the reactor of just a minute or two.

A couple of trips. Then it's someone else's turn.

Or shovel radioactive graphite off the roof of the building for 45 seconds.

Then it's someone else's turn.

Or run in and turn a valve part way.

Then it's someone else's turn.

It required approximately 800,000 such young men to 'clean up' Chernobyl (and I use the term 'clean up' very, very loosely!). Virtually all were conscripted.

Now, they're dropping like flies. It's called the Chernobyl Syndrome:

"Heart, stomach, liver, kidneys... nervous system... our whole bodies were radically upset [by the radiation and chemical exposure]." – testimony of a liquidator, from the movie Battle for Chernobyl (highly recommended):

<http://www.youtube.com/watch?v=yiCXb1Nhd1o>

Their children and the children of people who were downwind from Chernobyl often wear what's called the 'Chernobyl Necklace'. It's the scar across their throat, left over from thyroid surgery.

Far worse abnormalities and deformities await many others, as well. Thyroid cancer is just the tip of the iceberg, though perhaps the easiest one to prevent and to cure.

The authorities supposedly kept track of everyone's radiation exposure, but really it was bogus. Needles on radiation detectors were pegged on 'high'. Radiation detectors themselves were in short supply. Cumulative dose badges were practically unavailable. Nearly everyone's exposure was projected, estimated, and calculated instead. These bogus records were then used by the Soviet state later, to deny that Chernobyl was the cause of their comrade's illnesses.

In Japan it's happening again: Needles are pegging on 'high', detectors are in short supply, and exposures are being crudely estimated.

The 'heros' – as the media have aptly dubbed them – who are working at the highly-irradiated Fukushima Daiichi nuclear power plant right now – are reportedly receiving 20 times their normal day's pay for a day at Fukushima Daiichi.

And perhaps a thousand times their normal daily radiation dose.

Hardly worth it, but thank goodness somebody is willing to do it at any price. The world appreciates their effort. The problem is, nothing's working. Polymer sponge diapers (I kid you not, that's what they're trying) aren't working. Concrete isn't working. Sawdust and shredded newspaper (I kid you not...) isn't working. The plant is still leaking enormous amounts of radioactivity.

And they say that could go on for years.

Every nuclear power plant has the potential to become the next Fukushima. The next Chernobyl. Or the next 'worst industrial accident ever' – worse than Chernobyl. Worse than Fukushima.

Shut 'em down. This is crazy. We sacrifice our fellow citizens. We sacrifice ourselves. We sacrifice our future. We sacrifice our children. Shut 'em down forever.

Sincerely,

Ace Hoffman
Carlsbad, CA

Today's items:

- (1) Fukushima cancer forecast underlines need for evacuation (from Richard Bramhall, llrc)
- (2) The U.N. Would Never Lie to George Monbiot
- (3) The U.N. Cover Up of Ionizing Radiation Health FX
- (4) "Three Mile Island Beatles" to be heard this Saturday on the Dr. Demento Show!
- (5) Contact information for the author of this newsletter

(1) Fukushima cancer forecast underlines need for evacuation (from Richard Bramhall, llrc):

417,000 cancers forecast for Fukushima 200 km contamination zone by 2061

Scientific Secretary of the European Committee on Radiation Risk (ECRR), Professor Chris Busby, has released calculations of the cancer incidence to be expected in fallout areas of Japan. Using data from the International Atomic Energy Agency and official Japanese web sites he has used two methods to estimate the numbers of cancer cases. He compares these results with estimates derived from ICRP modelling.

The 'Tondel' Method is based on a conservative study by Martin Tondel in northern Sweden. This examined cancer incidence during 10 years after Chernobyl. It differentiated the varying levels of land contamination and found that the disease increased by 11% for each 100 kiloBecquerels of fallout per square metre of land surface. Professor Busby has applied this factor to the zone up to 100 km from the reactors, where IAEA has reported, on average, 600kBq per sq.m radioactivity. In the 3.3 million population of this 100 km zone a 66% increase over and above the pre-accident rate is predicted in 10 years. This implies 103,329 extra cancers due to the Fukushima exposures between 2012 and 2021.

Similarly applying the "Tondel" method to the ring between 100 km and 200 km from Fukushima (population 7.8 million but lower concentrations of fallout) 120,894 extra cancers are to be expected by 2021.

