

# CONTENTS

# 2000 Annual Report

Contents on pages three through six

Land - The Fundamental Resource .....	9
Land Restoration .....	11
Illegal Dumps .....	12
Eliminating Tire Dumps .....	13
Waste Tire Recycling in Oklahoma .....	14
Superfund .....	15
Oklahoma Refining Company .....	18
Tar Creek .....	20
Two Superfund sites added to NPL .....	22
Hudson Refining .....	23
Imperial Refining .....	24
Brownfields .....	25
Brownfields/Voluntary Cleanup	
Statistics .....	26
Brownfields Example Project .....	27

9 Land - The Fundamental Resource

29 DEQ Organization

33 DEQ Board and Councils

41 Air Quality

55 Customer Services

61 ECLS

67 Water Quality

77 Land/Waste Management

# CONTENTS

# 2000 Annual Report

DEQ Organization .....	29	MACT Program .....	47
Mission Statement .....	29	Streamlined Permits .....	47
Fiscal Year 2000 Goals .....	29	Lead-Based Paint Management Program .....	47
DEQ Organizational Chart .....	30	Air Quality Issues .....	49
DEQ Organization .....	31	Attainment Issues .....	49
<b>DEQ Board and Councils .....</b>	<b>33</b>	Ozone and Particulate Matter Standard Changes .....	50
Board and Councils .....	33	TEAM Database .....	50
Board and Council		Outreach Services .....	51
Rulemaking FY 2000 .....	38	Web Availability .....	51
<b>Air Quality Division .....</b>	<b>41</b>	Clean Air Alerts .....	51
Compliance and Enforcement .....	41	Air Quality Index .....	51
Inspections .....	42	New Source ID/Tracking Project .....	52
Anti-Tampering Program .....	43	Dry Cleaners .....	53
Enforcement Activities .....	43	Oil & Gas NESHAP .....	53
Monitoring .....	44	Open-Molded Plastics Industry .....	53
Permitting .....	46	Public Education .....	53
Title V Program .....	46	Environmental Impact Assessments .....	54

# CONTENTS

# 2000 Annual Report

Customer Services .....	55	Environmental Complaints and Local Services .....	61
Public Information .....	55	Complaints .....	61
Permit Administration .....	55	Facility Inspection Program .....	63
General Outreach .....	55	On-Site Sewage Program .....	64
SARA Title III .....	56	Water Supply Assistance .....	64
Toxic Release Inventory .....	57	Community-Based Environmental Protection .....	64
Small Business Assistance Program .....	57	Environmental Education .....	65
Pollution Prevention .....	57	Enforcement .....	65
State Environmental Laboratory .....	60	Emergency Response .....	66

# CONTENTS

# 2000 Annual Report

Water Quality .....	67	Land/Waste Management .....	77
Wastewater Compliance and Enforcement .....	67	Solid Waste .....	77
Compliance Inspections .....	68	Hazardous Waste .....	78
Compliance Monitoring .....	68	Hazardous Waste Permitting and Corrective Action .....	78
Enforcement .....	69	Hazardous Waste Compliance .....	80
Public Water Supply Program .....	70	Underground Injection Control .....	81
Permitting .....	71	Radiation .....	81
OPDES Permitting .....	72	Radiation Permitting .....	83
Drinking Water State Revolving Fund Program .....	72	Radiation Inspection .....	83
Source Water Protection Program .....	73	Radiation Operator Certification .....	83
Geographical Information System .....	74	Superfund and Voluntary Cleanup .....	83
DEQ Permitted Facilities within Legislative Districts .....	74	Environmental Education .....	84
Operator Certification Program .....	75		
Watershed Planning .....	75		

O K L A H O M A  
D E P A R T M E N T  
O F  
E N V I R O N M E N T A L Q U A L I T Y

2000  
ANNUAL REPORT



"THIS LAND IS YOUR LAND . . ."

THIS LAND IS YOUR LAND  
Words and Music by Woody Guthrie  
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# LAND

## The Fundamental Resource

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The signs on the interstate approaching Oklahoma City call it "America's Crossroads" – one way of saying that Oklahoma is the center of America. Our land says it too.

