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The Oklahoma Department of Environmental Quality is charged with the protection of the land, water and air of the State of Oklahoma. The Land Protection Division uses a number of regulatory and voluntary programs to clean up pollution from historical practices to restore land that has been contaminated. Programs include the 1976 Resource Conservation and Recovery Act (RCRA), the 1980 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or Superfund, the Oklahoma Waste Tire Recycling Act and the Oklahoma Brownfields Act.

The DEQ often provides management and technical assistance for remediation at Department of Defense restoration projects and other sites known as Formerly Used Defense Sites that the U.S. Army Corps of Engineers works on. These include old missile silos and bases. The DEQ also assists with EPA Superfund Removal Actions.

This report highlights land restoration activities at Brownfield/Voluntary Cleanup, Oil and Mining Land Restoration, RCRA Generator Cleanup, Superfund and Waste Tire Programs. There are a number of projects that are not in this report including smaller or short-term projects or projects where negotiations for a consent order are underway. For more information, contact the Land Protection Division.
The Oklahoma Brownfields Voluntary Redevelopment Act was signed into law June 1996. Last year, the federal Small Business Liability Relief Act was passed into law. The federal law clarifies liability under Superfund, expands the universe of eligible sites and provides funding for state and tribal programs. The Oklahoma Brownfields Act creates a voluntary program for the redevelopment and reuse of brownfields (contaminated sites) by limiting the liability of property owners, lenders, lessees and successors from DEQ actions. The Brownfields Program provides legal certification that the property has been cleaned up to a level that is appropriate for the planned reuse. The certification clears the participant and any future owners, lenders, lessees, etc., of the environmental liability associated with historical contamination. It also provides DEQ’s covenant not to sue for environmental problems addressed during the cleanup, and it provides protection from the federal Superfund program. Low interest loans are available for the cleanup of brownfield sites, and new federal legislation provides grants to communities and non-profit organizations for the assessment and cleanup of brownfields. This option is often chosen when the owner wishes to sell the property or when a lender is concerned about its liability. Several very significant sites have been cleaned up under this program. The DEQ also operates an informal voluntary cleanup program for those who do not need or desire the protection provided by the Brownfields Program.

Sites in the Brownfields Program and informal voluntary cleanup program are being addressed through Consent Orders, the instrument used to formalize commitments to address the cleanups. The Consent Orders include reimbursement for DEQ’s oversight costs for voluntary cleanups.
Brownfield/Voluntary Cleanup Sites

Blackwell Zinc Voluntary Cleanup - NPL Deferral
Blackwell, Kay County
DEQ Contact: George Thomas
(405) 702-5126

Status:
Ecological Unit: Completed 1996
Soil Unit: Completed 2001
Groundwater Unit: Remedial Design

The Blackwell Zinc Site was a horizontal-retort smelter that operated from 1916 to 1972. A site investigation in 1991 showed soils contaminated by lead, cadmium and arsenic. The DEQ, Phelps Dodge Corp. and the Blackwell Industrial Authority are parties to a Consent Order to clean up heavy metals contamination associated with the old smelter. The soil cleanup was completed in 2001; however, significant cadmium contamination of groundwater still needs to be addressed.

On August 15, 2003, the DEQ issued a Record of Decision selecting the groundwater remedy. The remedy is to pump contaminated ground water, treat the water to acceptable levels in an onsite treatment plant and discharge the treated water. Phelps Dodge is currently developing an engineering design for the selected remedy.
Claremore Hospital Medical Building Brownfields
Claremore, Rogers County
DEQ Contact:
Jarrett Keck
(405) 702-5121
Status: Investigation

The planned Claremore Regional Hospital Medical Office Building is located on top of a former municipal landfill that operated from approximately 1941 to 1960. Hazards sometimes associated with landfills include methane gas, volatile organic compounds and heavy metals. The site is located adjacent to the Claremore regional hospital and is currently used as a baseball field and temporary storage area. The hospital is building medical offices and hospital parking on the former landfill. The soil and groundwater is currently being evaluated for the presence of contaminants. With plans for engineering controls such as adequate ventilation and methane monitoring, the hospital has begun the early phases of construction as the Brownfields certification process proceeds.

Boynton Refinery Voluntary Cleanup
Boynton, Muskogee County
DEQ Contact:
Scott Stegmann
(405) 702-5118
Status: Site Characterization

This 48-acre site operated as a petroleum refinery from 1917 until it was abandoned in 1933. The refinery produced a variety of oil products including paraffin wax, motor oil, gasoline and kerosene. Waste areas at the site include a large tar pit, several smaller pits containing refinery waste and other assorted waste areas. Marathon Oil, through a Consent Order with the DEQ, has agreed to conduct a Site Characterization of the former refinery. The Site Characterization will further evaluate waste areas and potentially contaminated soil, groundwater and surface water at the site. Once characterization is completed, Marathon will evaluate options for site cleanup and reuse.
Duncan Refinery Voluntary Cleanup

Meridian, Stephens County
DEQ Contact:
Amy Johnson
(405) 702-5133
Status:
Interim Action & Remedial Investigation

This 400-acre inactive refinery, located five miles south of Duncan, operated from the 1920s until 1983. The refinery was never properly closed, leaving many serious environmental problems. These included oil and chemicals seeping into the creek, deteriorating vessels containing a range of waste materials, open unlined waste pits, oily wastewater ponds and significant amounts of badly deteriorated asbestos.

ConocoPhillips, Stephens County and the DEQ signed an agreement in April 2003 to investigate and clean up the site. The DEQ is currently working with ConocoPhillips to mitigate oil and chemical seeps to Clarity Creek. Conoco Phillips has also completed survey of the asbestos remaining at the refinery. Additional interim actions and a more complete investigation of the interior of the site are underway.
Federated Metals
Brownfields
Sand Springs, Tulsa County
DEQ Contact:
Ray Roberts (405) 702-5137
Status:
Remedial Action Completed

The Federated Metals Site was a 30-acre zinc smelter that operated from 1930 until 1989. Slag and smelter debris containing heavy metals littered the site. The smelter was near a kindergarten and soil lead levels exceeded cleanup levels in more than 90 nearby residential yards. Despite its environmental problems, the site was ideally located at the intersection of Highways 97 and 64.

