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The Bomb That Fell On Niagara: The Sphere **Cover Story**

by Geoff Kelly & Louis Ricciuti



Are the remains of an experimental reactor buried on the Niagara Falls storage site?

This is going to seem complicated and take a long way to get where it's going. So here's the gist, right upfront: Possibly, in Lewiston, are buried the remnants of an experimental nuclear reactor dating from the 1940s. This reactor would have been part of a secret program to weaponize poisonous materials—a program with roots in the study of poison gases in the First World War and whose culmination is found today in the use of depleted uranium munitions around the world.

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Sure, it sounds like a plot inspired by *Dr. Strangelove*. But read on.

Amid the radioactive slurry and scrap interred in the 10-acre interim containment facility at the Niagara Falls Storage Site in Lewiston is a curiosity: a hollow industrial steel ball, 38 feet in diameter.

You won't find that house-sized steel ball on any waste materials manifest, at least not on any manifest released to the public by the US Army Corp of Engineers, which is the site's caretaker, or the US

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The ball exists in aerial photographs taken of the site in the mid 1940s, however, and it appears to have been rediscovered in a 2002 electric resistivity underground imaging study performed by defense contracting giant SAIC.

In those aerial photos, the ball sits some distance from the main cluster of buildings; the nearest structure is a concrete silo, which eventually became a receptacle for high-energy radium wastes, a legacy of local industry's central role in the Manhattan Project and the Atomic Energy Commission, which produced the first atomic bombs.

The Army Corps say there is no documentary record of the ball having been removed from the site. And the 2002 electric imaging scans suggest that a steel sphere, 38 feet in diameter, just like the one in the photos, is buried about a quarter mile from the ball's original location, on the developed portion of a vast, former federal reservation called the Lake Ontario Ordnance Works.

The LOOW came online officially in 1942, a 7,500-acre facility cobbled together from farm fields by the Department of War. Its initial use, according to the site's official history, was a TNT factory. That factory closed, however, after nine months, at the height of the Second World War. The factory and all its infrastructure—miles of massive pipes, a water and power grid sufficient to sustain a city of 100,000 people, dozens of industrial buildings—were declared surplus.

The LOOW's actual uses have been a mystery, whose plots and subplots have been revealed slowly and grudgingly by an unforthcoming federal government. Part of the site became the Northeast Chemical Warfare Depot. Other parts were spun off to the Air Force and Navy and other defense and intelligence agencies for experimental activities, the detritus of which continues to pollute the surrounding environment and illuminate ever so slightly the site's history: boron suggests the manufacturing and testing of experimental jet fuels; phosgene suggests experimentation with nerve gases and other toxins; traces of PCP suggest experiments undertaken by the CIA; the list goes on.

Various sectors of the vast compound became dumping grounds for toxic radiological and chemical waste produced in Niagara Falls factories, as well as laboratories and reactors nationwide, working first on the atom bomb project and later on other Atomic Energy Commission and defense- and intelligence-related projects. A wide range of radioactive material was dumped cavalierly on site during the Second World War and the decades that followed: plutonium, uranium, thorium, cesium, polonium, strontium, and other dangerous materials. On site today, buried with that steel ball, is what is assumed to be irradiated graphite and almost 4,000 tons of radioactive radium-226, the largest repository in the western hemisphere, representing a staggering quantity of radiation.

Beginning in 1980, these wastes—originally dumped in open pools, seeping out of corroded barrels, or just piled on open ground—were consolidated by the DOE into a temporary containment structure on the 119-acre Niagara Falls Storage Site.

The existence on the LOOW of particularly exotic transuranics (that is, above uranium on the periodic



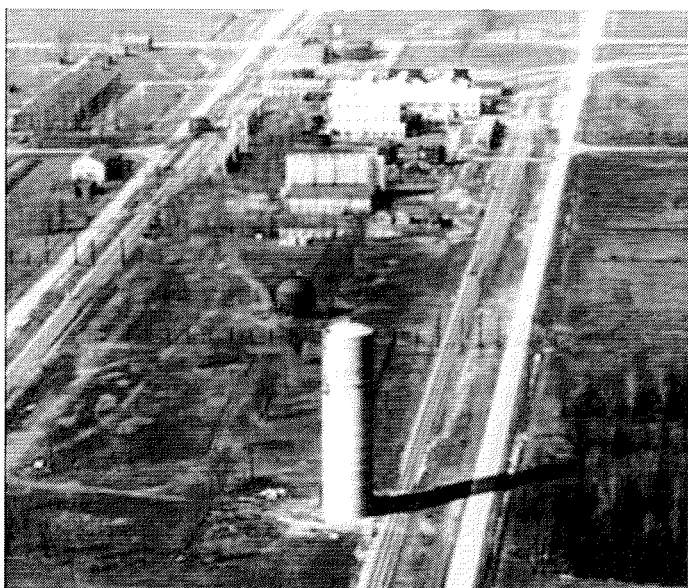
The Lake Ontario Ordnance Works. In the background, is the Hortonsphere and the silo.

