OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Land Protection Division

Our **Environment.**
Our **Future.**

Protecting Our Land for **Generations to Come**

Our future depends on our environment. Decisions we make today shape our landscape and define the world our children will inherit. By making the most of our resources today, we ensure that those resources will be available to serve our children and our children's children tomorrow.

Bearing in mind our responsibility as environmental stewards, the Land Protection Division (LPD) continues its mission to protect, preserve and restore Oklahoma's environment by educating and engaging the communities it serves. LPD regulates treatment and disposal of solid waste, hazardous and non-hazardous industrial waste, waste tires, biomedical wastes and certain radiation sources. LPD also oversees the cleanup of properties that have been adversely impacted by past industrial operations. By working with regulated communities to protect our environment from the byproducts of modern life, we ensure a clean and healthy environment for a sustainable future.

Our **Environment.** Our **Future.**

DEQ and Its Partners Play a Vital Role in **Environmental Education and Outreach**

Education and outreach are key components of DEQ's service to customers. Questions such as: "Where can I take my used oil for recycling? How can I make a difference in my school? Can I put my computer in the trash? Can you help us put on a "green event?" are commonly raised by concerned citizens, other government agencies, schools, companies, and public service organizations. Pollution prevention staff members answer these questions on the telephone, in presentations and classroom exercises, through fact sheets and brochures, and by exhibiting at events.

DEQ believes that it is important to lead by example. Event recycling illustrates this ethic. Beginning at the Woody Guthrie Folk Festival in Okemah and expanding to the Memorial Marathon, Festival of the Arts, Iron Man Triathlon, and Paseo Festival in Oklahoma City, DEQ demonstrates how to organize volunteers to make recycling central to those celebrations. More importantly, DEQ's recycling team is constantly coaching others to emulate those successes at other events.

Another way DEQ teaches the public to be more environmentally conscious is through the Green Schools Program. The Green Schools Program is planting the seeds for future quality of life in Oklahoma. Now in its second year, participating schools learn how to reduce environmental impacts through recycling, reducing energy and water consumption, and pursuing other sustainability strategies. Students and faculty form green teams that monitor energy and water consumption, trash generation, and recycling opportunities. DEQ and other partners provide toolkits and technical assistance to help the green teams develop recommendations. Upon approval by school administrators, the green teams pursue implementation.

Additionally, Oklahoma's environmental education license tags are not only eye catching, but they also support school activities. Revenues generated by the license tags are devoted to classroom materials, films and videos, continuing education, environmental club projects, outdoor classroom set-up, and environmental field trips. Educators have an opportunity each year to apply for their favorite projects.

Environmental education is an important part of DEQ's mission. By teaching children to become stewards of the environment, DEQ staff members are helping to create generations of Oklahomans with the knowledge and desire to keep Oklahoma, and the earth, beautiful.

The Secret Life of Garbage

Each person generates, on average, about four-and-a-half pounds of garbage every day. Every activity that we pursue results in trash. After you throw away your trash, you may not think about it anymore, but it still has to be picked up and put somewhere.

In Oklahoma most garbage is disposed in landfills. A modern landfill is a tomb designed to isolate our waste and its pollution from the rest of the environment, and most importantly, from people. DEQ's solid waste permit staff review landfill permit applications and oversee facility construction to ensure that landfills meet all applicable regulations. Staff members look at a number of things during review of permit applications. The environmental protection process begins with the landfill's location. It cannot be located in floodplains, wetlands, geologically unstable areas such as seismic impact zones or karst topography or where it will compromise endangered plants and animals. Landfills are prohibited within one mile upstream of a public water supply intake, within a one-year travel time (the aquifer recharge area) of a public water supply well, within the drainage basin of an Oklahoma Scenic River and within one-half mile of a recreation area. Each site must maintain a buffer zone around the perimeter of at least 100 feet. Oklahoma landfills must also be located at least five feet above ground water.

Modern landfills isolate the waste with a liner system that is built on the bottom, sides, and ultimately on the top. The base of the liner is Oklahoma clay that is moistened and compacted to the point that water passes through it about as slowly as it penetrates the top of a table. A thick sheet of heavy plastic is laid on top of the clay. Since this composite liner prevents the movement of liquids, a plumbing system is installed on top of the liner. This allows water that has contacted the trash and become contaminated to be removed and properly treated.