The potential for commercial reuse at this location helped bring about the development of Oklahoma’s Brownfields legislation. Federated Metals, Kucharski Development, the City of Sand Springs, the DEQ, EPA, elected officials and others worked in partnership to facilitate the investigation and remediation of the site. Contaminated soils at the residential properties were excavated and consolidated first. Once the residential work was completed, work began on the smelter site.

The remediation of waste and contaminated soil consolidation and capping is complete. The Cimarron Center Retail development is open. A Walmart Super Center opened at the site in August 2003. The cleanup and redevelopment of this site is a significant Brownfields success story, the site received the USEPA Region 6 Administrator’s Environmental Excellence award for Partnership in 1998.

Grand opening of the new Wal-Mart on the Federated Metals site.
Kerr McGee – Cushing Voluntary Cleanup
Cushing, Payne County
DEQ Contact:
George Thomas
(405) 702-5126
Status: Remedial Action

This 440-acre former oil refinery operated from the early 1900s until 1972. Refinery waste and low-level radioactive material is found at the site. The Nuclear Regulatory Commission is overseeing the radiological decommissioning of the site.

Kerr-McGee has been working with the DEQ since 1990 to conduct the site remediation. Using a “worst first” strategy, five acid sludge pits were neutralized and disposed in onsite landfills. All work on the acid sludge was completed by October 2001. Waste characterization of the soils and ground water across the entire site will begin after radiological decommissioning under the NRC is complete.
National Zinc Voluntary Cleanup
Bartlesville, Washington County
DEQ Contact: Dennis Datin
(405) 702-5125

Status:
Soil Remediation Unit:
Remedial Action
Ecological Unit:
Remedial Action Complete

The Zinc Corporation of America facility (also referred to as National Zinc) has a history of metal processing operations. Historical air emissions and slag material contaminated soils in the surrounding area with lead, cadmium and other heavy metals. Areas within a 3-mile radius of the Zinc Corporation facility, excluding the facility itself, were investigated.

Contaminated soils at residential and commercial/industrial properties were removed, consolidated and capped. The Union Pacific Railroad right-of-way has also been remediated. The SK&O Railroad right-of-way has been investigated in preparation for clean up.

Aquatic ecology was impacted by elevated concentrations of lead, cadmium, zinc, arsenic and selenium in stream sediments. Removal of contaminated sediments from the unnamed tributary was completed in 1998. Once the SK&O right-of-way is cleaned up, the work will be completed on this site. The City will enforce institutional controls to insure the remedy remains protective.

Aerial photograph of National Zinc during cleanup.
OCURA Phase I
Brownfields
Oklahoma City
DEQ Contact:
Dale Johnson
(405) 702-5122
Status:
Phase I, Bricktown Redevelopment Project: Site Investigation

These 21 acres comprise Phase I of the Oklahoma City Urban Renewal Authority’s Bricktown Redevelopment Project. Bound on the north by East Reno, Interstate 40 to the south, the BNSF tracks to the east and Stiles Avenue to the west, development of the area began in the 1890’s with oil and gas related industries, railroad operations, manufacturing, warehousing and retail operations. The Bricktown area sits above the old Oklahoma City oil and gas field and has been in constant commercial use throughout its history. The general area is being redeveloped. Improvements include a baseball stadium, a scenic canal, restaurants, retail businesses, hotel, office space, entertainment facilities and park and recreation areas. No residential facilities are planned for the site. Contaminants in soil and groundwater from past commercial activities are mostly gasoline and diesel. The site has undergone extensive soil and groundwater investigation and soil remediation. Ground water remediation is ongoing at an adjacent property. The Phase I Brownfields Application has been reviewed and approved for administrative completeness. The technical review is ongoing.
**Pure Oil Refinery Voluntary Cleanup**

Ardmore, Carter County
DEQ Contact:
Kendel Posey
(405) 702-5120
Status: Investigation and Interim Remedial Actions

This site is a 70-acre former oil refinery located in the northeast portion of Ardmore, in Carter County. Pure Oil operated the refinery from approximately 1916 until 1936. Union Oil of California acquired Pure Oil Company in 1965. The former refinery consisted of a refining process area surrounded by above ground storage tanks that contained fuel oil, benzene butts, gas oil, refined oils, stripped crude, crude oil and gasoline. Early maps show a pond on the southeast portion of the site, which is still visible today. Two coke piles remain on the southeastern boundary of the property. The company is participating in OK DEQ’s Voluntary Cleanup Program to assess the nature and extent of the contamination and to determine the actions needed to clean up the site.

*Demolishing the stack at the Pure Oil Refinery in Ardmore.*
Additional Brownfield/Voluntary Cleanup Sites

There are numerous other sites undergoing Brownfield/Voluntary cleanups. Additional information is available from the DEQ Contact.

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<thead>
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<th>Site</th>
<th>Location</th>
<th>Contact</th>
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<td>Clinton-Sherman Industrial Airpark</td>
<td>Burns Flat, Washita Co.</td>
<td>Dennis Datin  (405) 702-5125</td>
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<td>Ground water: Remedial Action</td>
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<td>Collinsville Smelter</td>
<td>Collinville, Tulsa Co.</td>
<td>Amy Johnson  (405) 702-5133</td>
<td>Brownfields Proposed Plan</td>
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<td>Coltec</td>
<td>Sallisaw, Sequoyah Co.</td>
<td>Ray Roberts  (405) 702-5137</td>
<td>Voluntary Cleanup Site Assessment</td>
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<tr>
<td>Kerr Glass</td>
<td>Tulsa County</td>
<td>Dennis Datin  (405) 702-5125</td>
<td>Voluntary Cleanup Operation and Maintenance</td>
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<td>Kerr McGee – Cleveland</td>
<td>Cleveland, Pawnee Co.</td>
<td>Ray Roberts  (405) 702-5137</td>
<td>Voluntary Cleanup Feasibility Study</td>
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<td>Kusa Smelter</td>
<td>Dewar, Okmulgee Co.</td>
<td>Scott Stegmann  (405) 702-5118</td>
<td>Voluntary Cleanup Site Characterization</td>
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<td>Okmulgee Refinery</td>
<td>Okmulgee, Okmulgee Co.</td>
<td>Angela Brunsman  (405) 702-5135</td>
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<td>Omni Services</td>
<td>Oklahoma City</td>
<td>Dale Johnson  (405) 702-5122</td>
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<td>Summit Machine Tool</td>
<td>Oklahoma City</td>
<td>Amil Lyon  (405) 702-5140</td>
<td>Brownfields Operation &amp; Maintenance</td>
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<td>Union Pacific Railroad</td>
<td>Kingfisher, Kingfisher Co.</td>
<td>David Cates  (405) 702-5124</td>
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<td>US Zinc</td>
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<td>Scott Stegmann  (405) 702-5118</td>
<td>Voluntary Cleanup Site Characterization</td>
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Brownfield/Voluntary Cleanup Sites Map
Background

Solid waste managers have long been intrigued with the recycling potential of organic materials such as yard waste and paper. These waste products comprise well over fifty percent of the material that is discarded every day. Organic materials can be diverted from disposal and processed into useful soil amendments.

