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Environmental Coverup: Radioactive Groundwater Contamination in the Chesapeake Bay

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Not far from the political wheeling and dealing, hidden from view outside Washington, DC, one of the most stunning cover-ups in environmental criminal history quietly gurgles below our feet. For outside the awareness of nearly 17 million residents exists a total news blackout of nuclear power plants that have leaked radioactive chemicals into the groundwater of the Chesapeake Bay Watershed.

To be clear, it's not that media coverage of the polluted, oxygen-deprived Chesapeake Bay with its forty percent "dead zones" doesn't exist. In fact, mid-Atlantic news coverage has been glutted for years with "save the Bay" rhetoric, public awareness campaigns, and half-hearted clean-up efforts. And while the dead-and-dying Chesapeake receives no shortage of coverage in the local media, the only pollution you're going to hear about is that which does not concern radioactive contamination of the Chesapeake Bay.

Nuclear poisons aside, the defiled Chesapeake is forever in the news. In May, 2009, President Obama donned his cape and made like a cartoon super hero to [ostensibly pretend to] jump in to protect and restore the Chesapeake with an Executive Order. Thanks to dutiful White House staffers, the greater DC metro area media ravenously devoured such fanfare – as is par for the course on the poor Chesapeake's woes. Well, on some of the Bay's woes, that is – considering the mainstream media's standard protocol of reporting only on topics deemed acceptable for public consumption.

There exists possibly no better example of the total stand down on the Chesapeake's nuclear woes than the day in August, 2009 when an EPA rep came to an Annapolis town hall forum. Organized by local non-profits Chesapeake Bay Foundation, Clean Water Action, and Maryland PIRG offshoot, Environment Maryland, the event was billed as an opportunity for the public to give EPA, tasked with coordinating the fulfillment of the Executive Order, its input. Press was in abundance in the standing-room-only event, ensuring wide press coverage of standard Bay pollution topics with bright smiling faces talking about nitrogen and storm drains.

Yet for all the rhetoric from the non-profit organizers and EPA about the Bay-on-its-way-out, (It's all that blasted fertilizer, cow manure, and storm water runoff, dang it!) radioactive chemical emissions generated by the eleven (11) reactors in the Bay watershed and their own "special" contributions to the Bay's demise were never mentioned. No one with a microphone talked about routine, planned radioactive discharges and continuous purges of 11 nuclear reactors into the air, Bay, and its tributaries. Predictably, neither was a word about "accidental" leaks – nor nuclear power's thermal, climate-changing pollution – uttered from the podium. In fact, this writer and one other citizen were the only ones to stand up

and expose the “elephant” in the room … namely, the deadly effects of the eleven nuclear reactors on the Chesapeake Bay.

Furthermore, in the EPA’s recent follow up effort, “Draft Strategy for Protecting and Restoring the Chesapeake Bay,” noticeably absent is not as much as a word of mention of nuclear fission products leaked into groundwater – nor about radioactive liquid effluents continuously spewing into the Bay and its tributaries for well into the fourth decade. In essence, for all the incessant “Chesapeake Bay saving” rhetoric, it’s as if the rampant point source radioactive and thermal pollution generated by the eleven Bay watershed reactors simply does not exist.

A Leaky Reactor or Two, Ya Say? How ‘Bout … ALL!

Yet whether EPA, environmental groups, or the media ever talk about it or not, the fact still remains that radioactive groundwater has been migrating steadily underground towards the Bay and draining into its tributaries for years. And whether residents living in the area are aware of it or not – increases in radioactive pollution now further threaten the health of nearly 17 million humans – and all other living things within the Bay ecosystem.

It’s a huge surprise to many to learn how many nuclear reactors discharge into the body of water often called “our national treasure” and its tributaries. Out of the eleven (11) nuclear reactors in the Chesapeake Bay Watershed, nine (9) are located on rivers or a lake (in North Anna’s case, a lake) that flow either directly or eventually into the Bay. The other two (2) reactors are located at Calvert Cliffs Nuclear Power Plant, which sits directly on – and dumps into – the Chesapeake Bay.