The trash is covered at the end of every day with at least six inches of soil or other material. This discourages the flies, rats, and skunks that transmit human disease from living in the trash. The surface is graded to prevent stormwater from running onto the landfill, and to control

runoff water that has come in contact with the waste.

Landfill operators constantly compact the trash. The microbes that feed on organic material in the absence of oxygen generate methane gas – the principal component of natural gas. This is not only an explosion hazard, but also a potent greenhouse gas. Therefore, modern landfills have a network of wells to extract the gas. Where there are nearby markets, many Oklahoma landfills are selling the gas to power facilities ranging from brick plants to cement kilns.

All modern landfills are also equipped with environmental early warning systems – a series of ground water monitoring wells designed to detect leaking contamination. The wells are installed upstream and downstream from the facility in the shallowest ground water zone and are checked routinely.

The final aspect of environmental protection is ongoing vigilance by all landfill workers to ensure that they do not accept any inappropriate chemical waste. Additionally, DEQ's compliance staff routinely visit landfills to ensure they are properly operated.

DEQ cannot predict what landfills of the future will look like, or whether they will continue to be the primary method for trash disposal. The agency does know that efforts to pull recyclable material from trash help prolong the operational life of current landfills, which helps to keep costs down. Recyclable material includes yard waste, aluminum cans, glass bottles, plastics, newspaper and other materials. DEQ continues to encourage recycling in the state and in its own building.

DEQ also monitors the evolution of landfill design. For example, instead of a combined clay and plastic cap, some landfills are installing soil caps designed to effectively evaporate water and to utilize normal transportation of trees and other plants to prevent rainwater from combining with the trash. This new design can be more attractive and has the potential to offset greenhouse gas emissions.

Waste is a fact of modern life. DEQ's goal is to educate the public about sustainability, recycling and reuse in order to limit the amount of the world's resources that end up as waste, while ensuring that wastes that are created are safely managed.

Revitalizing Oklahoma Brownfields **One Community at a Time**

The Brownfields Program continues to actively foster economic development by assisting with environmental cleanup of properties. In December 2009, DEQ's Brownfield Program received $1.9 million through the American Recovery and Reinvestment Act (ARRA). With this funding, DEQ was able to award five competitive Brownfields grants earlier this year, each totaling $200,000. The grants went to:

- The George Kaiser Family Foundation for removal of an underground storage tank system and the associated contamination. The foundation plans to build a public park in Tulsa's Brady Arts District. Under the park will be a matrix of geothermal wells to heat and cool a nearby museum.
- Love Link Ministries, Inc. for installation of a vapor mitigation system in its new Compassionate Ministry Center. The vapors are associated with the historical use of dry cleaning solvents on the property. The center will provide many services including a food pantry and drug and alcohol counseling.
- The City of Seiling for asbestos cleanup of a former American Legion building, so it can be demolished to build a much-needed parking facility. The parking facility will serve the downtown businesses, which lost all the on-street parking when the highway through town was widened.
- The Oklahoma Municipal League (OML) for the asbestos cleanup of a dilapidated office building next to OML headquarters. Future plans for the property include a training facility for state municipal officials and employees.
- The City of Tulsa for the asbestos cleanup of the former Morton Health Center and for the removal of the hospital's petroleum underground storage tank. Remediation and redevelopment of this historic building will improve the economic and social environment of this community.

Additionally, in 2010, another Oklahoma brownfield redevelopment was awarded the coveted Phoenix Award™. The City of Oklahoma City won the prestigious award for the Dell Redevelopment project. The Phoenix Awards™ recognize individuals and groups who have collaborated to transform old, contaminated areas into productive new uses. Oklahoma City worked tirelessly to convert an old landfill adjacent to the Oklahoma River into a prized development location. A Dell Computer Customer Service Call Center was built on the property, providing a cumulative overall economic impact of $764 million and creating 1,500 high paying jobs for Oklahomans. The Dell building is designed to ensure that landfill gases such as methane and carbon dioxide do not enter the building. The Phoenix Award™ was presented at the 2011 National Brownfields Conference in Philadelphia, Pennsylvania, in April. DEQ worked closely with the city on the project, and the site received a Brownfield Certificate in April 2009.