Assuming permanent residence and no evacuation the total predicted yield according to the "Tondel" method is thus 224,223 in ten years.

The second method is derived from weighting factors advised by the ECRR on the basis of the different ways in which different radionuclides behave in biological systems. This predicts 191,986 extra cancers in the 0 - 100km circle and 224,623 in the outer ring. Probably half of these will be expressed in the first ten years and the remainder between 10 and 50 years.

Assuming permanent residence and no evacuation the total predicted yield according to the second method will be 416,619 of which 208,310 will appear in the first ten years. There is thus good agreement between the two methods.

The ICRP method predicts 6158 additional cancers in 50 years which, among the 2½ million cancer cases expected normally in that population over half a century, would be invisible and deniable.

The report with all methods, assumptions and data is a pdf linked from the front page:
<http://www.llrc.org/>

Professor Chris Busby on Russia Today:
<http://www.youtube.com/watch?v=QFRXHHeUUPQ>

Professor Busby deconstructs media favourites Wade Allison, George Monbiot and other 'experts':
<http://counterpunch.org/busby03282011.html>

An acknowledgement about Dr. Richard Wakeford is included.

(2) The U.N. Would Never Lie to George Monbiot

By Joe Giambrone, Op Ed News

Quite the nauseating display on DemocracyNow the other day. Renowned doctor and scientist Dr. Helen Caldicott, with more than 3 decades intense study on this issue to her credit, attempted to school the British journalist on the gross ignorance and misinformation that guides his rationale. So, now Dr. Caldicott is a conspiracy theorist, fair game for snide rebukes and silly faces.

If Monbiot isn't a shill for the nuclear industry, then I could certainly get him set up there in about five seconds. Monbiot reveals his anti-intellectual agenda by repeatedly resorting to a false dichotomy:

"But I'm very worried that the global response to what's happening in Fukushima will be to shut down nuclear power stations around the world and to cancel future nuclear power stations, and that what will happen is that they will be replaced by coal."

(Monbiot)

Thus begins a discussion of coal, which nobody suggested in the first place – except Monbiot. This false choice, which I have heard time and again recently (like a PR script), is that our only decision is between nuclear and coal. Utter nonsense on its face. Monbiot leads with nonsense.

But it gets much worse, as you'll see.

Monbiot and his cult of technofascism either fail to understand the difference between radiation that is outside the body vs. radiation that is trapped internal to the body, or else they know full well and just don't give a damn.

Dr. Caldicott:

"You don't understand internal emitters. I was commissioned to write an article for the New England Journal of Medicine about the dangers of nuclear power. I spent a year researching it. You've bought the propaganda from the nuclear industry. They say it's low-level radiation. That's absolute rubbish. If you inhale a millionth of a gram of plutonium, the surrounding cells receive a very, very high dose. Most die within that area, because it's an alpha emitter. The cells on the periphery remain viable. They mutate, and the regulatory genes are damaged. Years later, that person develops cancer. Now, that's true for radioactive iodine, that goes to the thyroid; cesium-137, that goes to the brain and muscles; strontium-90 goes to bone, causing bone cancer and leukemia."

Bitchslapped, but does Monbiot accept basic medical facts from a specialist in the field? Of course not. It's time to obfuscate by appealing to a clearly unreliable United Nations study of Chernobyl (notably published by the IAEA). This study, blessed by the U.N., is greatly disputed by the doctors and scientists who actually live in the contaminated regions and have dealt directly with this catastrophe since 1986 (not tourists).

When directed to the New York Academy of Sciences compendium of 5,000 of these translated studies on Chernobyl, George Monbiot simply dismisses these numerous studies as 'cherry picking'.

"Well, we have to use the best available science, not cherry-pick our sources..."

He uses this buzzword at least three times, as he also uses the 'climate change deniers' smear again and again. This is Monbiot's style of so-called 'debate'.

That U.N./IAEA report however relied on a specific 350 studies and used criteria to ignore increases in the cancer rate statistics post 1986. Their approach uses a minimum threshold of radiation exposure as an apriori condition to exclude everyone that – in their opinion – didn't receive enough of a radiation dose to be made sick (whether they actually were made sick or not). This U.N./IAEA 'study' set the parameters such that they would only look at a specific demographic and exclude the rest of the population despite its ongoing exposure to lower levels of radiation and free floating radionuclide particles in the dust, crops and water.