With Bay restoration efforts focused on storm water drains, fertilizer, and farm animal dung, precious few in the greater Baltimore-Washington metro area ever seem to discover on their own that 11 nuclear reactors (plus, actually, the twelfth, the now-defunct infamous Three Mile Island Unit 2) have been wrecking havoc on the Chesapeake Bay Watershed since the 1970s. Even more of a well-kept secret, however, is the fact that all of the nuclear power plants – a full one hundred percent (100%) – have leaked radioactive materials into the Chesapeake Watershed’s groundwater.

Unbeknownst to most living in the Chesapeake Bay Watershed, the nuclear power plants described by Maryland Governor Martin O’Malley as “a new clean energy-generating asset” (or, rather, a$$et) are, in reality, anything but clean. How in the world can “clean” be used to describe complex machinery that continuously discharges materials that contaminate our water, air, soil (think food) with Uranium and its decay products that remain in the environment for an eternity and lethal fission products, most of which are not found in nature?

Tritium, the most plentiful radionuclide emitted by nuclear reactors, was found in nature in only miniscule amounts prior to the 1940s … that is, back in the pre-nuke era, before the nuclear orgy of reactor-generated electricity and thousands of atomic bomb explosions were still but a mere twinkle in Manhattan Project’s, J. Robert Oppenheimer’s, eye.

With 1,500 different radioactive isotopes called radionuclides, (most of which are created in the nuclear fission process) a few in particular – Tritium, Cobalt-60, and Cesium-137 most predominantly [see descriptions below] – have been reported in the soils and groundwater on and around the nuclear sites in Pennsylvania, Maryland, and Virginia.

One would be justified to surmise that if the extent of the radioactive contaminated groundwater's were to become public knowledge, then new, experimental nuclear reactors – such as those planned for Calvert Cliffs, MD, Peach Bottom (Bell Bend), PA and North Anna, VA might not ever get built. [Note: Approval of the new reactor at North Anna has not been smooth sailing for Old Dominion, due to the hard work of local environmentalists, with assistance of the Blue Ridge Environmental Defense League, who took the case to a Virginia Court – and won.]

Radioactive Water from Calvert Cliffs Heads for the Bay

Although many in the area realize the Calvert Cliffs Nuclear Power Plant sits on the Chesapeake, about 35 miles from Washington, DC, completely suppressed from public awareness has been the December 3, 2005 discovery of the underground radioactive contamination in one of the monitoring wells.

According to a 2006 report, a substantial leak of tritium – approximately 60,000 liters inside a 49 foot deep well, from an eroded pipe in a sub-surface drainage system connected to the plant's circulating water system, caused levels of tritium as high as 2,880 picocuries per liter. This is roughly 288 times the tritium found in nature. According to the Department of Energy, natural tritium levels [pre-Nuclear Age] were in the 10 to 30 picocuries per liter range.

Information submitted by Constellation Energy indicated that Calvert Cliffs' tritiated-contaminated groundwater plume was then roughly 273 feet from reaching the Chesapeake Bay. In a July, 2007 report, Constellation reported the tritiated plume was expected to migrate and reach the Bay "sometime between 2010 and 2028." So any day during the next 18 years, the silent radioactive "hit" on the Bay will quietly take place when no one is watching, when no one even knows. Tragically, the extent and size of the tritiated plume will neither be measured nor evaluated. As a Constellation Energy Senior Chemist admitted, there are no regulations nor reporting requirements specifically mandated by the NRC for tritium contamination levels in the soil.

Abnormal levels of tritium in the groundwater of Calvert Cliffs on the Bay, according to a December 5, 2008 report, are still present. Yet no remediation is planned to stop the radioactive water from further contaminating the Chesapeake – a dwindling source of crabs, oysters, clams, rockfish, bluefish, trout, flounder, and other fish for consumers along the East coast.

Where Are the Environmentalists?

Although information on groundwater contamination in the watershed has been reported by the NRC, Union of Concerned Scientists, and Exelon Corporation websites, the issue has been ignored by government officials, the media, and environmental non-profit organizations.

While searching for more details on groundwater contamination at Chesapeake Watershed nuclear power plants, no information on the subject was found on the websites of the Chesapeake Safe Energy Coalition – a group that reports it "exists to challenge and subsequently stop the proposed new reactor at Calvert Cliffs" – nor on any of the websites of the organizations that comprise the anti-nuclear coalition nor on the websites of the two leading "save the Bay" groups, Chesapeake Bay Foundation and Alliance for the

Chesapeake Bay.