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are produced only inside nuclear reactors and by nuclear explosions—has begged an explanation for decades. The Army Corps says that these transuranics and fission materials arrived at the LOOW with waste from the Navy's Knolls Atomic Power Laboratory near Schenectady. But the waste from Knolls doesn't explain all the transuranics and fission materials found on the LOOW, according to some experts, and it doesn't explain how widespread and how much.

That steel sphere buried among this collection of radiological waste suggests another, simpler explanation: Could that steel ball—a Hortonsphere, named for the inventor of the process of its fabrication—been a component in an early model of an experimental ball-and-pile reactor? One in which exotic materials were created or irradiated, all in the service of a federal weapons program that sought to find new and lethal applications of the materials created in Niagara Falls for the Manhattan Project and beyond?

"I'd have to say yes," says Tedd Weyman, of the Uranium Medical Research Centre, based in Toronto.



The Hortonsphere is the ball at center. The silo in the foreground was used to store radium waste.

Occam's Razor

Weyman is a physicist and his group, UMRC, studies the effects of uranium, transuranium elements, and radionuclides produced by the process of uranium decay and fission. UMRC is especially interested in the health effects of depleted uranium, whether it enters the environment as a result of munitions use or as waste.

Weyman examined the aerial photographs of the ball and silo, the list of transuranics and fission materials found on site, and the electric imaging scan that seemed to show that same ball from the photos buried alongside radioactive waste. He reviewed documents that describe the history of the LOOW site and of Niagara Falls industry over the past 60 or so years: the metals and chemicals and devices created in nearby factories, the experimental programs undertaken by defense and intelligence agencies beginning in the 1940s. He considered the size of the Hortonsphere, which he said is consistent with a ball reactor, and its placement in relation to the silo, which is consistent with the pile in a ball and pile reactor—that is, the source of the reactor's "fuel" and critical reactions.

Weyman then listened to the explanations the Army Corps offered for the ball and the transuranics and fission products: that the ball was used to store anhydrous ammonia used in making TNT and the transuranics and fission products came from Knolls. He concluded that an on-site reactor was a far simpler explanation.

"They're fission products," Weyman says of the residues found on site. "That's a pretty significant clincher. Either someone was reprocessing spent reactor fuel from some other location or somehow some sort of experiment—whether it was through cyclotrons or through fission—was producing materials that were low in availability in terms of quantity at the time and which, in terms of physics, have to be produced in that way...so either they're fission products that come out of a neutron reactor by neutron bombardment or they're products produced in a cyclotron by smashing atoms together which can't

produce very much quantity. So it's more likely, if it's detectable on any scale, to be nuclear-reactor-produced fission products."

The Army Corps maintains that the transuranics and fission products came from Knolls [known by the acronym KAPL]. "We actually tested on site for KAPL, which would address anything that would be in a reactor," says Michelle Rhodes, a project engineer for the Corps. "We did have widespread cesium, and we did have hits of plutonium."

There is also polonium-210 on site. According to Bob Nichols, a San Francisco-based researcher and writer who reviewed the same documents as Weyman, polonium was used as a trigger in nuclear weapons. Its presence in quantities sufficient to detect all these years and half-lives later is not easily explained by the KAPL wastes.

When asked if the Corps had considered other waste streams besides KAPL to explain the presence of transuranics and fission products on the LOOW site, Rhodes said—albeit in a careful, convoluted way—that the Corps had not.

"We look at it from a characterization and risk perspective," she said. "By pursuing the Knolls waste, we addressed all other reactor waste that might or might not have been on site."

Roughly translated, that means that the Corps is only interested in what's on the site and what they're going to do about it. They're not really interested in how it got there; if they can use the documentary evidence that rods and other radioactive waste from the Knolls reactor were dumped there, they felt no need to pursue other explanations.

When asked if the LOOW might have hosted its own a ball and pile reactor, Rhodes professed that she did not know what that was. When told it was a type of nuclear reactor, she said maybe a health physicist would have heard of such a thing. She had not. Then, after a lengthy silence, she said that there was no evidence of such a thing existing.

The Corps' initial explanation for the round anomaly revealed by the 2002 electric imaging scan was that it was the Hortonsphere depicted in the 1940s photographs. When I spoke to Rhodes, she said maybe not: Maybe that 38-foot-in-diameter circle were drums of waste buried in 1991. There was no evidence, she said, that it was the Hortonsphere.