In their own words:

"Because many organs and tissues were exposed as a result of the Chernobyl accident, it has been very common to use an additional concept, that of effective dose, which characterizes the overall health risk due to any combination of radiation. (emphasis in original)"
(U.N./IAEA, 2006, p.12)

This statement reveals an unscientific bias, straight off the bat. Why should the U.N., while finding out how many people actually died from Chernobyl, need to rely on a fictional concept called 'effective dose'? And further, this assumption that they can characterize someone's "overall health risk due to any combination of radiation" is a second fiction. They were supposed to be looking at just the facts on the ground, no (or below it)?

The U.N./IAEA does concede (unlike George Monbiot) that their numbers are not definitive, and that the true death toll cannot be known very accurately, particularly with the methodology they chose to employ:

"It is impossible to assess reliably, with any precision, numbers of fatal cancers caused by radiation exposure due to Chernobyl accident."
(IAEA, p.7)

George Monbiot instead tells the world that this study produced the "official death toll from Chernobyl in 25 years."

The actual study also left room for the tally to grow, without directly admitting that it was surely much higher:

"The international expert group predicts that among the 600,000 persons receiving more significant exposures... the possible increase in cancer mortality due to this radiation exposure might be up to a few per cent."
(IAEA, p.15)

The 'few per cent' are not included in what George Monbiot calls the 'official death toll'. Neither were the tens of thousands of stillbirths. And there is yet much dispute over spikes in nearly every type of cancer in those regions after 1986.

"Some radiation-induced increases in fatal leukaemia, solid cancers and circulatory system diseases have been reported in Russian emergency and recovery operation workers."
(IAEA, p.16)

Again, not reflected in Mr. Monbiot's magical 'official' toll of "43."

The IAEA exercise was a rigged study. It violated the scientific method. First you collect the data, and then you make sense of the findings. In the UN study, they first went to lengths to make sure data was restricted to only people whom they said had received certain exposure levels. That is the standard practice there.

Who's doing the 'cherry picking' in this equation?

If George Monbiot's real concern is the 'cherry picking' of studies and the corruption of science, he would be all over this situation and in agreement with Dr. Caldicott.

But, that's not the case.

Again Caldicott tries to educate Monbiot on the basic Nuclear 101 freshman introduction, to no avail:

"Nuclear power, George, creates massive quantities of radioactive waste. There is no way to put it on earth that's safe. As it leaks into the water over time, it will bioconcentrate in the food chains, in the breast milk, in the fetuses, that are thousands of times more radiosensitive than adults. One x-ray to the pregnant abdomen doubles the incidence of leukemia in the child. And over time, nuclear waste will induce epidemics of cancer, leukemia and genetic disease, and random compulsory genetic engineering. And we're not the only species with genes, of course. It's plants and animals. So, this is an absolute catastrophe, the likes of which the world has never seen before."

Monbiot's moronic conclusion to all this:

"Now, on these questions that Helen raises, I mean, if she's honestly saying that the World Health Organization is now part of the conspiracy and the cover-up, as well, then the mind boggles. ... If them and the U.N. Scientific Committee and the IAEA and – I mean, who else is involved in this conspiracy? We need to know."

Of course Monbiot should know about the agreement between the WHO and the IAEA, May 28, 1959 at the 12th World Health Assembly, clause No. 12.40:

"whenever either organization proposes to initiate a programme or activity on a subject in which the other organization has or may have a substantial interest, the first party shall consult the other with a view to adjusting the matter by mutual agreement..."

The IAEA's purpose is:

"to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world."

So yes George, pure science takes a back seat to other interests as you should well know.

So whose 'consensus' are we talking about?

In Monbiot's own newspaper, The Guardian from March 25th of 2006 (yes he worked there then):

"UN accused of ignoring 500,000 Chernobyl deaths

“United Nations nuclear and health watchdogs have ignored evidence of deaths, cancers, mutations and other conditions after the Chernobyl accident, leading scientists and doctors have claimed in the run-up to the nuclear disaster's 20th anniversary next month.”
(John Vidal)

"Leading scientists and researchers," George? In 2006? In your own newspaper?

George, did you follow up with these ‘leading scientists and researchers’? No, you could not have since you pretended to be so surprised by what Dr. Caldicott told you during your ‘debate’.