Our physical geography is literally where the east meets the west and the north meets the south. The mountains in eastern Oklahoma are linked to the Appalachians in America's eastern states. To the west they gradually give way to tallgrass prairies that are patchworked with thick crosstimbers. Central Oklahoma is the eastern doorstep of the Great Plains. The Arbuckle and Wichita Mountains that rise above the prairies are some of the oldest mountains in North America. Black Mesa, at Oklahoma's northwestern tip, is actually an element of the Rocky Mountains.

These transitions give us one of the most diverse landscapes in the country. Few other places can boast as rich a variety of landforms, climates, plants, and animals. Our land is truly our fundamental resource, the backdrop that helps make Oklahoma such a wonderful place.

This land was the magnet that drew our grandfathers. This land helped them to produce some of the world's most prominent thinkers, heroes, athletes and leaders. We have a wonderful blend of native, European, Hispanic, African, and Asian cultures

that shape an Oklahoman – one of the most resourceful citizens of this country.

Our grandfathers made Oklahoma a world leader in the production of lead, zinc, oil, and gas. They sweated and strained to make agriculture one of our leading industries. They mined coal to power their progress. Their successful efforts have provided us with enormous benefits.

Thanks to their diligence we have knowledge today that they did not. We understand how to operate huge factories without causing environmental pollution. We have learned how to control the environmental impact of our urban life. Principles of soil conservation that were unknown to our grandfathers have become standard practice today.

Much of this progress has been the result of a healthy synthesis of scientific advancement and regulatory development. The Department of Environmental Quality was an important product of that process, and has gained national acclaim for customer oriented results. The ongoing regulatory effort ensures that, to the best of our scientific understanding and legal capabilities, we are not creating new environmental hazards for our grandchildren.

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E N V I R O N M E N T A L Q U A L I T Y

There is still an environmental challenge that remains for Oklahoma, however. In the absence of our modern knowledge, our grandfathers created environmental scars along with their prosperity. Large tracts of land remain unproductive due to damage from mining, smelting, and oil and gas production. Also, there are too many acres marred by illegal dumps.

There can be a happy ending to this story. Restoration science is growing rapidly as we gain increasing reclamation practice. These pages chronicle an amazing array of DEQ projects that all have the same objective — restoring our land’s productivity. As I reflect on my own contribution to the lives of my grandchildren, my commitment to this land recycling task is redoubled, for land truly is our fundamental resource.

A handwritten signature in black ink, reading "Mark L. Coleman". The signature is written in a cursive style with a long horizontal stroke at the end.

# Land Restoration

Mining of natural resources was the economic foundation upon which Oklahoma was built. Oil and coal were the core resources of early Oklahoma industry. Tremendous technical advances have been made since Sooners first rushed to tap those riches. However, early production techniques caused extensive damage to the land. Large tracts have been totally barren since the early part of the twentieth century. An abundance of land permitted the resources to be extracted and the land abandoned. Today, we know the land itself is one of the great resources of Oklahoma and DEQ is determined to restore and protect it.

The Oklahoma Solid Waste Management Act directs DEQ to devote over \$200,000 each year to land restoration projects. By using materials recovered from solid waste — sewage sludge, wood chips, yard waste, paper mill sludge — DEQ is a national pioneer in land restoration.

The site in the photos is near Morris in Okmulgee County and is a good example of how poor production techniques can mar the land. At this site saltwater spilled on the ground and left it so salty that nothing could grow. Restoration treatment of the 60 acres focused on the application of organic materials to increase the soil's porosity so rain could wash the salt to lower horizons, allowing the return of plants. Both the Oklahoma land and economy benefit when a historical eyesore is transformed into productive pasture.



*Before restoration, the Roane project, damaged by historical oil production activities in Okmulgee county*



*The same site after restoration.  
Photos by Okmulgee County Conservation District*

# Illegal Dumps

When Oklahoma was first settled, taking out the garbage was not a big chore. Our trash was primarily organic in nature, so it simply became part of the soil wherever we threw it. As Oklahoma grew through the twentieth century, so did the amount and complexity of our garbage.