Then she changed course and acknowledged it probably was the Hortonsphere, but said it had been used to store anhydrous ammonia used by the TNT factory.

That seems a reasonable explanation, except that Hortonspheres are expensive now and were expensive then. It seems unlikely that a Hortonsphere that had contained ammonia would not have been re-used, or at least cut up and used for scrap. And why would so massive an object be dragged a quarter mile to be dumped alongside dangerous radiological waste unless it posed a similar hazard?

Later, in an email, Army Corps public affairs officer Bruce Sanders reverted to the position that the metallic anomaly on the electric imaging might not be the Hortonsphere at all. He said the Hortonsphere appeared to have been removed from its original location some time between 1956 and 1960, and no one knew what happened to it. And he reiterated the position that the Knolls waste was sufficient explanation for the transuranics and fission products.

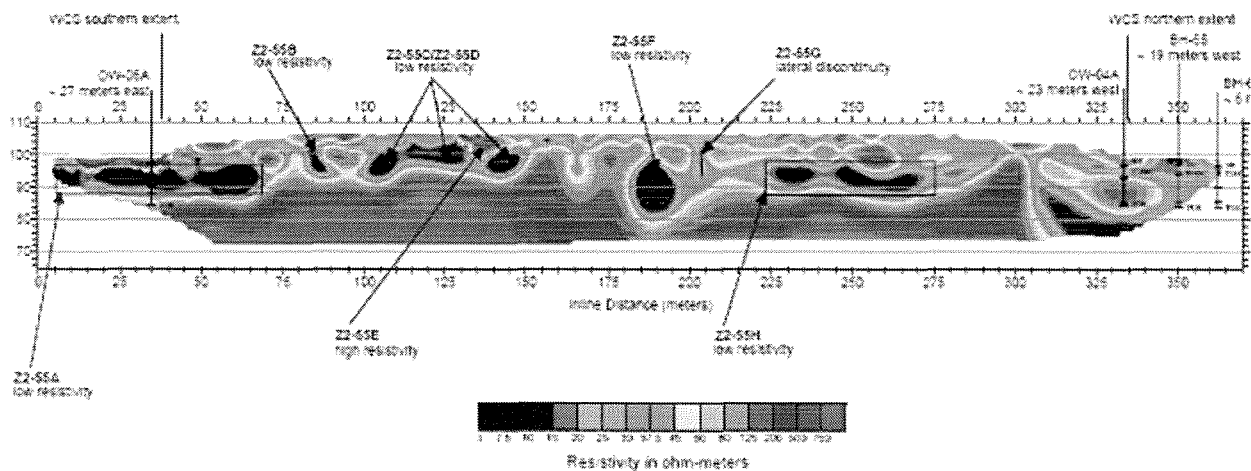
On the subject of the history of the LOOW site and the environmental damage it poses, the Army Corps

has been less than reliable when discussing the documentary evidence. In 2000, for example, when offered evidence that plutonium-tainted waste from medical experiments conducted at the University of Rochester had been buried on the LOOW site, the Corps denied such evidence existed. Eventually, they allowed both that the evidence existed and that the plutonium-tainted waste had been found on site.

In his email, Sanders said the Army Corps had reviewed no evidence that the Hortonsphere had been buried and seen no evidence of an on-site reactor. Rhodes had already acknowledged that the Corps was not looking further than the Knolls waste to explain the transuranics and fission products on site. And Sanders added that the Corps considered it would be of little use to pursue further information about the fate of the Hortonsphere.

Occam's Razor is the principle that the simplest explanation is most often the correct one. There's that anomaly, exactly the diameter of the ball in question, which is exactly the size and manufacture of a ball reactor vessel. It is interred alongside radioactive waste. It originally sat near a silo, which once stored radioactive waste; a 1944 photo of the site looks like a photo of a ball and pile reactor of that era. And there are transuranics and fission materials buried nearby, as well as irradiated graphite, whose nature, quantity, and location aren't completely explained by the Knolls hypothesis.

"If it quacks, is it not a duck?" Weyman says. "It's quacking pretty loud."



The Hortonsphere is suspected to be the blue circle in the middle of this electric imaging scan.

Why it makes sense

The laboratories and factories in and around Niagara Falls were on the cutting edge that opened the atomic age. When the federal government dedicated massive resources to the creation of the atom bomb, those laboratories and factories were among the first pressed into service, because of the metallurgical and chemical expertise and equipment that already existed at places like Union Carbide's Electro Metallurgical Works (which would become the free world's largest producer of uranium metal), Linde Air, Titanium Alloys Manufacturing, National Lead, Harshaw Chemical, Hooker Chemical, and other plants. All these companies contributed to the creation of the atom bomb, and all were rewarded financially for their work.

