JANUARY 1984

OKLAHOMA water news

MONTHLY NEWSLETTER OF THE OKLAHOMA WATER RESOURCES BOARD

State Will Request $4 Million for Tar Creek Pollution Cleanup

Price tags seldom go down in these times, but rather grow to accommodate inflation. Not so on the proposed cleanup in the Tar Creek-Picher Mining District of northeastern Oklahoma. That price tag dropped a whopping $30 million as a result of careful, well thought-out studies sponsored by the Tar Creek Task Force. Estimates made in 1981, when "Tar Creek" was whispered in the same hush as "Love Canal" and ranked at the top of the nation's 114 hazardous waste sites, suggested cleanup costs of $35 million or more.

On January 9, Gov. Nigh, members of the Tar Creek Task Force and the press heard Technical Subcommittee Chairman Ron Jarman describe a five-point remedy which effectively would abate pollution of area waters. The plan would cost about $3.9 million — 90 percent of that to be borne by the EPA Superfund and 10 percent by the state. The Superfund administered by the Environmental Protection Agency was created specifically to finance cleanup of the nation's hazardous waste sites. It was suggested that the state's share could be paid from the water development fund administered by the Oklahoma Water Resources Board, a source of cost-sharing funds for state-approved, federally funded water projects.

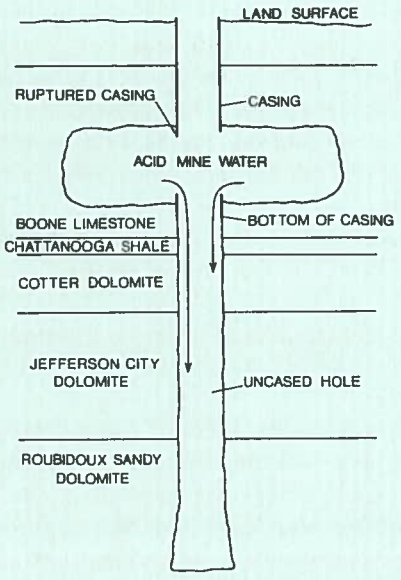
"Careful studies provided the information to make the recommendations," said Jarman. "Had the Task Force sought a 'quick-fix' for the Tar Creek pollution, the people and the environment of the area might have suffered irreparable harm, or the state could have spent huge sums on 'cures' that would not have protected the people."

The recommendations were based on studies conducted by three subcommittees within the Task Force — one evaluating health effects; another environmental effects, and the third, the Technical Subcommittee, measuring the impacts on area water supplies. A fourth committee evaluated potential economic effects.

The first and most important determination was that the pollution can be contained so that it will not endanger the lives of area residents. The acid mine water can be dealt with and the problem solved at a cost figure a fraction of early estimates.

The Task Force, co-chaired by Jarman, Ed Pugh of the governor's staff and Ron Coker of a Miami citizens'

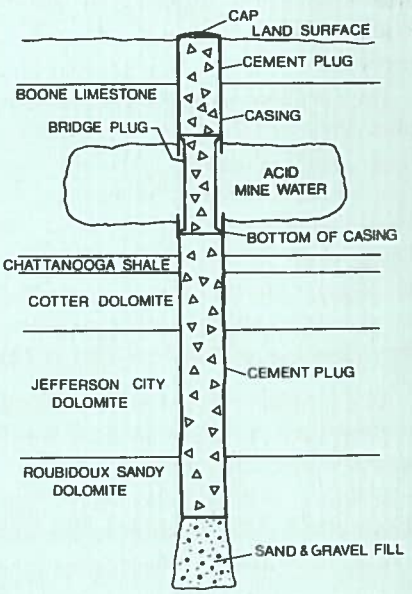
Continued on page 2



The ruptured casing of an abandoned well allows surface runoff and contaminated waters from the mine workings in the Boone Formation to migrate downward to the Roubidoux aquifer, a water supply for much of northeastern Oklahoma.

To seal the abandoned well from further contamination by surface runoff and acid mine waters, an acid-resistant cement plug is poured from bottom to top, and a bridge plug set in place to prevent mine waters from entering the hole.