Oklahomans began to learn that old disposal habits were no longer safe. Although most garbage now goes to a permitted landfill, many farms still have an old site, often at the head of an eroding creek, where cans and bottles, fence wire and other farm wastes were discarded in an attempt to put the waste materials to some good use.

Driving along county roads one can also see recent illegal dumps. Since dumpers seek isolation, the dumps are usually in a ravine or drainage area. Water in these ravines and drainage areas then percolates through the garbage and feeds the same streams that provide Oklahomans with drinking water.

Oklahoma is blessed with a network of environmentally safe disposal sites and abundant disposal capacity.

There is no excuse for illegal dumps. Remember, they dump it — we drink it!

DEQ helps local governments eliminate this scourge. The photos on this page show how the removal of an illegal dump near Calumet not only helped clean up the water, but also returned this land to agricultural productivity.

During FY 2000 the DEQ worked closely with counties, conservation districts and other agencies to restore our land. The results are listed in the right column.



*Above: Before cleanup of an illegal dump near Calumet, Oklahoma.*

*Below: After cleanup, showing a productive pasture.*

*Photos courtesy of Oklahoma Environmental Management authority*



- Results:*
- 19 counties cleaned up illegal dumps
  - 42 counties had trash cop programs
  - 2 counties developed new convenience collection centers
  - 3 counties developed new programs for recycling

# Eliminating Tire Dumps

Oklahomans throw away about one tire each year for every person in the state. Those old tires do not simply roll away. Unlike regular garbage, they are unwelcome at landfills because they will not stay buried.

Fortunately, Oklahoma is a national leader in waste tire management. The fee paid on the purchase of each new tire

funds a successful dealer collection and reuse program operated by private companies. However, prior to the development of Oklahoma's statewide tire recycling program in 1989, most tires, like these in Canadian County, were disposed illegally. In the effort to eliminate this unwanted heritage, Oklahoma became a national leader in ridding the state of existing tire dumps.



## Year 2000 accomplishments

*52,559 tires removed from illegal dumps*

*65,034 tires collected from citizens in community collection events*

# Waste Tire Recycling in Oklahoma

Oklahoma has been a national leader in the development of waste tire recycling. Waste tires are typically processed by either shredding or crumbling for reuse. Additionally, some whole tires are used in erosion control projects and some are burned for fuel.

Waste tire shredding produces a "tire chip" that measures approximately 2 x 2 inches. There are several end use markets in Oklahoma for tire chips. Septic tank system installers use tire chips to replace gravel in lateral lines. Tire chips can also be used in other similar applications such as the drainage layer of solid waste landfills. Cement kilns burn large quantities of chips, also called Tire Derived Fuel (TDF). TDF has the advantage of a higher energy content than the coal it replaces. It also burns more cleanly, and air emissions are controlled by the same pollution control equipment as that used for coal.



*A large pile of tire chips*

Two Oklahoma cement kilns have recently installed the equipment that allows them to burn whole tires. This should make the recycling process more efficient since the shredding step is bypassed.

Crumb rubber is the rubber from a waste tire ground into a fine powder. Manufacturers use crumb rubber to make mats, horse



*Tire chips being reused in a playground*

arena floors, rubberized asphalt for roads, molded products, playground safety material, astro-turf on athletic fields, bridge expansion joints, soil amendments, and roofing material.

Waste tires are also used in riverbank erosion control projects. Whole tires are cabled together into a tire mattress that is used to armor the eroding bank of a river. Several rows of trees are planted behind the tire mattress. The tires trap silt, beginning the process of stabilizing the eroding bank. Eventually, the tires become totally covered. The trees are the vital ingredient that ensure long term protection of the bank.



*Above is a photo of how tires can be used as bank erosion protection.*

# Superfund

## Oklahoma Superfund Sites

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### Site

Tar Creek – Tri-State Mining District Northeast Oklahoma

Compass Industries Landfill, Tulsa Co.

Sand Springs Petrochemical Complex, Tulsa Co.

Tenth Street Salvage Yard, Oklahoma Co.

Hardage-Criner site, McClain Co.