When the war ended with the successful use of two atom bombs, federal dollars for defense research regarding atomic weapons followed two parallel tracks. The first was making better bombs and better

delivery systems. Niagara Falls industry continued to win lucrative defense contracts and to play a role in that research for decades to come.

The second track was the use of radioactive materials themselves as a weapon. It was known as the Radiological Warfare, or RW, program, and under its auspices scientists studied what materials could best be weaponized, what health consequences they would have on an enemy, how best to deliver and disperse radioactive materials to a battle zone, and how much to use. This research was more secretive, but here too the expertise of local industries proved valuable. In a brochure from the postwar era, Bell Aircraft (later Bell Aerospace) bragged of its research in area weapons: that is, devices that disperse materials across a battlefield. Niagara Sprayer (a.k.a. FMC, the Middleport company that manufactured Agent Orange) created specialized compounds and nozzles for spraying agricultural metals, powders, and insecticides.

And over at the LOOW site, there was a mammoth federal reserve on which exotic radioactive wastes were accumulating.

Bob Nichols, the San Francisco-based writer who came to the same conclusion as Weyman about the ball buried on the NFSS, specializes in the history of this second track of research. He draws a straight line that connects the radiological warfare program to American research into poison gases, such as mustard gas and chlorine gas (both of which were produced in Niagara County), during the First World War; that line passes through the Manhattan Project along the way, and continues to the present-day use of depleted uranium munitions, which release a cloud of poisonous ceramicized uranium particles as a form of gas when they vaporize on impact.

Nichols explains that the first track—the building of more and better nuclear weapons—created vast stores of radiological waste materials. “The question back then was what on earth to do with it,” he said.

Some of this waste—inevitably and misleadingly referred to as “slag”—was callously turned over to municipalities for use as fill and road construction materials. “They have this free stuff, and it’s really good and hard,” Nichols says. “So people use it for roads and fill all over”—sometimes with full knowledge of the dangers posed by the material but more often in ignorance, promoted by federal secrecy.

This phenomenon should be all too familiar to Niagara County residents. Studies conducted by the Oak Ridge National Laboratories in the 1980s identified more than 100 radioactive hotspots on city and county roads and private properties. Flyover surveys conducted by a company called EG&G in the late 1970s revealed dozens more radioactive areas of concern. This is hardly the only region that is confronting the specter of radioactive waste, cavalierly and callously repurposed. France, armed with nuclear weapons and dependent on nuclear power, is facing tremendous problems with waste disposal. So is Pakistan.

But Niagara County’s environment is especially compromised. John P. Shannon, a retired major in the US Marine Corps, is a nuclear physicist and engineer. He worked for 30 years at the Knolls Atomic Power Laboratory as manager of nuclear and industrial safety and hygiene. “I have heard much about the radioactive contamination near Niagara Falls,” he said. “Aside from Hanford, Washington, the Niagara contamination is probably the worst in the country.”

History matters

The waste produced in making bombs also dovetailed neatly with earlier poison gas research, according

to Nichols. Here, he says, was a brand new toxin to weaponize.

“The end result I see at Livermore is a mature poison gas program,” Nichols says, referring to the nuclear weapons programs at Lawrence Livermore National Laboratory in the Bay Area. “What you have [in Niagara County] is the way it was put together, the very messy way that it was put together by people who had a goal in mind: They never wavered from their goal of a radiological poison gas weapon.”

The industries and materials associated with radiological warfare research were present in Niagara County. Is it such a stretch—given the apparent presence of a Hortonsphere buried in a radioactive waste dump—to imagine that there might have been a reactor on the LOOW site? One in which new materials were created and other materials irradiated in the service of weapons research?

In his email, Army Corps spokesman Bruce Sanders wrote, “...the Corps sampled the NFSS for fission products (cesium-137 and plutonium for example) due to the Knolls Atomic Power Lab (KAPL) waste stream and addressed fission materials from reactor residues at that time.”

Again, the Corps seems satisfied to know what presently exists on the site for which it is responsible and less curious about how it got there. Maybe that seems a reasonable approach to a current question: what to do about the Niagara Falls Storage Site and its deadly contents, buried in a temporary containment cell that is nearly 30 years old and has already begun to leak.

Whatever took place on the former LOOW site in the first decades of the Cold War may have evolved and—like so many local industries—moved away. But its legacy is in the dirt, air, and water. It’s interred under that clay cap. It’s in the region’s higher-than-expected rates of cancer, diabetes, and other illnesses.

History should matter to the Corps as much as it matters to those who live in its aftermath.

For more documents and photographs related to the article, visit [AV Daily](http://artvoice.com) at [Artvoice.com](http://artvoice.com).