Just how can it be possible none of the environmental, consumer protection, and Bay-saving organizations in the DC area have covered the issue of radioactive groundwater contamination occurring at no less than all of the nuclear power plants in the Chesapeake Bay Watershed?

Even more astonishing, however, than the blackout by local non-profits is the fact that both UniStar (a new firm formed by Constellation Energy and Electricite de France) and the State of Maryland did not mention leaking reactors nor groundwater contamination in the process of obtaining a Certificate of Public Convenience and Necessity to construct a third, double-size, experimental French EPR ("European Pressurised Reactor") at Calvert Cliffs. Incidentally, the application was subsequently granted by the State of Maryland Public Service Commission in August, 2009.

With six nuclear power plants involved, it certainly defies belief that none of the afore-mentioned organizations, media, or state government agencies have exposed the radioactive groundwater contamination at all Chesapeake nuclear plants. Even the NRC does not list on its page of nuclear sites with tritiated groundwater any of the six nuclear power plants in the Chesapeake Bay Watershed.

What's the Big Deal About Radioactive Hydrogen in our Water?

Tritium is but one of the 1,500 hazardous radioactive isotopes that put human health at risk. The NRC states that it "assumes that any exposure to radiation poses some health risk, and that risk increases as exposure increases in a linear, no-threshold (LNT) manner. The LNT assumption suggests that any increase in dose, no matter how small, incrementally increases risk."

Why, exactly, is this radioactive groundwater such a concern? For starters, tritium, the only radioactive isotope of hydrogen and most prevalent contaminating element, according to the NRC, "cannot be filtered out of the water."

Environmental Epidemiologist and Founder and Past President of The International Institute of Concern for Public Health, Dr. Rosalie Bertell , echoes the NRC's statement, as she states, tritium is "a very effective distributor of radioactivity in the environment since it is exceedingly mobile as tritiated water, and can travel everywhere that water can travel. The human body, all tissues and cells, are composed of about 70% water. About 80% of the atoms in the human body are hydrogen atoms, which can be replaced by tritium."

So are Americans actually protected from the hazards of this dangerous radiation? Consider the following carefully – but only on an empty stomach. The DOE states the "maximum contaminant level developed by the Environmental Protection Agency for tritium in drinking water supplies is 20,000 pCi/L or 0.02 microcuries per liter (a picocurie is a millionth of a microcurie). Higher concentrations can be present in water at facilities that produce and utilize tritium, including certain DOE sites."

Twenty thousand (20,000) picocuries per liter, you say, EPA? Hold the phones! If the water our grandparents found outdoors in nature in the 1930s [before nuclear reactors and bomb explosions began polluting our environment] contained a mere 10 to 30 picocuries per liter of tritium – a truly miniscule amount generated by the sun's cosmic rays and subterranean

sources which originated from the formation of the earth – why in the world is it now acceptable for humans alive today to be permitted to drink a full 20,000 picocuries per liter of tritiated water…. in other words, up to 2,000 times the amount of radioactivity found in nature prior to the advent of the "Nuclear Age"?

In the words of Dr. Bertell, "It is the role of regulators to protect the public health, not to protect the right of corporations to pollute up to industry established non-health based levels. Industry based regulations have ordinarily proven too lenient! Tritium is not the exception!"

Radioactive Water Impacts Humans and Other Living Things

As far as the effects of tritium and its impact on aquatic life in the Bay, research shows that tritium – even at minimal doses – has adverse effects on the genetic materials of marine mussels. In fact, current levels of "permissible" radiation in our waters may not be protective of aquatic life. One study suggests "that the generic dose limits recommended by the International Atomic Energy Agency for the protection of aquatic biota might not be applicable to all aquatic organisms." Research also shows that, in tritium accumulation in the aquatic organisms food chain, radionuclide concentrations are highest up the food chain with consumer fish.