Tinker Air Force Base, Oklahoma Co.

Fourth Street Refinery, Oklahoma Co.

Double Eagle Refinery, Oklahoma Co.

Mosley Road Landfill

Oklahoma Refining Company

Tulsa Fuels and Manufacturing

Hudson Refining

Imperial Refining Company

### Status

Active - Remedial Investigation, Design & Construction, Cleanup partially complete and Monitoring

Cleanup complete, Monitoring

Cleanup complete, Monitoring

Cleanup complete, Monitoring

Cleanup complete, Monitoring

Active - Remedial Investigation, Design & Construction, Cleanup partially complete and Monitoring

Active - Remedial Investigation, Design & Construction, Cleanup partially complete and Monitoring

Active - Remedial Investigation, Design & Construction, Cleanup partially complete and Monitoring

Active – Remedial Investigation, Design & Construction, Cleanup partially complete and Monitoring

Active - Remedial Investigation, Construction, Cleanup mostly complete and Monitoring

Active – Pre-Remedial Investigation

Active – Pre-Remedial Investigation

Active – Pre-Remedial Investigation

# Superfund

Oklahoma lead made the bullets that won World War II. Oklahoma oil fueled the Allied victory. Unfortunately, in Oklahoma, the long-term aftermath was large areas of contamination from the lead smelters and oil refineries.

Smelting was a thriving industry in Oklahoma during the early twentieth century. It is a process by which ore is refined into useable metal. Historical records indicate at least 17 lead and zinc

smelters operated across the state. The DEQ has evaluated the historical records and current conditions at each of the smelters over the last several years. Three sites have been cleaned up through combined local, state and federal actions. Preliminary investigation determined that no action was required at two sites. One will be dealt with as part of the Tri-State Mining area activities. Six old smelters are actively being cleaned up by the responsible parties under the Brownfields/Voluntary Cleanup Program. Four

*National Zinc Smelter Site,  
Bartlesville*



*Smelter Foundations  
Kusa, Okmulgee Co.*

other smelters are undergoing clean up by responsible parties, with DEQ oversight, as part of the national program to refer oversight work from EPA to the state environmental agency. One smelter, on the NPL, will be investigated for clean up by the responsible party with oversight by DEQ's Waste Management Division (WMD).

The history of Oklahoma and oil are deeply intertwined. The Oklahoma economy and the evolving oil business grew together hand in glove for most of the twentieth century. Industrial records from the teens and twenties list some 456 refineries in existence across the state. Some were tiny and short-lived; others were huge and operated for decades. The disposal practices and



*Stream sampling is a common part of Superfund assessments.*

understanding of the wastes was completely different than it is now. Modern science has developed techniques for eliminating these health hazards and returning the land to productivity. DEQ works through a variety of programs to recycle our historical industrial sites. The federal Superfund program targets the largest, most hazardous sites, working with responsible parties and the DEQ in investigating and solving the environmental problems.

There are currently thirteen Superfund sites in Oklahoma: one hazardous waste disposal site, two landfills, one air force base industrial facility, one salvage yard, one lead mining and smelter site, one zinc mining and smelter site, and six refineries. These sites make up the range of industries in Oklahoma that are on EPA's National Priorities List (NPL) of the most serious uncontrolled or abandoned hazardous waste sites identified for long-term remedial action under Superfund. Six of those thirteen sites have been remediated to the point that they are now just being operated or monitored to ensure that cleanup continues in order to protect human health and the environment. Four of the sites involve remedies which are "under construction," while DEQ is still in the process of determining what the remediation will involve for the remaining three sites.



*A sample of tar wastes for Superfund Investigation*



*Collecting soil and waste samples.*

## Oklahoma Refining Company

The Oklahoma Refining Company (ORC) site is a good example of the long-term work that is required to clean up Superfund sites.

The ORC site, located in Cyril, is an abandoned oil refinery that encompasses approximately 160 acres. When the ORC site was active between 1909 and 1984, wastes were placed in unlined pits and impoundments on the refinery property. Leakage from crude oil tanks, product tanks, and surface impoundments eventually contaminated the nearby soil and sediment, and the shallow ground water beneath the site. Investigations conducted from 1982-1986 caused the site to be added to the NPL in February 1990.