Also this year, for the first time, a Brownfield Certificate was issued for a portion of a former Superfund National Priorities List site. The City of Sand Springs and the Sand Springs Railway wanted to relocate an existing track, and the vacant land of the Superfund site provided an ideal location. The property would allow the railroad to

expand its operations. The Sand Springs Railway Site is located within the Sand Springs Petrochemical Complex Superfund site. The planned reuse of this parcel is heavy rail. Sites that have been cleaned up and deleted from the National Priorities List are eligible for Oklahoma's Brownfield Program.

The Brownfield Program continues to grow. One of its major goals is to continue to provide funding for environmental cleanups so idle contaminated property can once again be beneficially used.

Left to right: Secretary of the Pennsylvania Department of Environmental Protection Michael Krancer; Senior Fellow, Urban Land Institute, Tom Murphy; City of Oklahoma City Brownfields Planner, Amanda Alewine; DEQ Brownfields Program Manager Lloyd Kirk; Assistant Administrator for the Office of Solid Waste and Emergency Response, EPA, Mathy Stanislaus with the 2011 Phoenix Award™.

Economic Impact of **Sustainability and Greening Business**

As an environmental agency, DEQ fosters partnerships with the business community, municipalities, and other state agencies. Through these partnerships, DEQ staff develop ideas to prevent pollution and recognize those who promote sound environmental management.

In 2005, the agency launched the OK Star Incentive Program (OKStar) as part of the existing Pollution Prevention (P2) program. Then in 2009, DEQ and the Oklahoma Department of Tourism and Recreation formed a partnership to target businesses in the tourism sector. Encouraging Conservation in Oklahoma (ECO) takes the criteria developed for OKStar and applies it to the tourism sector.

The overall goal is to improve efficiency and environmental performance. By examining an organization's waste streams and making internal changes to reduce waste, significant financial and environmental savings may be realized. Program participants provide proof of this every day. Currently, there are 40 OKStar/ECO participants with 30 others in the application process.

Participants realize lower energy and waste removal costs, reduced environmental liabilities, free training and education, improved employee health and morale, and a sense of pride for environmental responsibility. Data from three hospitality participants show annual reductions of 10 percent in energy usage, 22 percent in water consumption, and 18 percent in solid waste generation. When adjusted for occupancy rates, there was increased efficiency for services provided. For example:

- The National Center for Employee Development (NCED) in Norman is the largest hotel in Oklahoma with 964 rooms. NCED installed a meter on the trash compactor that alerts the City of Norman when pickup is required. This resulted in fewer pickups and reduced energy use. NCED installed a higher efficiency energy management system that allows better tracking of real-time energy usage. In the laundry, NCED installed four new, high-efficiency dryers as well as a more efficient ozone machine. The new ozone machine decreases water, chemical, electricity and natural gas usage. These changes have made it possible for the facility to improve efficiency and gain state and national recognition.
- The Norman Convention and Visitors Bureau (working with OG&E) installed an Energy Star smart grid system to track real time energy usage. This resulted in an annual reduction of 1,220 kilowatt hours (4 percent) of electricity used. There have also been annual reductions of 19 percent in natural gas and 18 percent in water consumption.
- In its inaugural ECO Art on Tap event, the OKC Museum of Art reduced the cost on dumpster rental by $1,200 and avoided $370 in trash disposal costs by providing recycling bins.
- The FAA Mike Monroney Aeronautical Center is the lone federal facility OKStar participant. Its efforts have resulted in increased energy efficiency and recycling rates while increasing total gross square footage of operations.