Historically there has been little demand for such soil conditioners. In agriculture, this has been due to a focus on primary plant nutrients rather than soil structure. In conservation, this has been due to a focus on mechanical techniques for controlling erosion. In the emerging field of land restoration, this is due to a lack of understanding about the dynamics of healthy soil.

In 1995, the state legislature sought to unite various technical disciplines through an amendment to the Oklahoma Solid Waste Management Act. New provisions directed the DEQ to work with the Conservation Commission, the Corporation Commission and the Oklahoma Energy Resources Board to use materials recovered from solid waste in projects to restore lands damaged by oil production and mining activities.

The DEQ began this new activity by developing a partnership with the Okmulgee County Conservation District and the Oklahoma Energy Resources Board. The Oklahoma Energy Resources Board was already in the business of restoring lands damaged by historical oil and gas production. This collaboration in Okmulgee County led to a wonderful synergism. The Oklahoma Energy Resources Board coordinated the removal of old oil-field equipment and the installation of any erosion control structures needed, while the Conservation District specialized in restoring the productivity of the damaged soil. The DEQ facilitated the identification and use of organic material. The organic materials that were most easy to recover from solid waste for such projects were sewage sludge and wood chips. The results of applying these materials to damaged lands were very encouraging to everyone involved in the project.

### Oil and Mining Land Restoration Program

DEQ Contact: Fenton Rood (405) 702-5159

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<th>FY 2002</th>
<th>Acres in planning</th>
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<td>Acres treated</td>
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<td>Acres in follow-up</td>
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<td>FY 2003</td>
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<td>Acres treated</td>
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<td></td>
<td>Acres in follow-up</td>
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<td>FY 2004</td>
<td>Acres in planning</td>
<td>610</td>
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Land Restoration

FY 2002

- Acres in planning: 419.5
- Acres treated: 106.5
- Acres in follow-up: 730

FY 2003

- Acres in planning: 684
- Acres treated: 426
- Acres in follow-up: 783.5

FY 2004

- Acres in planning: 610
Land Restoration Sites Map
Eliminating Small Community Blight

Small communities throughout Oklahoma are struggling with the problem of dilapidated structures. Many local governments have been unable to remove this blight due to the high cost of disposal.

The Solid Waste Management Act provides relief by eliminating the need for solid waste permits on projects approved by both the DEQ and the appropriate local conservation district. The projects use suitable portions of the structures to restore and reclaim Oklahoma lands.

The DEQ works with local communities and conservation districts to identify dilapidated buildings, ensure that they are free of toxic hazards and develop a plan for using the demolition material to restore scarred land. For many localities this has sufficiently reduced their costs, making blight removal an affordable enterprise.

List of Upcoming Projects for Land Reclamation 2004

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<tr>
<th>Hugo</th>
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<td>Hollis</td>
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<td>Sallisaw</td>
<td>Miami</td>
<td>Commerce</td>
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<tr>
<td>Forgan</td>
<td>Gage</td>
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Community Assistance Sites
Resource Conservation and Recovery Act (RCRA)

**RCRA**

The 1976 Resource Conservation and Recovery Act (RCRA) was the nation’s first comprehensive hazardous waste management law. It created a regulatory system that governed the treatment, storage and disposal of hazardous waste and has subsequently been delegated to the State by the federal government. RCRA has been amended several times, and for the most part addresses land disposal of hazardous waste and corrective action. Although numerous sites are addressed under RCRA, as the program was implemented, it became apparent that it did not provide a mechanism to address historical hazardous waste sites.

**Chief Supply/Greenway Environmental**

**RCRA Cleanup Site**

Stone Bluff, Wagoner County

DEQ Contact:
Cindy Hailes

(405) 702-5114

Status: Closure

In 1984, Chief Supply Company began operating a RCRA Treatment Storage and Disposal facility under a DEQ permit at this 19-acre site 6 miles northwest of Haskell. A fatal explosion and fire occurred in March 1997. Chief operated the facility until November 1997 when the bankruptcy court awarded Greenway Environmental, Inc., control of the facility. Greenway Environmental, Inc., ceased operations in 2000 when the permit was relinquished and the site was abandoned. As much as 33,000 gallons of hazardous waste remain onsite. Two 20-yard and one 50-yard roll-off containers full of hazardous waste and two fuel tanker trailers remain onsite.
The DEQ has reached an agreement with the insurance company that covered Chief Supply for a one-time $175,000 settlement. The money will be used for waste removal with work starting in early 2004.

Clean Harbors Lone Mountain RCRA Generator Cleanup Site

Major County
DEQ Contact:
Sam Ukpaka
(405) 702-5148
Status: Active Remediation

The Clean Harbors Lone Mountain Facility is a commercial facility which treats, stores and disposes of hazardous and non-hazardous wastes generated in the United States. As a result of wastes generated at the site, mostly landfill leachate, Clean Harbors Lone Mountain is classified as a Large Quantity Generator of hazardous wastes. The Lone Mountain Facility has one source of ground water contamination located in the Cell 5 area. The facility is working to remediate the plume in this area.

The facility is using pump and treat technology to remediate the ground water. It conducts routine monitoring to ensure containment of the contamination. The latest report indicates contamination has not migrated to any of the boundary wells and shows reduction of the area of the dissolved plume since starting the remedy. The various components of the cleanup will continue.