In humans, tritium can be taken into the body by drinking water, eating food containing tritium, breathing air, and absorption through the skin. When tritium is inhaled, it is taken into the lungs, where it is circulated in the bloodstream and distributed to all tissues. Ingested tritium is almost completely absorbed, moving quickly from the gastrointestinal tract to the bloodstream. Within minutes it is found in all body fluids, organs, and is uniformly distributed throughout the soft tissues. And according to the NRC, after 10 days of exposure, approximately one-half the radioactive tritium still remains within the body.

With skin absorption of tritium, exposure to high concentrations of tritiated water vapor readily occurs under conditions of high humidity during hot weather, due to the normal movement of water through the skin. According to the DOE, "Tritiated water behaves the same as ordinary water, both in the environment and in the human body. Hence, a significant fraction of the inhaled and ingested tritium is directly absorbed into the bloodstream." When radioactive tritium is taken into the body through any of these means, it is distributed through all body fluids within one to two hours.

While inside the body, tritium can cause significant damage to health. When ingested in food, tritium can remain within the body for years. In a paper by Committee Examining Radiation Risks of Internal Emitters (CERRIE) titled "Tritium: Properties, Metabolism and Dosimetry," the amount of tritium in protein (think fish caught in a highly tritiated body of water) appears to be greatly increased. A study found that, in tritium in foods, the amount of tritium can increase the radiological dose 1.7 to 4.5 times over the dose found in water.

Specifically, scientific research shows proximity to nuclear power plants with high rates of tritium discharges includes cell damage within the genetic materials, especially DNA, with mutations causing birth defects and Down's syndrome. In pregnant females, tritium ingested by the mother can cross the placenta and become incorporated directly into the fetus.

High rates of tritium have also been associated with high newborn death rates, high

childhood leukemia death rates, childhood cancers in children from birth to 14, and children born with central nervous system disorders. Even the NRC affirms on its website, “The health risks include increased occurrence of cancer and genetic abnormalities in future generations.”

What may be perhaps most concerning to all may be the latency period – or the period of time between radiation exposure and the detection of cancer and other diseases. In other words, the tritium we inhale, consume in our water and food, or absorb directly through our skin today can cause cell damage today that results in diseases and problems with our offspring many years in the future.

Environmental Epidemiologist and Founder and Immediate Past President of The International Institute of Concern for Public Health, Dr. Rosalie Bertell, has reported that tritium is “a very effective distributor of radioactivity in the environment since it is exceedingly mobile as tritiated water, and can travel everywhere that water can travel. The human body, all tissues and cells, are composed of about 70% water. About 80% of the atoms in the human body are hydrogen atoms, which can be replaced by tritium.”

Dr. Bertell tells us also that current tritium doses are disproportionately damaging to women and children, the populations at highest risk. In addition to fatal cancers and severe genetic defects, miscarriage, and still-births, tritium protection risks must also take into account non-fatal cancers, reproductive problems, and chronic diseases caused by nonfunctioning enzymes, hormones, and other proteins due to tritium-induced damage. These disruptions, however, just may be the proverbial “icing on the cake.” As Dr. Bertell states about the harm caused by radiation in general, “There are a large number of auto-immune diseases like type two diabetes, lupus disease, rheumatoid arthritis and others, which are likely to be radiation related since their mechanisms are similar to those of cancer – namely mutations of the DNA.”

Quite unfortunately for our kids, grand kids, and their children yet to come, the NRC reports about genetic effects as a result of cell mutation caused by radiation can sometimes skip generations and may not manifest abnormalities for several generations to come. And since effects of radiation occur at the level of the cell, “thus changes may not be observed for many years (usually 5-20 years) after exposure.” Yet it’s not like any of this is breaking news. Scientists have known since the 1950s the multitude of diseases caused by ionizing radiation can appear years after initial contamination.

To help better visualize these radiation-induced damages, proteins, enzymes, DNA and RNA depend upon their shape for their activity and biological integrity. When the shapes are altered, this results in inactivity of normal processes. In addition, the radioactive decay process of one tritium atom may have “a catastrophic effect” on the activity and normal processing of these molecules.

Environmental radiation expert Dr. Chris Busby of the Low Level Radiation Campaign has labeled tritium an “enhanced hazard” because, as a form of radioactive hydrogen, it freely exchanges with hydrogen in biological systems, such as enzymes, to DNA, “which is held together and whose reactions are controlled and facilitated by hydrogen bonds.” In essence, all hell breaks loose within our cells when tritium enters our bodies!