Investigations conducted in December 1991 showed extensive surface and subsurface contamination by petroleum related organic compounds, heavy metals, and acidic and caustic materials. After performing a Risk Assessment, DEQ concluded that the exposure level to current off-site residents and on-site



*Seaming the HazWaste Landfill Liner*



intruders was acceptable, but that the exposure level to future on-site residents and on-site workers was not acceptable. So far, the hazardous and non-hazardous wastes from this site have been disposed of in the newly constructed on-site hazardous and non-hazardous landfills. Both landfills will be capped and seeded with grass in the coming year. The numerous waste pits, acid and caustic areas, multiple sludge traps, and various ponds have been excavated and filled with clean soil. Biotreatment of the wastes from across the site has nearly been completed. Biotreatment involved tilling and disking, nutrient addition, and irrigation to optimize microbial action. Microbes use organic contaminants as food sources and degrade these contaminants into non-toxic by-products. Finally, the groundwater will be addressed as a long-term remediation project. Groundwater monitoring will continue to assess the effect of source removal. If groundwater monitoring

shows that contaminants are not degrading or migrating off-site, additional remediation may be required. Removal of gasoline floating on groundwater will take place during the next few years.



*Placing fill in the HazWaste Landfill*

*Areas of former pits and ponds*

*Areas of former waste disposal*



*Non-Hazardous Waste Landfill*

*Hazardous Waste Landfill*

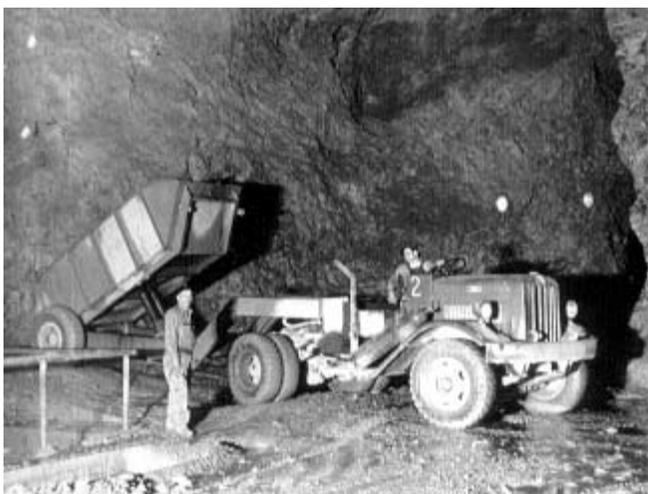
*Water Treatment Plant*

*ORC site showing most of the remedy completed*

## Tar Creek

The Tar Creek Superfund site was the first Oklahoma National Priorities List (NPL) site and one of the first in the nation. It has required a great deal of study, work and resources to understand and to formulate ways to best solve the environmental problems in this area also known as the Tri-State Mining district.

The Tri-State Mining District, centered largely in Northern Ottawa County, was once the world's largest producer of lead and zinc. The mines lured settlers even before Oklahoma was a state, and supported several generations of hard working Oklahomans. By 1970, the ore and its associated prosperity ran out.



*Working Deep Underground*

The mining companies then left Oklahoma, leaving behind a virtual moonscape of chat piles, open mine shafts, subsidences, acid mine water, and wasteland. Tar Creek, a stream located in the heart of the mining district, lent its name to the nation's largest and worst Superfund site.

The ravaged land covers over forty square miles. Subsidences and the potential for more have made large areas uninhabitable. Acid water seeps from the abandoned mines into Tar Creek turning it orange. Open shafts are a common feature of the

landscape. They not only pose an immediate safety hazard for people, livestock, and pets, but they also serve as conduits contaminated mine water with deeper groundwater. The deep aquifer is the drinking water source for northern Ottawa County.

Worse yet, lead, left behind by the mining and smelting operations, is poisoning many of the area's children. This literally robs them of their future by limiting the development of their brains. New research is also beginning to disclose that lead can harm adults as well.