Another disposal cell that contains drum contents is currently being investigated for possible release of volatile organic compounds. The facility has begun investigations to delineate and characterize the contamination.
**Conoco, Ponca City Refinery**

**RCRA Generator Cleanup Site**

Ponca City, Kay County  
DEQ Contact:  
J. David Lawson  
(405) 702-5104  
Status: Operation and Maintenance

The Conoco Ponca City Refinery, located along the southern edge of Ponca City, includes a petroleum refinery, a corporate research and development operation, bulk petroleum storage operations, and a management services organization. This site has been used for petroleum refining since the early 1900s. As a result of past practices, the site has an underground plume of petroleum product and contaminated ground water. RCRA facility investigations identified several areas that needed to be cleaned up.

The refinery is working to contain and recover the underground petroleum product plume and to remediate contaminated ground water using over four hundred ground water monitoring wells and by pumping the hydrocarbons and ground water to the surface. Several years of investigation have resulted in “no further action” findings for many refinery waste units. Recovery and treatment of the hydrocarbon plume and contaminated ground water will continue.

**McAlester Army Ammunition Plant**

**RCRA Generator Cleanup Site**

Pittsburg County  
DEQ Contact:  
J. David Lawson  
(405) 702-5104  
Status: Operation and Maintenance

McAlester Army Ammunition Plant is a Department of Defense ammunition storage facility that was constructed during World War II. It receives, stores and issues ammunition, explosives and other expendable ordnance items for the Department of Defense. In accordance with their RCRA permit, facility investigations have been performed which identified several individual solid waste management units.

Several of the waste units were found to require “no further action” and others were cleaned up by removal of lead and pentachlorophenol contamination. A new solid waste management unit has been identified. Its remediation and continued monitoring will be the focus of future work at the site.

**Moore Document Solutions**

**RCRA Generator Cleanup Site**

Stillwater, Payne County  
DEQ Contact:  
Cindy Hailes  
(405) 702-5114  
Status: Active  
Groundwater Remediation,

Moore Document Solutions manufactured business forms. Dyes and adhesives were manufactured in one building and in May 1992, a perchloroethylene spill occurred. Moore removed a section of concrete flooring and excavated soils; however, ground water was contaminated. After backfilling the excavation, a shallow well was installed to pump accumulated liquid in the backfilled material. Site investigations identified perchloroethylene and its degradation products in the backfilled area and in the ground water down gradient toward Boomer Lake. Moore implemented a ground water, surface water and sediment monitoring program at the facility. A 300-ft. horizontal well was installed to contain the ground water contaminant.
plume. Semi-annual samples of lake water and sediment from Boomer Lake have shown no perchloroethylene or degradation product contamination.

Moore has closed the facility and submitted a closure report to the DEQ. Final cover must be established on the former building site before closure is approved by the DEQ. An Administrative Consent Order between Moore and the DEQ is in place. The company will continue groundwater monitoring and operation of the pump and treat system.

Old Enid Refinery
RCRA Generator Cleanup Site
Enid, Garfield Co.
DEQ Contact:
Bob Welch,
(405) 702-5112
Status: Investigation

The Old Enid Refinery operated between 1916 and the mid-1980s. Ownership changed over the years and the Anadarko Petroleum Corporation now owns the property. Today, most of the area where the refinery once stood is a grassy meadow.

Over the years periodic spills and leakage from the refinery contaminated the soils and groundwater beneath the facility. An oil recovery system removed liquid petroleum from the groundwater for a 10-year period and routine groundwater sampling has been ongoing.

In 2003, the DEQ Land Protection Division reviewed existing data and decided that more investigation was needed to get a “snapshot” of current conditions over a larger area, including offsite properties. In November of 2003, the DEQ and Anadarko cooperated on sampling some 50 monitoring and private water wells in areas to the north and south of the refinery property. Once the data from these samples is evaluated in early 2004, the DEQ will have a more comprehensive picture of groundwater contamination associated with the old refinery. This will enable the DEQ to assist Anadarko to plan additional remedial measures that may be needed in the future.

Sun Company, Inc.
Sunoco R&M
RCRA Generator Cleanup
Tulsa
DEQ Contacts:
Don Hensch
(405) 702-5152
Status: Closure

This refinery, located on the banks of the Arkansas River, has operated since 1913. The site covers over 800 acres, operates 24 hours a day, and employs approximately 700 people. The refinery is an integrated complex with a crude oil capacity of 90,000 barrels per day. Crude oil is refined into a variety of petroleum products. The bulk of the hazardous waste that is generated is managed in the wastewater treatment process. The refinery also generates tank bottoms and some solvent wastes in the maintenance and electrical shops.

Sun has worked under DEQ permits to use land treatment for the onsite disposal of both hazardous and non-hazardous wastes. Sunoco has an extensive free phase hydrocarbon plume on the ground water below the facility. Additional information on ground water has been submitted and is under review by the DEQ. Sunoco has performed several focused investigations on older disposal areas and is cleaning up these older disposal sites to formally close them. This work is planned to continue through 2006. The DEQ is currently in the process of reviewing the status of a Sun Permit Renewal Application.
Thomason Lumber and Timber Company, Inc RCRA Generator Cleanup Site

Broken Bow, McCurtain County DEQ Contact:
Cindy Hailes
(405) 702-5114
Status: Post Closure, Compliance Monitoring

This facility was a wood preserving operation that used creosote and pentachlorophenol to preserve wood products. Sludge from wastewater treatment was disposed in a series of surface impoundments. In 1985, two of these interim status surface impoundments were closed in place as landfills. Post-Closure maintenance activities required by the closure permit include ground water monitoring for a thirty-year period. The owner of Thomason abandoned the property in 1999. Another company, Oklahoma Pole and Lumber Company, took title and responsibility for the property. It also abandoned the property but retained the deed. The required monitoring and maintenance is not taking place.

American State Bank in Broken Bow is seeking new buyers for the property. The DEQ is working with the Oklahoma Pole and Lumber Company and the bank to conduct an investigation of the site.

Tinker Air Force Base RCRA Program

Oklahoma City, Midwest City & Del City DEQ Contacts:
Robert Replogle
(405) 702 5131
Status: Investigation and Cleanup

Tinker Air Force Base has completed most of the requirements of a RCRA Facility Investigation. The soil cleanup is complete, and a separate investigation of ground water under the entire facility is taking place. Several waste management units including underground storage tanks, waste storage areas, old dump sites, fire training areas and former maintenance facilities have been cleaned up. All of the Base landfills have been closed and covered with interim or final caps. A complex groundwater recovery system in the southwest quadrant of the base impedes the movement of contaminated groundwater.

