

Oak Ridge Stories – a product of the coming generation

(As published in *The Oak Ridger's Historically Speaking* column on October 11, 2011)

As promised in the *Historically Speaking* column a couple of weeks ago when I discussed the success of Keith McDaniel's 2011 Secret City Film Festival, I will now feature the details of the *Oak Ridge Stories*, a series of short films (less than 10 minutes each) that feature a specialized focus on a part of our Oak Ridge history that has been researched by middle and high school students.

Video interviews were conducted and the film was edited. The Oak Ridge Stories were shown for the very first time to audiences at the film festival who responded with strong positive feedback. The first six films in the series were huge hits with the viewing audience. Now, all 12 films are completed.

Have you ever heard of Vimeo? I just learned of it as a result of the project I am going to tell you about in this edition of *Historically Speaking*. Vimeo is an online service specializing in storage and display of films. It is designed for ease of use and is popular with filmmakers. It is frequently used to feature independent films and as a way to promote filmmaking.

On the *Oak Ridge Stories* Vimeo web page, the following introduction is found: "In 2011, Documentary filmmaker Keith McDaniel - along with Michael Twardy, Robert Cathey, D. Ray Smith and Jim Campbell - led a team of more than 50 middle school, high school and college students to produce twelve short documentary films about Oak Ridge."

The introduction continues, "From the area's history to life-changing technology, these films tell some of the stories which have made Oak Ridge one of the world's most unique cities. This series of first of their kind short video documentaries involving students and those who lived the history is a product of the Department of Energy made possible through a contract with local filmmakers."

The introduction concludes with, "Through this project, these students have become excited about the world of documentary filmmaking. They may well become our future documentary filmmakers and while doing so, the rest of us benefit from learning our history in an enjoyable and engaging fashion."

Here is the link to the *Oak Ridge Stories* Vimeo web page:
<http://www.vimeo.com/channels/oakridgestories>

Each short documentary film is introduced on the Vimeo web page as follows:

Daily Life

It's wartime in the 1940s. Ration cards and shortages are the norm at the grocery store. Families huddle around the radio to hear news from the fronts. But in Oak Ridge, wartime meant much more.

Building a city of 75,000 people in just three years from 59,000 acres of East Tennessee farmland meant long days, massive construction projects, and mud - lots of mud. It also meant complete secrecy and living within the restrictions - and safety - of a fenced city.

This film looks at the daily life of Oak Ridge's earliest citizens, from construction workers and scientists to home makers and historians.

On the Job

During World War II, every American had a role to play. They might have been building war machines in factories and shipyards, or they might have been holding a family together while fathers and brothers were fighting in Europe and the Pacific.

The workers who brought Oak Ridge to life, however, had jobs unlike almost every other American. Their job was to build the machines and buildings that would enrich uranium 235 for the first atomic bomb. Of course, very few of them had any idea what they were really working on, and talking about your job meant a visit from Army intelligence. Still, they knew their jobs were important to winning the war, and they worked tirelessly to complete the tasks at hand.

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In “On the Job,” we take a closer look at the jobs that built Oak Ridge. From construction laborers and machinists to chemists and “calutron girls,” everyone played their part.

A Child's Life

Imagine letting your ten-year-old children leave the house on a summer day to venture around your city of 75,000 people and not worry about where they are or what they're doing all day long.

Growing up in Oak Ridge was a singular experience for the kids who lived it. The safety of living in a city behind a fence meant that parents felt comfortable letting their kids enjoy a freedom to explore and wander that few parents today could even imagine.

In this film, we look at what it was like growing up in America's Secret City, as well as some of the adventures and experiences these youngsters enjoyed.

Building the City

From 59,000 acres of East Tennessee farmland, the city of Oak Ridge grew to 75,000 people in just three short years. How did such a massive project happen?

“Building the City” takes a detailed look at what was required to bring Oak Ridge into being in such and impossibly short time. And, it looks at the innovative ideas pioneered in Oak Ridge that made building on such a massive scale possible.

Sworn to Secrecy

Successfully enriching enough uranium 235 to build an atomic bomb and end World War II meant taking huge engineering risks, condemning tens of thousands of acres of East Tennessee farmland, building on a scale unprecedented in human history, and doing it all on a breakneck pace.

And it all had to be done in complete secrecy.

In “Sworn to Secrecy,” we explore both the seriousness of Oak Ridge's veil of secrecy, as well as the consequences of violating that secrecy. The film features many of the men and women who were sworn to secrecy and tells their stories in their own words.

Graphite Reactor

The first sustained, industrial scale, controlled nuclear reaction in history happened in Oak Ridge. And it happened for a very important reason: Scientists and engineers were working feverishly to beat the Germans in developing an atomic bomb fueled by plutonium. To make the plutonium, scientists designed the Graphite Reactor and used it to draw the curtain back on elements of nuclear physics and chemistry that had only been theorized a few years prior.

In this film, we look at this incredible feat of science and engineering, which laid the foundations for a global nuclear power industry and a wealth of scientific discoveries.

Mouse House

With World War II won and the weapons manufacturing resources of Oak Ridge focused on the Cold War, Oak Ridge National Laboratory took on a new mission: Studying the effects of radiation on human health.

Mice provided a nearly-ideal human analog, and work was begun on a facility to house the research facility, which was completed in 1948. Dubbed “The Mouse House,” scientists including Lee Russell laid the groundwork for stunning discoveries that led to advances in our understanding and treatment of obesity, diabetes, skin and stomach cancer, leukemia, cleft palate, polycystic kidney disease, chronic hereditary tyrosinemia, neurological dysfunctions, seizures, and a wide variety of birth defects.

This video uncovers the genesis of the first Mouse House, demonstrates how its important mission grew, examines the stories of those who made the work possible, and takes a look at the new Mouse House,

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opened in 2008.