*Subsidence leaves gaping sinkholes*



*Acid mine water flows into creek*



*Cleaning yard of lead contamination*

DEQ's highest priority at Tar Creek is eliminating the public's exposure to lead. Through cooperation with EPA, an extensive program is underway to test residential yards for lead. Where contamination is found, the tainted soil is replaced and the yard is restored. There is exciting documentation that this effort is actually paying off by lowering the levels of lead in the area's children. DEQ is also taking extensive measures to evaluate and protect the area's drinking water in the deep aquifer.

The total solution for restoring the Tri-State Mining District has yet to be determined. Executive Director Mark Coleman has been an integral member of Governor Keating's Tar Creek Task Force, chaired by Secretary of Environment, Brian Griffin. The Task Force



*Acid mine water contaminated pond*



*Sinkholes can be an attractive nuisance and dangerous*

deliberations and final report launched the search for the recovery strategy. DEQ will next be pursuing the complex studies required to assess the possibilities, estimate costs, and provide the information necessary to identify the long-term remedy.

However, we cannot wait for the studies to be completed. We must continue to remove the lead from residential yards and from the interiors of homes. The abandoned mine shafts that pose immediate safety hazards still must be plugged. We must take all steps possible to hasten the removal of the chat piles by increasing their economic value.



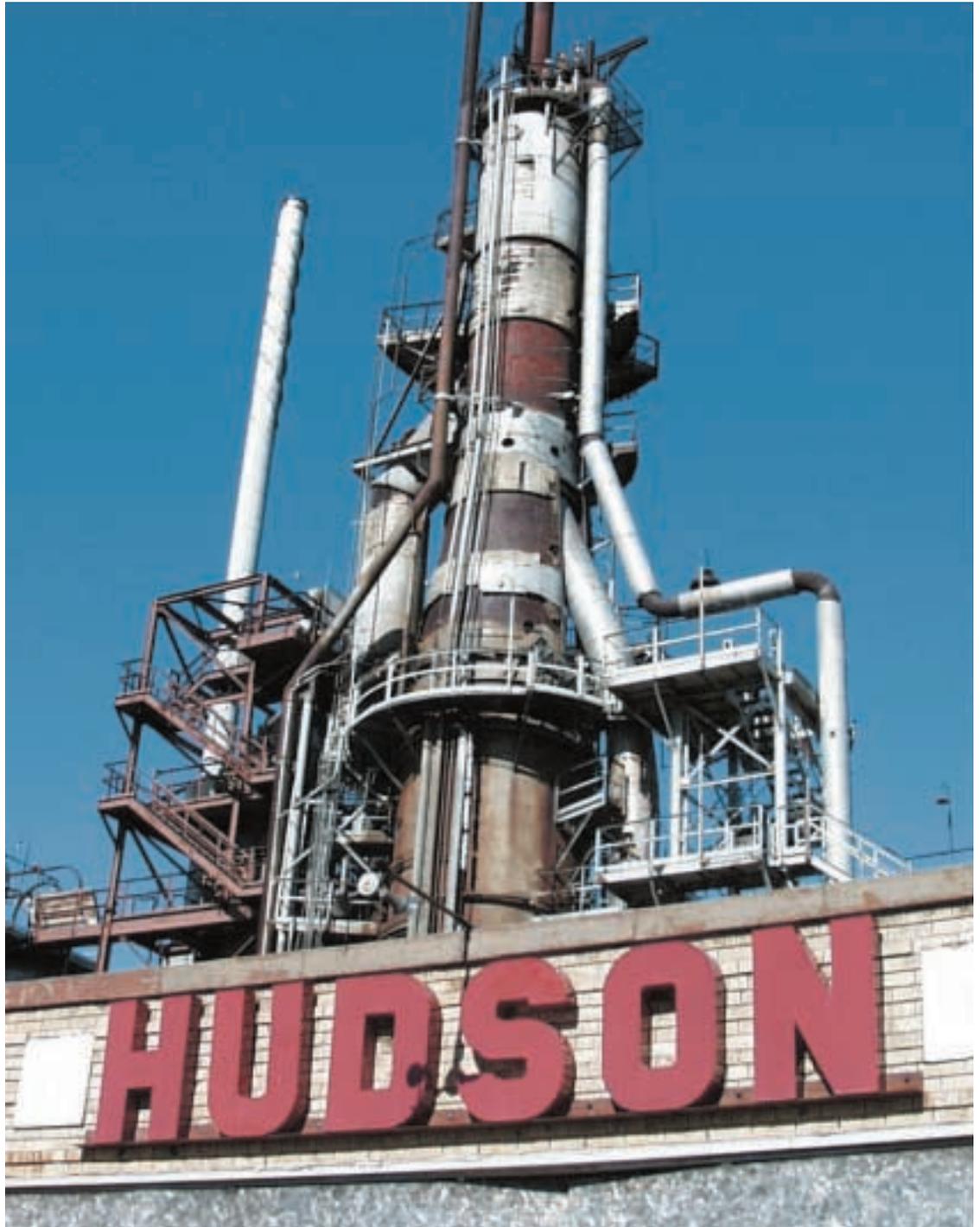
*Large Chat Pile South of Cardin, Ottawa County*