In response to the discovery of contaminated groundwater offsite in November 2000, Tinker initiated a plan to provide residents of a neighborhood to the southwest with connections to public water. An extensive investigation of the groundwater is ongoing. An interceptor trench will be constructed in 2004 at an off-base location near 59th Street and Douglas to prohibit migration of contaminated groundwater to neighboring groundwater wells. Completion of the RCRA Facility Inspection is anticipated in 2004.

Vance Air Force Base RCRA Corrective Action

Enid, Garfield County DEQ Contact:
Bob Welch (405) 702-5112
Status: RFI approved

Vance Air Force Base opened in 1941 as a flying school. Over the years Vance has had multiple releases of solvents used in maintenance operations. There were also releases of fuel used for airplanes and other vehicles. The main contaminants of concern are trichloroethene and methylethel ketone released from leaking underground storage tanks. These chemicals contaminated ground water. In August of 1996 Vance was
issued a permit for two sites which mandated general clean up actions on the base. After the permit was issued it was discovered that a plume of contaminated ground water had migrated off base to the north. The city of Enid bought the adjoining land and deeded it to Vance Air Force Base so that the ground water contamination would be within the boundaries of the base. A facility-wide investigation was conducted and interim actions taken to address contamination. Corrective Measures in the industrial zone are being implemented and ground water monitoring continues.

**Wynnewood Refining Company**

**RCRA Corrective Action**

Wynnewood, Garvin County  
DEQ Contact: Hillary Young  
(405) 702-5106  
Status: Deferred RFI

The Wynnewood Refinery was originally constructed in 1923 by the Texas Pacific Company. In November 1950, after changing hands a number of times, the refinery began operating under Kerr-McGee ownership. In 1995, Kerr-McGee sold the facility to Gary Williams Energy Corporation of Denver, and the facility is operated under the name of Wynnewood Refining Company. The Wynnewood refinery currently processes approximately 47,000 barrels of Oklahoma sweet crude oil daily, primarily producing gasoline, diesel and fuel oils. An EPA facility-wide investigation identified some areas of contamination which were subsequently removed. After it was determined to pose no future threat to human health or the environment, a closed land treatment unit was dropped from the RCRA post-closure care permit in 1997. Currently, two RCRA permits exist for this facility: one for operation of a hazardous waste storage tank, and one for post-closure care of a surface impoundment. Further elements of the RCRA Facility Investigation have been deferred until remediation of a free-product plume on ground water beneath the facility has been completed. Post-closure detection monitoring continues for the surface impoundment.

**Zinc Corporation of America**

**RCRA Generator Cleanup Site**

Bartlesville, Washington County  
DEQ Contact: J. David Lawson  
(405) 702-5104  
Status: Active Remediation

The Zinc Corporation of America operated a zinc refinery in Bartlesville producing various metals from the refining of zinc concentrates and zinc rich materials. After July 18, 1991, wastes generated from the refining and processing activities conducted at the facility were subject to regulation under RCRA. The facility has been operating under DEQ permits since that time. One permit allowed for use of an onsite landfill to dispose of wastes generated at the facility. Historical operations resulted in areas that required cleanup. The facility has completed cleanup activities. The facility will submit an engineer certification that the closure actions were performed according to plans submitted to the DEQ. The DEQ will issue a draft post-closure permit for public review and comment.
### Additional RCRA Generator Cleanup Sites

There are numerous other sites undergoing generator cleanups. Additional information is available from the DEQ Contact.

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Contact</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Force Plant No. 3</td>
<td>Tulsa</td>
<td>Robert Replogle (405) 702-5147</td>
<td>Closure</td>
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<tr>
<td>Allied Materials Corp.</td>
<td>Stroud, Lincoln Co.</td>
<td>Hillary Young (405) 702-5106</td>
<td>Post-Closure Maintenance</td>
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<tr>
<td>American Airlines Maintenance &amp; Engineering Center</td>
<td>Tulsa</td>
<td>Don Hensch (405) 702-5152</td>
<td>Operation and Maintenance</td>
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<tr>
<td>Cavenham Forest Industries, Inc. (CFI formerly Crown-Zellerbach)</td>
<td>Sallisaw, Sequoyah Co.</td>
<td>Askari Zaidi (405) 702-5145</td>
<td>Monitoring</td>
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<tr>
<td>Centrilift</td>
<td>Claremore, Rogers Co.</td>
<td>Askari Zaidi (405) 702-5145</td>
<td>Operation and Maintenance</td>
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<tr>
<td>Chemical Products Development Corp.</td>
<td>Oklahoma City</td>
<td>Sam Ukpaka (405) 702 5148</td>
<td>Operation &amp; Maintenance</td>
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<tr>
<td>Chevron Gas Plants</td>
<td>Ada, Alva &amp; Woodward</td>
<td>Askari Zaidi (405) 702-5145</td>
<td>Closure</td>
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<tr>
<td>Crosby Group Inc.,</td>
<td>Tulsa</td>
<td>Sam Ukpaka (405) 702-5148</td>
<td>Operation and Maintenance</td>
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<tr>
<td>McKissick Products Div. Dowell-Schlumberger</td>
<td>El Reno, Canadian Co.</td>
<td>Bob Welch (405) 702-5112</td>
<td>Operation and Maintenance</td>
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<td>El Reno Federal</td>
<td>Canadian County</td>
<td>Bob Welch (405) 702-5112</td>
<td>Monitoring</td>
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<td>Correctional Institution</td>
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<tr>
<td>Exxon Chemical</td>
<td>Ada, Pontotoc Co.</td>
<td>Askari Zaidi (405) 702-5145</td>
<td>Monitoring</td>
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<tr>
<td>Eagle-Picher EOM</td>
<td>Quapaw, Ottawa Co.</td>
<td>Askari Zaidi (405) 702-514</td>
<td>Monitoring</td>
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<tr>
<td>Flex-N-Gate</td>
<td>Ada, Pontotoc Co.</td>
<td>Hillary Young (405) 702-5106</td>
<td>Operation and Maintenance</td>
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<td>Halliburton Industrial Services Osage Road Facility</td>
<td>Duncan, Stephens Co.</td>
<td>Bob Welch (405) 702-5112</td>
<td>Operation and Maintenance</td>
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<tr>
<td>Kwikset</td>
<td>Bristow, Creek Co</td>
<td>Hillary Young (405) 702-5106</td>
<td>Preliminary Investigations</td>
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<tr>
<td>Lucent Technologies-Celestica, Inc.</td>
<td>Oklahoma City</td>
<td>Cindy Hailes (405) 702-5114</td>
<td>Interim Corrective Measure</td>
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<tr>
<td>Madewell &amp; Madewell</td>
<td>Jones, Oklahoma Co</td>
<td>Sam Ukpaka (405) 702 5148</td>
<td>Closure</td>
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<tr>
<td>Madewell Metals, Inc. (SES Land Corporation)</td>
<td>Muskogee, Muskogee Co.</td>
<td>Sam Ukpaka (405) 702-5148</td>
<td>Closure</td>
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<tr>
<td>Mixon Brothers Wood Preserving, Inc.</td>
<td>Idabel, McCurtain Co</td>
<td>Cindy Hailes (405) 702-5114</td>
<td>Post Closure</td>
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<tr>
<td>Newcastle Land Company</td>
<td>McClain County</td>
<td>Askari Zaidi (405) 702-5145</td>
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<td>Norris/O’Bannon Electroplating</td>
<td>Tulsa</td>
<td>Bob Welch, (405) 702-5112</td>
<td>Monitoring</td>
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<tr>
<td>Ozark Fluorine Specialties Waste Water Plant</td>
<td>Tulsa</td>
<td>Askari Zaidi (405) 702 5145</td>
<td>Investigation and Design</td>
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<tr>
<td>Phillips Research Center</td>
<td>Bartlesville, Osage Co.</td>
<td>J. David Lawson, (405) 702-5104</td>
<td>Operation and Maintenance</td>
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<tr>
<td>Samson Resources/Global Compression</td>
<td>Yukon, Canadian Co.</td>
<td>Bob Welch (405) 702 5112</td>
<td>Remediation</td>
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<tr>
<td>Seagate Technology</td>
<td>Oklahoma City, Canadian Co</td>
<td>Askari Zaidi (405) 702-5145</td>
<td>Monitoring</td>
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<tr>
<td>Union Pacific Resources Land Treatment Unit</td>
<td>Enid, Garfield Co.</td>
<td>Hillary Young (405) 702-5106</td>
<td>Preliminary Investigations</td>
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<td>Unit Parts</td>
<td>Oklahoma City</td>
<td>Bob Welch (405) 702 5112</td>
<td>Investigation</td>
</tr>
<tr>
<td>Xerox Corporation</td>
<td>Oklahoma City</td>
<td>Bob Welch (405) 702 5112</td>
<td>Remediation</td>
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Resource Conservation and Recovery Act (RCRA) Sites
National Priorities List (NPL) - Superfund