What is the public’s bottom line on groundwater contamination?

Nuclear reactors that leak tritium are a real concern. With a half-life of 12.43 years, some of the tritium will still be around in the environment for more than a couple of hundred years. Yet in the minds of nuclear energy firms like Calvert Cliff's Constellation Energy, the fact that underground, leaked radioactive water migrating toward the Bay will be around for years presents no problem at all!

Constellation showed its unabashed hubris and wonton disregard for the environment and public health in a 2006 NRC report. "Since the tritium was originally permitted for discharge to the Chesapeake Bay," said the firm that recently sold out half its business (and all of its soul) to Electricite de France, a firm that is, for all intents and purposes, the French nuclear state, "there will be no significant impact."

Qu'est-ce que c'est, Constellation Nucleaire? No significant impact, you say? Au contraire! And go tell that to the crabs and oysters! As bottom-dwellers, the Chesapeake's prized seafood is the Bay life most impacted with the lion's share of radioactive materials that settle in the sediment! In the twisted logic of those in the nuclear pollution industry – and their enablers in positions of federal power – since tritium and other radioactive chemicals are already permitted to be discharged into the Bay and its tributaries through what is called "planned effluent releases"– what harm does it do, goes the argument, when even more tritium and other radioactive poisons migrate through the soils into the Bay?

Yet even despite the current warped mindset that allows the imperiled Chesapeake to function as the nation's largest floating nuclear dumping site, energy firms like Constellation actually do realize that leaky reactors are absolutely not okay. As a representative of Constellation Energy acknowledged at a September, 2007 presentation on Tritium, [nuclear] "plants do not have legal authorization to release radioactive material to the groundwater." Furthermore, "Groundwater flows through and off the plant property, potentially contaminating private property."

As Constellation Energy also stated, "Groundwater is considered a public resource." Thus, by contaminating our public resource, the residents' right to clean groundwater suitable for drinking has been compromised. While even though possessing no discernible moral responsibility toward public and environmental health, the nuclear industry still does understand the law and realizes that contaminating groundwater is an ongoing action in violation with the law. As the Constellation spokesperson stated, "plaintiffs can claim property damage…'You have put your radioactive waste on my property and damaged my property value'."

Sad is the day when even nuclear regulators shrug their shoulders and admit that nuclear-generated poisons will increase human diseases, anomalies, and disorders in sad and painfully debilitating ways – including brain abnormalities and, according to CDC, "decreased intelligence as measured by Intelligence Quotient [IQ] tests."

Can there be any other solution than for all of us to work our hardest to stop the continued onslaught of radioactive contamination of, not just the Chesapeake Watershed, but the entire United States? Each day the contamination increases, so we must act all the more quickly while those members of the human species among us with consideration for all those to come after still have vitality, decent health, and some semblance of normal brain functioning left.

The complete blackout that surrounds groundwater contamination of all nuclear power

plants in the Chesapeake Bay Watershed without question constitutes one of the greatest environmental crimes in US history.

Tragically, all indications are such that this trend of increased, life-destroying, environmental radiation will only continue – that is, of course, unless and until ordinary but determined Americans in large numbers relentlessly demand an end to the continuous radioactive poisoning and reckless endangerment of our environment and our people.

You can start with the Chesapeake Bay Watershed or you can start in your own backyard. But wherever you choose to protect, please go ahead and do it – and make it fast! For there are so many precious lives already born and yet to be born for the next umpteen billion years who, although they do not yet realize it, are dependent upon just average folks like you and me and the next guy and gal to take a stand, speak up, speak out, and tell those in positions of power they may no longer permit the unabated radioactive poisoning and contamination of our nation any longer –at least not on our watch!

The nuclear polluters – and the radiation-enablers in all levels of power – are not going to stop running our nation into the ground with always more toxic, more dangerous, more lethal nuclear poisons… until the American people in large numbers not request – but rather, demand – that it is so.