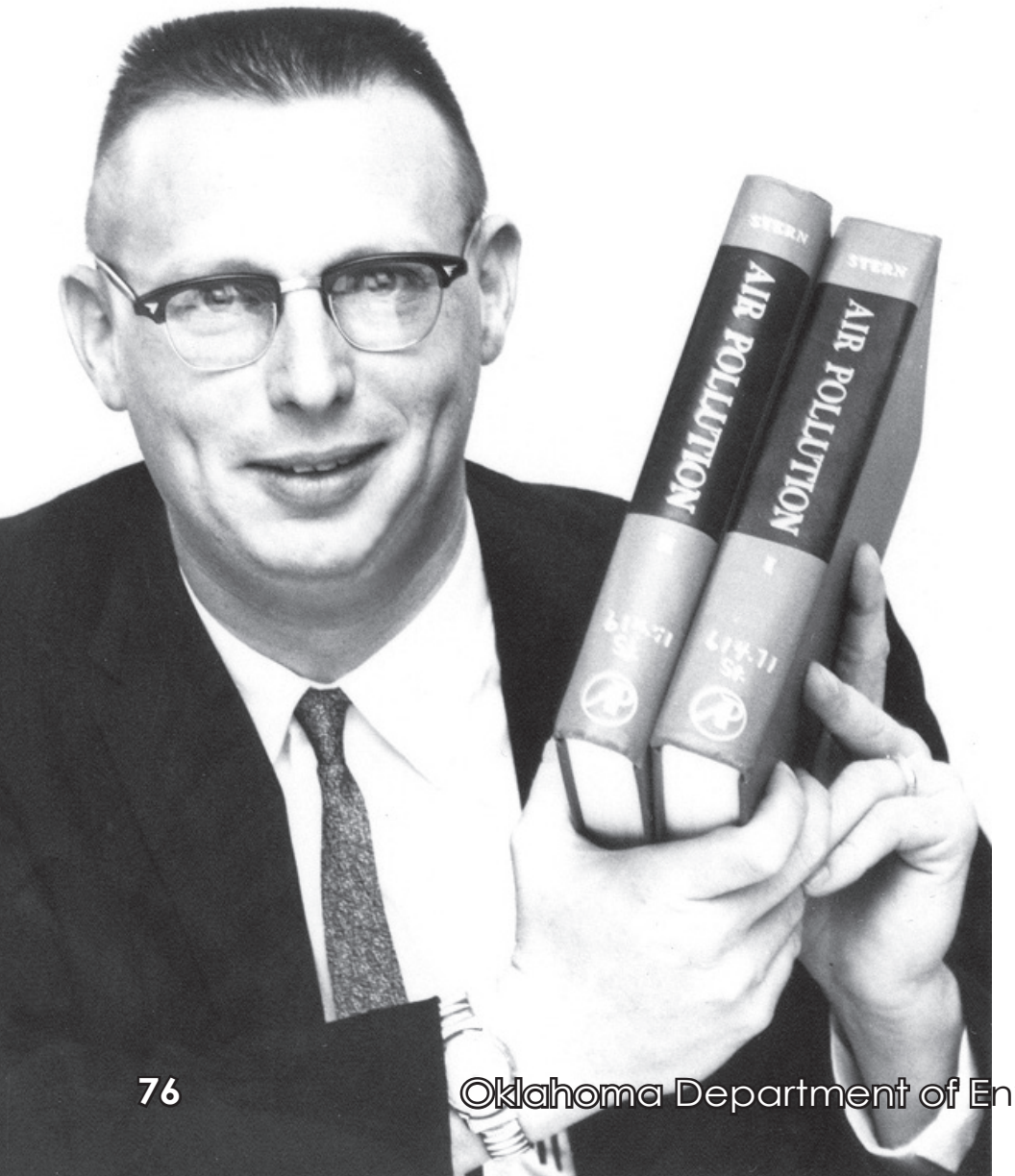
- Unarco Industries, a manufacturing OKStar participant, installed a white PVC roof that is expected to reduce overall energy usage by 20 percent. In 2011, process modifications and material changes will result in an additional five percent reduction in water and sewage costs and three percent reduction in natural gas usage. After initially changing hazardous waste generator status from large to small quantity in 2009, the facility generated no hazardous waste requiring disposal in 2010. Non-hazardous waste disposal was also reduced by 10 tons (74 percent) in 2010. In 2007, the facility began operation of a community recycling center that has collected cumulative amounts of 154 tons of paper, 159 tons of plastic, 6 tons of aluminum, and 7 tons of glass.

The progression is clear. OKStar/ECO participants are showing that being environmentally friendly goes directly to the bottom line. For the hospitality industry, environmental stewardship can help improve customer loyalty by sending a clear message that management cares about the health and well-being of its guests.

The Encouraging Conservation in Oklahoma (ECO) program strives to promote sustainable practices in the state.

Radiation Safety and Technology in Oklahoma over the Years

Dale McHard ends over 50 years of work on radiation issues in Oklahoma



In September 1958, a recent graduate of Oklahoma A&M University began what would end up being a long and distinguished career working to protect Oklahomans from a very specialized hazard. Dale McHard began work for the state Health Department and much of his work involved radiation. Dale ended his career with DEQ and retired September 27, 2010.

Over the span of his 52 year career, many things have changed, but many things are still the same. One of McHard's earliest duties was working with Oklahoma dairies to test milk for the presence of radioactive iodine from atmospheric nuclear testing. This year, radioactive iodine in milk is once again a concern due to the disasters in Japan.