The Guardian (2006) continues:

"An IAEA spokesman said he was confident the UN figures were correct. 'We have a wide scientific consensus of 100 leading scientists.'"

Wait a minute! An ‘IAEA spokesman’ is handling this supposed ‘consensus’ of just 100 ‘leading scientists’?

I thought it was a health issue, not a promotion of nuclear energy worldwide issue.

The IAEA flack tells The Guardian:

"If they have data that they think are excluded then they should send it."

Data that "they think" are excluded. That's cute.

“At least 500,000 people – perhaps more – have already died out of the 2 million people who were officially classed as victims of Chernobyl in Ukraine,” said Nikolai Omelyanets, deputy head of the National Commission for Radiation Protection in Ukraine. ... “We have found that infant mortality increased 20% to 30% because of chronic exposure to radiation after the accident. All this information has been ignored by the IAEA and WHO. We sent it to them in March last year and again in June. They've not said why they haven't accepted it.”
(Vidal)

So who are the true “leading” scientists, and who's got the real “consensus”?

Dr. Janette Sherman who edited the translated 5,000 European studies said:

"On the 20th Anniversary of Chernobyl WHO and the IAEA published the Chernobyl Forum Report, mentioning only 350 sources, mainly from the English literature while in reality there are more than 30,000 publications and up to 170,000 sources that address the consequences of Chernobyl."
(Sherman, 2011)

Just how does the United Nations IAEA manage to ignore half a million to a million dead Eurasians?

It just so happens I've been going through some of the aforementioned excluded studies, and I found some interesting commentary pertaining to just that question.

"These findings indicate that the spectrum of developmental defects generated by incorporated radioactivity in humans may be much greater than derived by international radiation committees from the follow-up of Japanese A-bomb survivors. The findings are compatible with a particularly high radiosensitivity of the fetus... In contrast to this, the International Commission on Radiological Protection ICRP has postulated a threshold dose as high as 100 mSv in Publication 90 of 2003 for effects after prenatal exposure. They and other committees exclude radiation effects by Chernobyl fallout referring to the very low doses which were derived for the population."

(Wolfgang Hoffmann, Inge Schmitz-Feuerhake: Malformations, Perinatal Deaths and Childhood Morbidity after In Utero Exposure by Chernobyl Fallout. Observations in Europe and Turkey, Institut für Community Medicine, Ernst-Moritz-Arndt Universität, Greifswald and Universität Bremen, Fachbereich Physik und Elektrotechnik (i.R.), 2006)

The 'threshold dose' concept is used as the determinant of who is counted and who is not. That's how the IAEA/WHO manipulates the data on Chernobyl and in-effect lies to the world on the horrors of radiation poisoning.

Multiple official sources confirm that there is no safe dose of radiation, at all:

Environmental Protection Agency: "... any exposure to radiation poses some risk, i.e. there is no level below which we can say an exposure poses no risk."

Department of Energy: "... the major effect is a very slight increase in cancer risk."

Nuclear Regulatory Commission: "... any amount of radiation may pose some risk for causing cancer ... any increase in dose, no matter how small, results in an incremental increase in risk."

National Academy of Sciences: "... it is unlikely that a threshold exists for the induction of cancers"
(John LaForge: Dangerous Disinformation About Radiation, 2011)

It's not surprising that the UN is in favor of promoting nuclear power and glossing over its faults. All the powerful nations are pro-nuclear. It is these nations' governments who provide the 'leading scientists' to write up the manipulated faux 'consensus'.

By the way, George Monbiot, cherry picking 100 experts (why not 99? Or 101?) is not the definition of a 'consensus'. I'm afraid I'm going to have to call that one out as a lie. You don't get to redefine the language.

The real consensus comes out of Russia, Ukraine, Belarus and thereabouts:

"These results challenge the assumption of thresholds for genetic effects of low-level ionizing radiation as well as the assumption of relatively high doubling doses for genetic effects as propagated by pertinent international commissions."

(Hagen Scherb: Statistical Analysis of Genetic Effects after the Chernobyl Disaster, GSF-National Research Center for Environment and Health, Institute of Biomathematics and Biometry, Neuherberg/Munich, 2006)

"They showed that the existence of the effect at the low foetal doses which had been received defined an error in the current ICRP risk model for this kind of exposure of upwards of 100-fold. ... The finding effectively falsifies the current radioprotection system for these kinds of internal exposures to fission products and suggests urgent reappraisal of the nuclear site child leukaemia clusters..."