Contaminating Bay Tributary Nuclear Power Plants

Three Mile Island, PA – Unit 1 –

In July, 2006 AmerGen Energy Company reported numerous releases that “may have” a current impact on groundwater. The report admits the presence of underground tritiated water but gives no amounts of any radionuclides. In addition, an unusual comment is made with regard to the underground contaminated water: “The site maintains three production supply wells that are pumped continuously for supply water to various systems. The benefit of this is that the station recovers tritiated water beneath the site for use at the station.” This is atypical due to the fact that nuclear power plants do not customarily have any need to use radioactive water for plant operations at commercial nuclear power plants used to generate electricity for the public.

The report of groundwater contamination from Unit 1 at Three Mile Island includes:

Leaks from the Unit 2 Borated Water Storage Tank occurred between 1981 – 1987.

1990 – Secondary Side water drained to roof from the Feed Water Heaters.

1986/1996/1997 – Unit 1 Borated Water Storage Tank leaks.

1999 – Unit I Liquid radwaste discharge line leakage.

1995/2004 – Unit I Aux Boiler Blowdown sump leakage.

2006 – Unit 1 Condensate Storage Tank – A, de-icing line leak.
North Anna Power Station, VA – Units 1 and 2 –

In August, 2006, Dominion’s North Anna Power Station reported 56 occurrences where either the volume or the source of the release exceeded the reporting threshold. There are

no plans for remediation of contaminated soils prior to decommissioning.

A 2008 report showed a tritium level on April 9, 2008 from the storm drain as high as 4,290 picocuries per liter (roughly 429 times the natural level) and on December 30, 2008, a well monitoring reading reached 5,580 picocuries per liter (about 558 times natural tritium levels). On September 29, 2008, a different well showed a Cobalt-60 level of 3.24 picocuries per liter and Cesium-137 at a level of 32.2 picocuries per liter. Both Co-60 and Cs-137 are not found in nature, as they are solely a product of manmade nuclear fission. (See below for more info).

Surry Power Station, VA – Units 1 and 2 –

In August, 2006, Dominion's Surry Power Station reported eight (8) events where either the volume or the source of the release exceeded the reporting threshold. There are no plans for remediation of contamination until decommissioning of the plants take place.

In one of the wells, tritium levels went from 14,700 picocuries per liter on March 6, 2008 to 17,200 picocuries per liter on September 8, 2008 to an even higher 17,900 picocuries on November 20, 2008. Surprisingly, despite the increasing amounts of tritium up to 1,790 times greater than normal levels, the narrative simply stated there were no on-site leaks. Another well reading indicated tritium levels as high as 10,700 picocuries per liter – that is 1,070 times natural levels.

That same well showed Cobalt-60 at a level of 25.6 picocuries per liter. (See info on Cobalt-60 below). In addition, in October 2007, a water leak from an underground storm drain pipe contained 31,900 picocuries per liter of tritium, roughly 3,100 times the amount found in nature. This amount was over and above the 20,000 picocuries per liter permitted by the EPA in drinking water. The leaked water – at the rate of 60 to 120 drops per hour – also contained a fair amount of Cobalt-60 (18.3 picocuries per liter) and a high amount of Cesium-137, (986 picocuries per liter) over four times the "permissible" amount of Cesium-137 of 200 picocuries/liter. (See info on Cesium-137 below).

Peach Bottom Atomic Power Station, PA– Units 2 and 3 –

In September, 2006 Exelon Generation put out a Hydrogeologic Investigation report on its Peach Bottom Atomic Power Station with tritium levels as much as 57 times above natural levels. As a background note: With regard to Unit 1 no longer in operation, in February, 1986 there was a release of an estimated 34,000 to 36,000 gallons of tritiated water from the Condensate Storage Tank that landed in the storm drain system that flows into the Conowingo Reservoir, which in turn flows into the Chesapeake Bay. In addition, at the Units 2 and 3 area site, there were three other releases of radioactively contaminated liquids that occurred in 1981, 1982, and 1983.

Five well sites showed significant tritium levels and nine sample locations in all were selected (including surface water). The highest tritium reading was 575 picocuries per liter, about as much as 57 times over natural levels. The report indicates there is no indication that tritium has yet migrated offsite.