In the course of his career, McHard dealt with risks that were side-effects of the beneficial use of radiation, such as medical treatment with radium sources. Today the beneficial uses are much more sophisticated. Oklahoma is home to a cutting-edge proton therapy machine used by cancer patients from all over the world. DEQ works with medical authorities to ensure that all medical treatments using radioactive sources or machines that generate radiation are safe and secure. DEQ continues to protect workers and the public from risks posed by radioactive materials used in nondestructive testing of oil and gas refining and pipeline infrastructure.

DEQ is also on hand to help when things go wrong and public health is threatened. McHard began his career working to protect human health from the fallout

from atmospheric nuclear weapons testing and ended his career protecting the public from potential terrorist threats. DEQ works with EPA to maintain a network of airborne radiation monitors in the state to detect any airborne radiation.

During his career, McHard helped to recover lost radioactive sources and was commended by Governor David Boren for his efforts. Today, DEQ continues to work with licensees and law enforcement when radioactive materials are lost or stolen. The security of radioactive materials in the state is a major responsibility of DEQ.

McHard raised Oklahoma's profile nationally in radiation regulation circles. He was Chairman of the Conference of Radiation Control Program Directors in 1979, and DEQ continues its work with this group to foster effective working relationships between state and federal radiation programs.

The capabilities and responsibilities of the state have grown greatly during McHard's career. Early in Dale's career, Kentucky became the first state to make an agreement to assume responsibility for regulating radioactive materials in the state. Oklahoma began serious consideration of this just a few years later in the mid-1960s. After a sustained effort in the late 1990s, Oklahoma did take over this responsibility from the Nuclear Regulatory Commission and became the 32nd Agreement State in September of 2000. This gives DEQ responsibility for regulating safe use of radioactive material in industrial, medical, and academic uses at about 250 licensees across Oklahoma.

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Dale McHard receives an achievment award of 50 plus dedicated years for the State of Oklahoma.

Oklahoma's federal partners have changed over time. McHard began his career working primarily with the US Public Health Service and the Atomic Energy Commission on radiation safety issues. The Atomic Energy Commission no longer exists, but DEQ continues to have a constructive relationship with the Nuclear Regulatory Commission and the EPA.

As the radiation program looks toward the future, it is evident that changes in industrial and medical technology that use radiation will continue at a rapid pace, and DEQ will need to stay in step with those changes. If nuclear power continues to expand domestically and globally, our continued ability to identify and respond to events will be critical. Just as the program evolved since McHard's early involvement in 1958, DEQ's program will continue to evolve with advances in the field of radiation.

One thing that Dale McHard maintained consistently in his career was his devotion to caring about the state, its people, and its environment. Today, the dedicated staff of DEQ's radiation program carries that same passion to maintain systems that will protect the citizens and environment of Oklahoma.

Industrial Radiography Certification - An Important DEQ Service to Oklahoma Industry

Industrial radiography is the use of radiation to detect flaws in materials. This is a key technology for ensuring safety in boilers, refineries, petrochemical pipelines, and the aviation industry. Clearly, industrial radiography is important in Oklahoma. Tulsa is one of the world's major centers of industrial radiography. DEQ regulates industrial radiography in Oklahoma, whether the radiation is produced with radioactive materials or an x-ray machine.

Industrial radiography involves the use of some of the most powerful radioactive sources in the state. DEQ and federal rules require that industrial radiography be conducted by teams of two workers, one of whom must be a certified industrial radiographer. Certification involves proving a certain level of training and experience and getting a passing score on a written test on industrial radiography safety principles. Considerable work is required to set up a certification program in a state, get it approved nationally, and maintain the program and keep it up to date. Only a few states do this. The federal government does not provide this certification. DEQ's Radiation Management Section is one of only seven regulatory programs in the country that have been approved to certify industrial radiographers. There is no requirement that DEQ offer the test; however, DEQ chooses to provide this service to industry, and in doing so, helps protect human health and the environment from the improper handling of radiation sources.

Offering this test in Oklahoma is a great benefit to industry in Oklahoma. Wayne Conway, a member of the Radiation Management Advisory Council, said "For DEQ to offer this test in-state really helps workers, who otherwise would have to travel out of state, often at their own expense, to get the certification they must have to do radiography."