(Chris Busby: Infant Leukemia in Europe after Chernobyl and its Significance for Radiation Protection. A meta-analysis of three countries including new data from the United Kingdom, University of Liverpool, Dept of Human Anatomy and Cell Biology, And Green Audit, Aberystwyth, UK, 2006)

"Deteriorated radiation situation in Ukraine has adversely affected the brain tumor incidence in infants thereby leading to over 2.3 times growth of total patient population and 6.2 times growth in the number of patients under 1 year. "

(Yuri Orlov, Andrey Shaversky, V. Mykhalyuk: Intracranial Neoplasms in Infants of Ukraine. An Epidemiological Study, Institute of Neurosurgery named after acad. A.P.Romodanov, AMSU, Kiev, 2006)

"It should be noted that earlier made prognosis for thyroid cancer failed, and real picture has surpassed all expectations."

(A. E. Okeanov 1 , E. A. Sosnovskaya: Incidence of Malignant Tumors Among Different Groups of Belarusian Population Affected to the Chernobyl Accident, International State Environmental University, Minsk, Republic of Belarus and Republican Research-Practical Center of Radiation Medicine and Human Ecology, Gomel, Republic of Belarus, 2006)

"Thus, it was shown that small doses of radiation are statistically significant risk factors of malignant development."

(Emilia A. Diomina: Radiation Epidemiological Studies in a Group of Liquidators of the Chernobyl Accident Consequences, R.E. Kavetsky Institute of Experimental Pathology, Oncology and Radiobiology of National Academy of Sciences of Ukraine, Kiev, 2006)

We hear a lot of chatter from pundits like Monbiot how we are surrounded by background radiation. Have you once seen them distinguish between the radiation source outside the body vs. one emitting inside your body and jammed up against your cells and DNA?

You don't hear them concede that pregnant women aren't allowed to receive x-rays either. Their arguments tend to fall apart under scrutiny. These findings were quite sobering:

"The wrong general assumption of a constant linear radiation effect from high to zero (half a dose, half the effect) is unfortunately even today still the base of the radiation protection laws, although supralinear effects in vivo (Petkau effect) are today confirmed on all levels of [life] including man."

(Ralph Graeb, Langnau, Schweiz: The Petkau Effect, Chernobyl - 20 Years Later - Experiences and Lessons for the Future, 2006)

"Chernobyl's radioactive contamination at levels in excess of 1 Ci/km² (as of 1986 -1987) is responsible for 3.8 -4.4% of the overall mortality in areas of Russia, Ukraine, and Belarus. In several other European countries with contamination levels around 0.5 Ci/km² (as of 1986 -1987), the mortality is about 0.3 -0.7% (see Chapter II.7). Reasonable extrapolation for additional mortality in the heavily contaminated territories of Russia, Ukraine, and Belarus brings the estimated death toll to about 900,000, and that is only for the

first 15 years after the Chernobyl catastrophe. "

(Alexey Yablokov, Vassily Nesterenko, Alexey Nesterenko: Chernobyl Consequences of the Catastrophe for People and the Environment, New York Academy of Sciences, VOLUME 1181, 2009)

And then we finish up with DemocracyNow, March 30 2011, live...

"GEORGE MONBIOT: – that so far the death toll from Chernobyl amongst both workers and local people is 43. Am I – sorry, are you saying you didn't know that they had examined this...

HELEN CALDICOTT: That's a lie, George. That's a lie."

In sum: If you believe that less than fifty people died after the greatest nuclear meltdown in history, then I've got a fantastic house to sell you, mansion, pool, hot tub, everything. It's a steal... just outside Fukushima, Japan. Ocean view, stunning. Email me (George).

Joe Giambrone is a filmmaker, troublemaker, and author of Hell of a Deal: A Supernatural Satire. He edits the Political Film Blog. polfilmblog at gmail.