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or Superfund, was enacted in 1980. It created a large-scale national program to identify and clean up sites contaminated from previous hazardous waste management practices. This effort is known as Superfund because CERCLA established a national trust fund to pay for cleanup at sites whose owners were no longer available or financially solvent. CERCLA also established a mechanism to recover cleanup costs from potentially responsible parties (PRPs). The Superfund Amendments and Reauthorization Act (SARA) amended CERCLA in 1986. Thirteen sites in Oklahoma are on EPA’s national priorities list (NPL). Sites on the national priorities list are often referred to as Superfund sites. The DEQ is the designated lead agency for remediation activities on five of these Superfund sites.
Double Eagle Refinery
NPL-Superfund
Oklahoma City
DEQ Contacts:
Amy Johnson
(405) 702-5133,
Dennis Datin
(405) 702-5125

Status:
Source Control:
Remedial Action complete
Groundwater:
Remedial Action ongoing

This 12-acre facility collected, stored and re-refined used oils to be sold as recycled oil from 1929 through 1980. The facility is located adjacent to the Fourth Street Refinery Superfund Site. Waste materials left onsite consisted of the abandoned refinery infrastructure and acidic tar that was high in lead.

Chlorinated solvents, hydrocarbons and metals including lead and arsenic from the refining operations contaminated the underlying alluvial aquifer and the shallow Garber-Wellington aquifer. Cleanup efforts focused on removal of the treated waste to an offsite landfill. The excavated areas were then filled in with clean soil, and the site was vegetated. Because the waste was excavated and the surface area was cleaned up, no ongoing operation and maintenance is required. Initiatives to allow redevelopment of the site are underway by state, federal and local governments.

The ground water incorporates both the Double Eagle and Fourth Street Superfund sites since they are adjacent and share similar ground water problems including brine contamination, volatile organics and chlorinated solvents. Thirteen Garber-Wellington Aquifer monitoring wells were tested on a quarterly basis for 5 years to establish the contamination background. These wells are now monitored on a semi-annual basis. EPA’s latest review of the site showed that the remedy continues to be protective and effective.
Fourth Street Refinery
NPL-Superfund
Oklahoma City
DEQ Contacts:
Amy Johnson
(405) 702-5133,
Dennis Datin
(405) 702-5125

Status:
Source Control: Remedial Action Complete
Groundwater: Remedial Action ongoing

During the early 1940s until the early 1970s, this facility collected, stored and recycled used oils much like the operations at the adjacent Double Eagle Refinery Superfund site. Tank bottoms and sludge were disposed of onsite. Chlorinated solvents, hydrocarbons and metals, including lead and arsenic from the refining operations, contaminated the underlying alluvial and shallow Garber-Wellington aquifers.

Cleanup efforts focused on the sludge pits and groundwater.

The remedy for the sludge pits consisted of neutralization and stabilization of acidic sludge, removal of the treated waste to an offsite landfill, filling in the excavated areas with clean soil and vegetating the site. This was accomplished by 1999. Since the waste was removed and the surface area was cleaned up, no operation and maintenance is required. Initiatives to allow redevelopment of the area are underway by state, federal and local governments.