# Two Superfund sites added to National Priority List

The Waste Management Division works within the federal NPL process to identify, evaluate and screen abandoned waste sites for ranking and potential placement on the Superfund (NPL) list. The investigations include limited sampling and extensive research into the past history and potential environmental threat of a site.

When significant threats are found, the site is listed in the Federal Register as a NPL site. The Hudson Refining site and the Imperial Refining Company sites were added to the NPL during fiscal year 2000.

*Pictured are some structures that were left at the Hudson refinery.*



## Hudson Refining

This approximately 200-acre site is a former oil refinery that produced propane gas, gasoline, diesel fuel, fuel oils, and petroleum coke. It operated under various owners from 1922 to 1984. Concerns about the completeness of the clean up arose due to discoveries of oil in tanks on site and the presence of



sludges in areas that had supposedly been cleaned. An expanded investigation of the site conditions led to an emergency removal of hydrofluoric acid and the formal placing of the site on the NPL in July 1999. The Remedial Investigation will begin in FY 2001.



*The abandoned Hudson refinery*

## Imperial Refining

This abandoned 55-acre site is a former crude oil refinery operated under several owners from 1917 to 1934. There are numerous pits, piles, and an on site lake that are contaminated with metals and refining wastes. The site was evaluated and then proposed to be

placed on the NPL in May 2000. The Remedial Investigation work is scheduled to begin later in 2000. The investigations and remedial strategies will focus on determining the amount of the wastes left on site and how best to clean it up and restore the wetlands.



*In these photos are some of the waste commonly found at the Imperial Refining site.*



# Brownfields

The DEQ Brownfields program strives to reduce environmental liability for redevelopers and help communities develop new economic assets. DEQ is a vital partner for Oklahoma businesses who are pursuing voluntary cleanups.

Brownfields are formerly used properties that are difficult to sell or reuse because of the fear of possible environmental contamination and the associated liability. The stigma makes it

difficult to attract prospective purchasers or obtain financing and insurance to redevelop such properties. By participating in the program property owners, developers, prospective purchasers and others can receive either a "Certificate of No Action Necessary" or a "Certificate of Completion." These certificates provide assurance that the site meets the cleanup standards set by DEQ and that the participating parties need not fear future enforcement by DEQ for the issues covered by a certificate.