(3) The U.N. Cover Up of Ionizing Radiation Health FX:

[http://www.opednews.com/articles/The-UN-Cover-Up-of-Ionizing-Radiation Health FX: 110402-173.html?show=votes](http://www.opednews.com/articles/The-UN-Cover-Up-of-Ionizing-Radiation-Health-FX-110402-173.html?show=votes)

By Lynda Williams

April 3, 2011 at 10:25:42

I watched this video click here:

<http://www.youtube.com/user/RussiaToday#p/u/1/MognnB0g56Y> earlier today on Russian TV in which Dr. Chris Busby, British scientist and expert on the health effects of ionizing radiation, says that what is most similar between Fukushima and Chernobyl is how much we are being lied to about the seriousness of the consequences. He actually said that Fukushima may be worse because of the high population in the area. Sadly, I spent the rest of the day learning about one of the most evil and horrific scientific and political coverups of all time.

First stop I found this article http://www.thepowerhour.com/news4/busby_radiation.htm by Dr. Busby on the Fukushima Radiation Risks. In it he says that an independent European group of scientists working on the The Low Level Radiation Campaign (<http://www.llrc.org>) predict that

"Radioactivity from the Fukushima Catastrophe is now reaching centres of population like Tokyo and will appear in the USA. Authorities are downplaying the risk on the basis of absorbed dose levels using the dose coefficients of the International Commission on Radiological Protection the ICRP. These dose coefficients and the ICRP radiation risk model is unsafe for this purpose. 17,000 cancers will be caused by Fukushima within the 200 km contamination zone by 2061."

So why do we keep hearing 'experts' say that "the radiation levels are safe"? It is because they are basing the risk on an old outdated and wrong model. It is the (ICRP <http://www.icrp.org/>) risk model that the UN and its organizations such as IAEA and UNSCEAR uses to determine the risk due to low level radiation. The ICRP risk model was developed after the Hiroshima nuclear blast and includes exposures and dosages due only to EXTERNAL gamma radiation, not any INTERNAL RADIATION!! It is an entirely outdated model and has been falsified over and over again, but these scientific results are suppressed. So, every time you see a chart that shows the health consequences of radiation doses, they are all WRONG because they are based on the ICRP model which is what IAEA and every agency at the UN uses and as well as text book, every reporter and every educator, including me. Up until today. I will no longer perpetuate the lies and coverup.

The European Committee on Radiation Risk (ECRR <http://www.euradcom.org/>) has developed and tested a new risk model that is based on internal absorption and exposure to radiation. Their model correlates higher cancer rates due to low dosages that are 100x greater than the ICRP model. They have made their study available online <http://www.euradcom.org/2011/ecrr2010.pdf> free due to Fukushima. Here is what Dr. Busby says about the different models:

"Take the dose which is published by the authorities. Multiply it by 600. This is the approximate ECRR dose for the mixture of internal radionuclides released from Fukushima. Then multiply this number by 0.1. This is the ECRR 2010 cancer risk."

Most of this is clearly explained in this video <http://vimeo.com/15382750> which took place in Stockholm, 22nd April 2009. The recently resigned Scientific Secretary of the ICRP, Dr Jack Valentin concedes to Dr. Chris Busby, that the ICRP model can not be used to predict the health effects of exposures and that for certain internal exposures it underestimates the risk by up to two orders of magnitude (100 times). He also said that as he was no longer employed by ICRP he could agree that the ICRP and the United Nations committee on radiation protection (UNSCEAR) had been wrong in not examining the evidence from the Chernobyl accident, and other evidence outlined below, which shows large errors in the ICRP risk model. Transcript of the video here: <http://www.euradcom.org/2009/lesvostranscript.htm>

The UN's report on the health consequences of Chernobyl from UNSCEAR is here: <http://www.unscear.org/unscear/en/chernobyl.html>. It is full of lies: 31 workers dead, 2000 children from leukemia. What is astounding to learn is that the IAEA only counts deaths that have been verified by Los Alamos and its equivalent in France – two nuclear bomb makers!! This is madness. Did you know that?

The independent European Group published a study you can download for free and the New York Academy of Science published a study based on Russian science research that claims that some 985,000 people died, mainly of cancer, as a result of the Chernobyl accident. That is between when the accident occurred in 1986 and 2004. More deaths, it projects, will follow.

Chernobyl: Consequences of the Catastrophe for People and the Environment

you can read on google books or here is a review:
<http://www.globalresearch.ca/index.php?context=va&aid=23745>

Another VERY important video to watch is "Nuclear Controversies"
<http://video.google.com/videoplay?docid=8746168177815160826>
a film made by acclaimed Swiss journalist Wladimir Tchertkoff in which he shows scientists debating the science at the UN regarding the health consequences of the Chernobyl accident.