The ground water phase of the cleanup incorporates both the Double Eagle and Fourth Street Superfund sites because they are adjacent and share similar ground water problems. Thirteen Garber-Wellington Aquifer monitoring wells were tested on a quarterly basis for 5 years to establish the contamination background. These wells are now monitored on a semiannual basis. EPA’s latest review of the site showed that the remedy continues to be protective and effective.
Hudson Refining
NPL Site - Superfund
Cushing, Payne County
DEQ Contact:
Amy Johnson
(405) 702-5133
Status: RI/FS Planning

The 200-acre Hudson Oil Refining Company was active from 1922 to 1982. Hudson produced liquid propane gas, gasoline, diesel fuel, fuel oils, and coke. Highway 33 divides the site into north and south sections. The refinery was not properly closed and various chemicals were left onsite including 6,000 gallons of anhydrous hydrofluoric acid. EPA initiated an emergency response action at the site to remove an abandoned laboratory, various chemicals and asbestos. The DEQ and EPA coordinated closely during the removal action including a partial evacuation of the City of Cushing during the acid removal. The site received the USEPA Region 6 Administrator’s Strategic Alliance Award in 2003.

USEPA has removed the dangerous chemicals and demolished and removed refinery buildings and structures on both the north and south portions of the site.

The DEQ will investigate remaining contamination beginning in late 2003. The focus is to determine the nature and extent of remaining contamination in the soil, surface water and groundwater and propose actions for remediation.

The Cat Cracker was the last structure of the old Hudson refinery to come down.
The Imperial Refining Company is an 80-acre abandoned former crude oil refinery located on both sides of State Highway 142 in east Ardmore. Imperial operated from 1917 until 1924. All tanks and storage equipment were dismantled by 1948. Numerous waste pits, waste piles and water impoundments contaminated with metals and refining wastes remain and have impacted an adjacent wetland. The site was listed on the National Priorities List (Superfund) in July 2000.

The EPA, Agency for Toxic Substances and Disease Registry, U.S. Fish & Wildlife and the DEQ are working together to develop plans for an investigation and feasibility study. This work will be led by DEQ. The DEQ is in the process of procuring a consultant to perform the investigation and feasibility study. Work should start in mid-year of 2004.
Oklahoma Refining Company (ORC)  
NPL Site - Superfund

Cyril, Caddo County
DEQ Contact ORC South
Angela Brunsman
(405) 702-5135
DEQ Contact ORC North: Ray Roberts (405) 702-5137

ORC South
Status: Remedial Action

ORC North
Status: Emergency Removal

ORC is a 220-acre abandoned oil refinery that operated from 1908 to 1984. Petroleum related contamination of soil, sediment and shallow groundwater occurred from leaking tanks, product lines, pits and impoundments.

ORC South:
Initial investigations resulted in placing the site on the National Priorities List in February 1990. The remedy, completed in 2002, included bioremediation, in-situ stabilization, neutralization and disposal in onsite landfills. The groundwater remedy was postponed until the source remedial action was complete. DEQ and EPA are evaluating the next steps for groundwater monitoring and remediation.
ORC North:

Until September 2002, the north portion of the ORC refinery was considered an “active” facility and was regulated under the RCRA. RCRA referred the site to Superfund. Numerous drums of unknown chemicals were improperly stored. An abandoned laboratory with numerous chemicals remained onsite. Tanks were leaking unknown contents. Deteriorated asbestos hung from vessels and littered the ground. The DEQ requested assistance from EPA’s removal section to address the immediate problems. The DEQ and EPA determined that the refinery presented an imminent threat to the health and safety of the community. EPA’s removal section is currently conducting an Emergency Response at the site. Significant cleanup has been accomplished this year. The Emergency Removal has already removed the laboratory chemicals and the drums at the facility. The site is now fenced and secured. EPA is assessing the refinery superstructure and tank farm for possible asbestos abatement and demolition. The DEQ and EPA will continue to work closely together on this project.
Tar Creek
NPL - Superfund

Ottawa County
DEQ Contacts:
David Cates
(405) 702-5124,
Dennis Datin
(405) 702-5125

Status:
Groundwater and Tar Creek
Surface Water Operable
Unit 1:
Operation and Maintenance
Residential Property Operable
Unit 2:
Remedial Action
Drum Removal in Cardin
Operable Unit 3:
Complete
Nonresidential (chat piles,
millponds, ecological, etc.)
Operable Unit 4:
RI/FS

The Tar Creek site is a
former mining area that takes
up forty square miles in far
northeastern Oklahoma.
Heavy metals contamination
affects the towns of Quapaw,
Commerce, Picher, Miami,
North Miami, and Cardin.
Extensive lead and zinc mining
during the early 1900s through
the 1960s resulted in the
formation of acid mine water
that has contaminated shallow
groundwater and surface water
with iron, sulfate, zinc, lead, and
cadmium throughout the Tar
Creek area. Mining wastes on
the land surface (chat) and the
former flotation ponds contain
elevated levels of lead, cad-
mium and zinc and have re-
sulted in elevated levels of lead
in children’s blood.

Groundwater and Tar
Creek Surface Water
Operable Unit 1:
Remedial action began in
1986 with diversion diking for
Tar Creek and plugging
groundwater wells. The diver-
sion dike did not eliminate flow
of acidic waters from the
mines. Well plugging and
monitoring of the Roubidoux
aquifer continues.

The Tar Creek Area
Sinkhole after reclamation from approximately the same location as the Before picture.

Sinkhole before reclamation, looking South.

**Residential Property Operable Unit 2:**

Removal of contaminated residential soil began in 1997 by the EPA. Residential soils with lead concentrations above the 499 mg/kg cleanup level is excavated and removed. To date, 1,983 properties have been cleaned up.

**Drum Removal in Cardin Operable Unit 3:**

The drum removal is complete.

**Nonresidential (chat piles, millponds, ecological, etc.) Operable Unit 4:**

EPA is working with potentially responsible parties to develop a Remedial Investigation and Feasibility Study for mining waste outside the residential areas.

A pilot land restoration project was completed at year-end on a 50-acre area that contained chat, subsidences and mine shafts. The project cleared the chat, filled in the sinkholes and subsidences and revegetated the area. Other restoration projects are planned in perimeter areas as funding becomes available.
Tinker Air Force Base
NPL Site - Superfund
Oklahoma City, Del City, Midwest City
DEQ Contacts:
Hal Cantwell
(405) 702-5139,
Robert Replogle
(405) 702-5131

Status:
Building 3001 Operable Unit:
Remedial Action
Soldier Creek Surface Water Remedial Action
& Sediments Operable Unit:
Soldier Creek IWTP RI/FS, Proposed Plan
Groundwater Operable Unit:

This aircraft maintenance and rebuilding facility has a long history of industrial use and groundwater contamination. Organic solvents and chromium have contaminated the Garber-Wellington Aquifer. Cleanup is focused on three operable units: Building 3001, Soldier Creek Surface Water and Sediments and Soldier Creek/Industrial Waste Treatment Plant Groundwater.