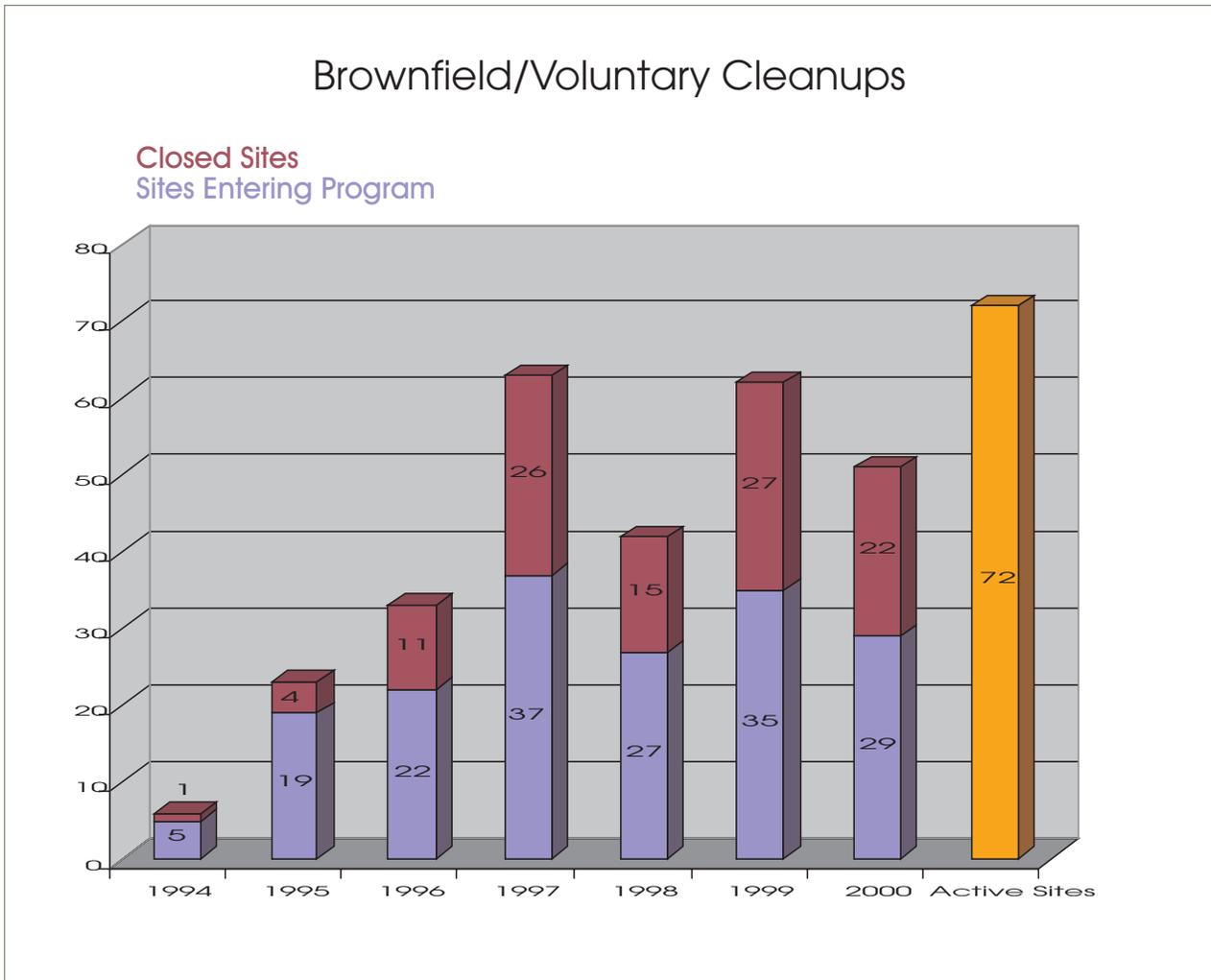


*This FlintCo Building and site are undergoing Brownfield redevelopment.*



# Brownfield/Voluntary Cleanup Statistics

The DEQ began the Brownfield/Voluntary Cleanup Program in 1994. The following chart shows the number of sites in the program for each year since that time.



# Brownfield Example Project

The Quinton Smelter in southeastern McIntosh County operated from 1919 to 1931, producing zinc, cadmium and germanium. Until recently the site was covered with black smelter waste, debris, and old foundations. The waste was considered a source of pollution in the immediate area and the site had been unproductive for 66 years.

The contamination at this site was cleaned up under a Brownfield redevelopment plan through the joint effort of the Quinton School

District, City of Quinton, EPA and DEQ. All the old foundations and waste were consolidated and a soil cap was built over the site.

The site is now ready for construction of a new high school building.



*Old Foundations and debris – Quinton Smelter site*



*The capped site at the end of the clean up*