Susquehanna Steam Electric [Nuclear] Power Station, PA – Units 1 and 2 –

In a July, 2006 Susquehanna Steam Electric [Nuclear] Station report made by PPL

Susquehanna to the NRC, four wells were identified as being used for “domestic” water use, such as for drinking within the nuclear plant. Condensate and radwaste system leaks and spills into groundwater were reported as having occurred in 1983, 1988, 1991, and 1995. Levels of radioactive contamination were simply omitted from this report, which stated, “The potential for contamination of groundwater and/or soils is being re-evaluated as part of the on-going review of events (see question 3) involving inadvertent releases of liquid radioactive materials,” concluding, “there is no indication that remediation efforts need to be initiated.”

In a 2008 report submitted to the NRC, Susquehanna reported a tritium level of 525 picocuries per liter (roughly 52 times the tritium from natural sources) and groundwater samples as high as 181 picocuries per liter (roughly 18 times the natural tritium value). The 2007 report showed a similar tritium value of 529 picocuries per liter and higher ground water tritium values, with a high of 298 picocuries per liter (roughly 29 times the amount found in nature).

Two Other Radionuclides in Chesapeake Watershed Groundwater

Cobalt-60 – A product of manmade nuclear fission, Cobalt-60 is a highly radioactive isotope not found in nature. Created by human nuclear endeavors beginning in the 1940s – Cobalt-60 wrecks havoc within the body for many years, one-half of it depositing in the liver and soft tissues. In addition, as the EPA warns, “Because it emits such strong gamma rays, external exposure to cobalt-60 is also considered a significant threat.” The CDC tells us “Co-60 can cause skin burns, acute radiation sickness, or death. “ As the DOE itself admits, “Cobalt-60 is the isotope of most concern at Department of Energy (DOE) environmental management sites.” Despite all of this, the amount of Cobalt-60 permitted in our drinking water is 100 picocuries per Liter(!)

According to the CDC, short-term exposure of rats to high levels of cobalt in the food or drinking water results in effects on the blood, liver, kidneys, and heart. Longer-term exposure of rats, mice, and guinea pigs to lower levels of cobalt in the food or drinking water results in effects on heart, liver, kidneys, and blood as well as the testes, and also causes effects on behavior.”

To quote the CDC, “Being exposed to radioactive cobalt may be very dangerous to your health.” Cells can become damaged from gamma rays that can penetrate your entire body, even if you do not touch the radioactive cobalt. Radiation from radioactive cobalt can also damage if one ingests, drinks, breathes, or touches anything that contains radioactive cobalt. With enough exposure, one can experience a reduction in white blood cell count, which could lower resistance to infections. Skin can also blister or burn, and hair loss can take place. Reproductive system cells can become damaged and cause temporary sterility. Exposure to lower levels of radiation can cause nausea, and higher levels can cause vomiting, diarrhea, bleeding, coma, and death. Exposure to Cobalt-60 can damage the genetic materials within cells and also result in the development of cancer and other diseases.”

Cesium-137 is another radionuclide not found in nature. A by-product of nuclear fission in reactors and nuclear explosions, exposure to Cesium-137 can cause burns, acute radiation poisoning, and even death. Exposure to Cesium-137 can increase the risk for cancer and other diseases, with the radioactive material distributed in the soft tissues, especially widely distributed in muscle tissue. Cesium-137 has been associated with heart arrhythmias. With a

half-life of 30 years, it will remain in the environment for many generations.

Even though no Cesium-137 is present in nature, the EPA allows up to 200 picocuries per liter in our drinking water(!) According to the CDC, tests on animals given large doses of cesium compounds have shown changes in behavior, such as increased activity or decreased activity. Exposure to Cesium-137 can cause cell damage, and, with high doses, acute radiation syndrome, which includes nausea, vomiting, diarrhea, bleeding, coma, and death. In utero, babies exposed to enough radiation during the time when their nervous system is rapidly developing can experience brain changes that can result in behavior changes or decreased mental abilities.

To read the reports of radioactive groundwater contamination and associated effluent reports at a nuclear power plant near you, visit the NRC website.

Cathy Garger is a freelance writer, organizer, and speaker who works to stop the continued obscene, eternal radiation poisoning of the planet. Living in the shadow of the national District of Crime, Cathy is constantly nauseated by the stench emanating from the nation's capital during the Washington, DC, federal work week. Contact the Author

More information: http://axisoflogic.com/artman/publish/Article_57993.shtml

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