Building 3001 Operable Unit:
A groundwater remediation project started in 1990 using a pump and treat system for contaminated groundwater. The DEQ recently approved a Tinker Air Force Base proposal to suspend the pump and treat operations for one year to study its effectiveness and to investigate additional remedial alternatives. This shut down period will allow the aquifers to recharge so Tinker and The DEQ can re-evaluate the aquifers in a static state. If any evidence of migration occurs during this temporary shutdown, Tinker will immediately restart the pump and treat operation.

Soldier Creek Surface Water & Sediments Operable Unit:
The 1993 Remedial Investigation and Feasibility Study Risk Assessment for Soldier Creek showed that water and sediment contamination levels were below concern for human health risks. The remedy requires periodic monitoring of water in the creek and its sediments. The monitoring of the creek will continue for a number of years. The DEQ recently approved a five-year review that showed the selected remedy has adequately maintained protection of human health and the environment.

Soldier Creek /IWTP Groundwater Operable Unit:
The DEQ,Tinker Air Force Base and EPA are working closely to select a remedy to address metals and organic chemicals contamination in groundwater beneath the northeast quadrant of the Base. The proposed remedy should be chosen in 2004.
**Tulsa Fuel & Manufacturing**

**NPL - Superfund**

Collinsville, Tulsa County  
DEQ Contact:  
George Thomas  
(405) 702-5126  
Status: RI/FS  
Planning & Procurement

This 50-acre former horizontal retort zinc smelter operated from 1914 until 1925. In September 1994 the DEQ conducted a site inspection, and in May 1999, EPA completed a removal assessment. These investigations determined arsenic, cadmium, lead and zinc were contaminants of concern at the site. The site was placed on the National Priorities List in 1999. The DEQ will direct the investigation of the site and is in the process of procuring a contractor to conduct the investigation and feasibility study.

### Additional Superfund Sites

Other sites in the NPL – Superfund program. Additional information is available from the DEQ Contact.

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<th>Site</th>
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<th>Contact</th>
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<td>Compass Industries Landfill</td>
<td>Berryhill, Tulsa Co.</td>
<td>Hal Cantwell (405) 702-5139</td>
<td>Operation &amp; Maintenance</td>
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<td>Hardage/Criner</td>
<td>McClain Co.</td>
<td>Hal Cantwell (405) 702-5139</td>
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<td>Mosley Road Landfill</td>
<td>Oklahoma City</td>
<td>Dennis Datin (405) 702-5125</td>
<td>Remedial Action</td>
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<td>Rab Valley Lumber EPA Removal/AOC</td>
<td>Panama, LeFlore Co.</td>
<td>Karen Khalafian (405) 702-5122</td>
<td>Feasibility Study</td>
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<td>Sand Springs Petrochemical Complex</td>
<td>Sand Springs, Tulsa Co.</td>
<td>Dennis Datin (405) 702-5125</td>
<td>Operation &amp; Maintenance</td>
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<td>Tenth Street</td>
<td>Oklahoma City</td>
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National Priorities List (NPL) – Superfund
The Oklahoma Waste Tire Recycling Act was created in 1989 to clean up historical tire dumps and to prevent further illegal dumping by providing a monetary incentive to promote proper disposal. On average, Oklahoma generates about one waste tire per person per year. Tires are not ideal for landfill operations because they do not compact well and are prone to vermin infestation and fires. Tire fires release toxic gases and oil. Tires do, however, lend themselves to recycling because there is a retrievable value in waste tires. But, despite recycling options, illegal dumping continues.

Oklahoma waste tire dumps fall into two categories. The first category includes dumps that meet statutory requirements for placement on the Priority Clean up List (PCL). The second category is waste tire dumps are exempted under the Act. Property owners with approved PCL tire dumps receive free remediation by permitted waste tire processors or river erosion entities. In order to qualify for the PCL, a tire dump must not have existed when the owner took possession of the property. In addition, an affidavit must be signed stating the illegal tire dump was created without the consent of or benefit to the owner of the property. Waste tire dumps that do not meet the statutory requirements for placement on the PCL are remediated though enforcement actions.

Waste tire facilities meeting the requirements of the Act are eligible to receive compensation from the Waste Tire Recycling Indemnity Fund. The Fund consists of monies received from waste tire recycling fees and any moneys received from gifts, grants, reimbursements and accumulated interest. For processing whole tires, waste tire facilities are eligible for reimbursement at the rate of $49 per ton of processed tire material. As an added incentive, waste tire facilities are entitled to an additional $48 per ton (of processed tire material) if they engage in the statewide collection of waste tires. In order to qualify for compensation, waste tire facilities must demonstrate that over the life of the facility at least 10% of the tires processed were collected from tire dumps on the PCL or Department approved community-wide clean up events.

River Erosion entities that have obtained a permit or other authorization from the United States Army Corps of Engineers or a local Conservation District and meet the requirements of the Act are also eligible to receive compensation from the Fund. In order to qualify for compensation, the legal entity must demonstrate that all of the tires processed were collected from tire dumps on the PCL or Department approved community-wide clean up events. Tires from these sites are reimbursable at a rate of $2.80 per tire for tires with a rim diameter over 17 ½ inches and $0.50 per tire for tires with a rim diameter of 17 ½ inches or less.
Sites Cleaned Up

In 2002 (most recent year with complete data), remediation work at 58 PCL dump sites was under way. Remediation efforts resulted in removing 268,157 waste tires from PCL sites and the clean up of 38 PCL sites. Sixty-three community-wide clean up events were held resulting in the removal of 51,634 waste tires.

Tire dump and community-wide cleanup information through September 2003:

- Number of tire dumps being cleaned up: 31 dumps
- Number of tires cleaned up from those 31 dumps: 218,760 waste tires
- Number of dumps completely cleaned up January – September, 2003: 6 dumps
- Number of Community-wide cleanup events: 46 cleanup events
- Number of tires cleaned up from these cleanup events: 62,990 waste tires
Waste Tires Map
Location of tire clean up activity in 2003