Spallation Neutron Source

The most powerful research instrument in the world for studying the atomic structure of materials came online in 2007 at the Oak Ridge National Laboratory.

Today, the Spallation Neutron Source (SNS) provides the most intense pulsed neutron beams in the world for scientific research and industrial development. SNS enables researchers from all over the world to study the science of the materials that forms the basis for new technologies in [energy](#), [telecommunications](#), [manufacturing](#), [transportation](#), [information technology](#), [biotechnology](#), and [health](#).

In this video, we look at what is neutron science, the visionaries who made SNS happen, and the discoveries and innovations it brings to light.

Nuclear Medicine

In 1946, scientists at Oak Ridge National Laboratory used the facility's Graphite Reactor to do something it had never been designed to do.

The reactor, built to prove plutonium for the nation's super-secret nuclear weapons program during World War II could be obtained from a uranium reactor, was to be used for a far more peaceful purpose: the production of iodine-131. This radioactive isotope would be used to treat thyroid cancer, a treatment that was considered by many to be the most exciting, important experimental medical technology of the day.

This video shows how success with iodine-131 led to the production of other medical isotopes and radiopharmaceuticals. Today, the Oak Ridge National Laboratory is an international leader in the science of nuclear medicine. Specifically, the Lab is leading research into combining nuclear medicine with nanotechnology and nanoparticles to precisely deliver isotopes with molecular precision. This minimizes damage to healthy tissues and concentrates medicine where it can have the most positive impact.

Calutrons

The earliest technology to effectively separate uranium-235 from its slightly heavier isotope, uranium 238, was called the calutron.

Named for the University of California at Berkeley, **CAL**ifornia **U**niversity **Calu**TRON, where it was conceived, 1,152 calutrons were built and operated at Y-12 during World War II, plus four more in the Pilot Plant, Building 9731, to separate the uranium 235 that would be used in the Little Boy atomic weapon dropped on Hiroshima, Japan.

This film explains how calutrons worked, honor the army of young women who ran the machines, and describe how the machines continued to play a role after the war in providing specialized isotopes for nuclear medicine.

Gaseous Diffusion

Imagine you are holding two basketballs, one in each hand. One basketball has a nickel taped to it. If your eyes were closed, could you tell which one was heavier?

That's an analogy for the challenge facing scientists trying to separate the isotope uranium 235 (material needed for an atomic bomb) from its slightly heavier isotope, uranium 238. During World War II, this task was of national importance, as physicists theorized that an appropriate quantity of uranium 235 could be fashioned into an atomic weapon that would help the United States bring the war to a swift conclusion.

One of the technologies chosen to separate uranium was gaseous diffusion, and the government built a massive building on the west end of Oak Ridge to house the maze of piping, pumps and other equipment needed to do the job. The gaseous diffusion plant required massive amounts of electricity, the world's largest building, and the use of highly corrosive chemicals. And no one was sure it would work.

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It did work. In March 1945 the process began to feed the calutrons at Y-12 and by December 1946 had surpassed the calutrons by producing highly enriched uranium at 1/10 the cost of Y-12. The K-25 plant went on to produce uranium for America's nuclear deterrent during the Cold War, as well as uranium for the nation's domestic nuclear power industry.

This video documents how the plant was built, explain the technology and discuss how the plant is being dismantled and the land converted to peacetime use.

Environmental Cleanup

Our nation's need to win World War II and the Cold War collided with our developing understanding of the dangers and responsibilities inherent in handling nuclear and industrial wastes. By the 1980s, it was clear that a coordinated, dedicated effort would be required to restore the environment near Oak Ridge from the damage it had suffered.

This film takes a frank look at the environmental impact of nuclear research and production in Oak Ridge, the blueprint for addressing it, and some of the technologies employed to make it happen.

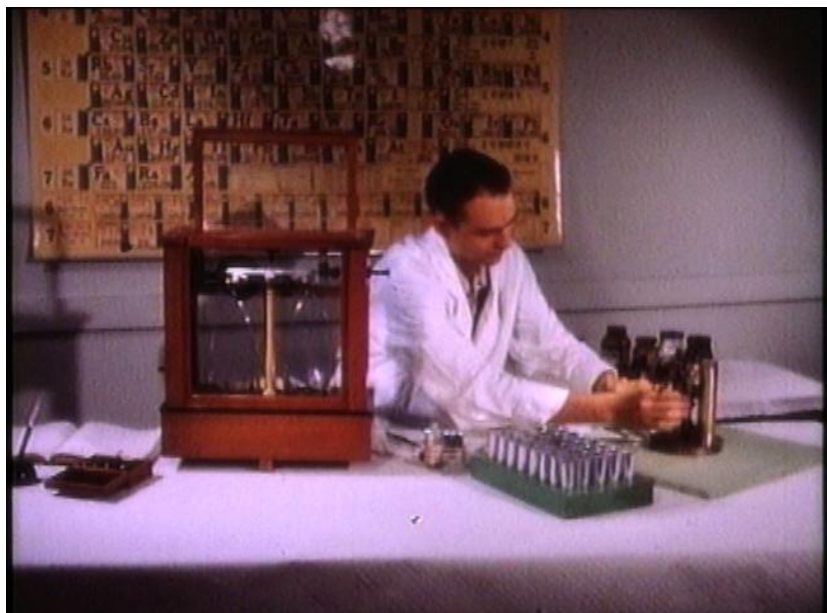
I hope you will check out these films that are products of our young people. A promising future is in store for them, what talent! What a joy to see their work.

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The Spallation Neutron Source, the discoveries and innovation of the world's most powerful pulsed neutron source

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Oak Ridge is the birthplace of nuclear medicine