If you are a self proclaimed 'realist' or 'rationalist' you may not like this video because it does show sick children.

(Image: Russian 14 year old, sick, because of exposure to Chernobyl Radioactive exposure (screen capture from movie).)

Many of you all think that this somehow disqualifies an argument, if there is anything emotional or human about it. So get over it. We are all human. Buck up and watch the Russian scientists rage at the UN liars. They know the consequences. Their families are dying. And Russian scientists are jailed for publishing their scientific studies that dispute the political line. It doesn't make them irrational. It makes them passionate. And there is a huge real difference.

Why is this information suppressed? Why do these agencies keep using the ICRP model when it is clearly false and underestimates risk? I think it is partly due to greed and technology worship. We want to believe that technology and science can save us. We are in a nuclear quagmire. And who is going to pay to clean up the radioactive mess around the world? We are in a nuclear quagmire and we have no idea how to get out of it. So underestimate the risk and keep going business as usual.

And let us never overlook that GE, who pays no taxes, built the Fukushima reactor and 23 'sister' reactors in the US. Are they liable for any of this? No. You can see here if there is one near you.
<http://www.nrc.gov/reactors/operating/list-power-reactor-units.html>

(4) "Three Mile Island Beatles" to be heard this Saturday on the Dr. Demento Show!

I wrote to Dr. Demento yesterday and asked him if he happened to have a digitized copy of my comedy routine about Three Mile Island called Three Mile Island Beatles, which I created in 1979. I wanted to create a video montage to go along with it, and post it on You-Tube along with No Cause For Alarm which I posted a few days ago.

This morning Dr. Demento responded by sending me a copy! He also informed me that the routine is already in the pipeline to be aired Saturday, April 9, 2011 on his nationally-syndicated comedy radio show! To find out more: www.dr.demento.com

My thanks to Dr. Demento for holding onto the tape, for sending me a copy so promptly, and, of course, for playing it several times on his show, the last time as recently as 2008!

-- Ace Hoffman

(5) Contact information for the author of this newsletter:

Ace Hoffman
Author, The Code Killers: An Expose of the Nuclear Industry
Free download: acehoffman.org
Blog: acehoffman.blogspot.com
YouTube: youtube.com/user/AceHoffman
Phone: (760) 720-7261

Address: PO Box 1936, Carlsbad, CA 92018
Subscribe to my free newsletter today!
Email: ace [at] acehoffman.org

Ever-Glowing

From: Coffin, Bob Senator <bcoffin@sen.state.nv.us>
To: Gary Vesperman
Subject: RE: Depleted uranium - grotesque birth defects
Date: 12 Dec 2001

Gary:

Yes, there has been mention in the papers some time ago about all the spent sabot rounds used out there. There is evidence that the Gulf War remainders are dangerous, too. That is something that will need to be cleaned up and, yet, it pales with the amount of isotopes on the surface from above-ground nuclear tests from the fifties. There is a bunch of stuff out there slowly migrating somewhere and we don't hear a hoot about that. I am much more worried about that than the spread of the underground stuff.

Bob

(Numerous ammunition rounds containing depleted uranium have been fired in the vicinity of Nellis AFB which is a few miles northeast of Las Vegas. After the Gulf Wars, many Iraqis suffered grotesque birth defects and increased cancer from exposure to depleted uranium that was dispersed during artillery and tank battles.)

From: Henry Curtis
To: Gary Vesperman
Subject: Ever-Glowing
Date: 19 Mar 2002

Gary,
Yea, though I walk though the valley of Las Vegas,
Bathed in the Ever-Glow of radioactive waste
I shall fear no evil,
For the Nuclear Regulators are my salvation.
Henry

DISCLAIMER: Inclusion of any invention or technology described in this compilation of radioactivity neutralization methods does not in any way imply its suitability for investment of any kind. All investors contemplating any investments in these devices and technologies should first consult with a licensed financial professional. Prospective investors should exhaustively perform their own investigation of pertinent facts and allegations of facts. Investors should also ensure thorough compliance with regulations of the federal Securities and Exchange Commission and appropriate state securities divisions. For more information, see <http://www.zpenergy.com/modules.php?name=News&file=article&sid=1655>.