PREPARED BY OKLAHOMA WATER RESOURCES BOARD



$4 Million, continued from page 1

group, concluded that the abandoned lead and zinc mines contain about 76,000 acre-feet of water — roughly the equivalent to the water in Lake Hefner in central Oklahoma or Lake Eucha in the northeast. Jarman pointed out that if the polluted water were left to natural processes, it would take 60 to 100 years for the mines to flush out — that is, for somewhat clean water to replace the heavily contaminated mine water.

A slide show prepared by the water resources board set out the five points the Technical Subcommittee recommends as remedies to the pollution:

— plugging and sealing deep wells
— diverting surface inflows
— monitoring Roubidoux wells
— treating reduced mine flows
— developing water supply alternatives

The first recommendation calls for plugging 66 abandoned water wells — 40 in Oklahoma and 26 in Kansas. The abandoned wells drilled into the Roubidoux formation — many with ruptured casings — potentially offer passage of contaminated mine water and surface flows directly into the aquifer that is a major source of drinking water for northeastern Oklahoma.

Total cost of the well plugging strategy is $1,951,000 with 10 percent, or $195,190, to be provided by the state.

The second recommendation calls for the diversion of surface runoff away from mine shafts and subsidences which carry it into the mine workings. Eighteen such inflows were located by water resources board staff. Two sites in Kansas were identified as contributing more than 70 percent of the total inflow. Findings of the Technical Subcommittee of the Task Force also concluded that each of the remaining inflow sites contributes less than one percent.

Diking and diversion structures would cost $2 million, with a state contribution of $200,000.

A sampling program would continue to monitor water quality in the Roubidoux wells, checking for traces of contamination. Meanwhile, the OWRB and the U.S. Army Corps of Engineers will have developed plans for alternate water supplies, in the event that wells in the Roubidoux show signs of pollution sometime in the future.

Jarman also proposed as part of a much longer-range plan the construction of a treatment plant, in the event that well plugging and diversion strategies fail to reduce significantly the amount of acid mine water. This might be years down the line — perhaps never — but the Task Force will have a contingency plan ready. A small package treatment plant would pump the remaining mine waters to the surface, purify them, then discharge the harmless water into area streams.

The Health Effects Subcommittee, concluded that:
—there are no adverse health effects as long as mine water is not consumed,
—properly treated waters of the Neosho River, Spring River and Grand Lake are safe to drink,
—the air in the mining region is safe to breathe,
—water supplies currently provided to cities, towns and rural water districts by wells in the Roubidoux aquifer are safe to drink.

The Environmental Effects Committee studied the effects of the mine water discharges on the environment of the Grand Lake System and reached these conclusions:
—the aquatic life in much of Tar Creek has been destroyed,
—however, the effects on the fish community diminish greatly, once the waters enter the Neosho River,
—only a small portion of the heavy metals discharge is taken up by the fish in the Grand Lake System. The fish show no effects, nor do their tissues tend to accumulate heavy metals,
—the sediments provide an effective, long-term sink for the heavy metals in the streams and should remove them from further processes.

Miami Resident Recalls Brighter Days in Tri-State Mining Area

EDITOR'S NOTE— The information presented here is drawn largely from the files of Frank J. Cuddeback, longtime resident of the Miami area and Eagle-Picher employee whose dedication to the industry caused him to preserve a written and pictorial account of the Tri-State Mining District. It is with the gracious consent of Mr. Cuddeback that Oklahoma Water News is able to share this history with its readers.

Lead and zinc mining, a blessing that spanned a half century, became the bane of the region in 1979 when the huge catacombs belched their acidic waters to the surface. Like ghosts captive underground since the miners and their machines departed late in the 60's, the ominous acid water spilled from the mines to haunt the Tar Creek Basin.

Major mining began in about 1880 — first in Missouri, then around Galena, Kansas, and after 1905, in the Oklahoma-Kansas area centered around Picher. Of the 500 million tons of ore that would come from this Tri-State field, 300 million tons of it would come from the Picher-Baxter Springs area.

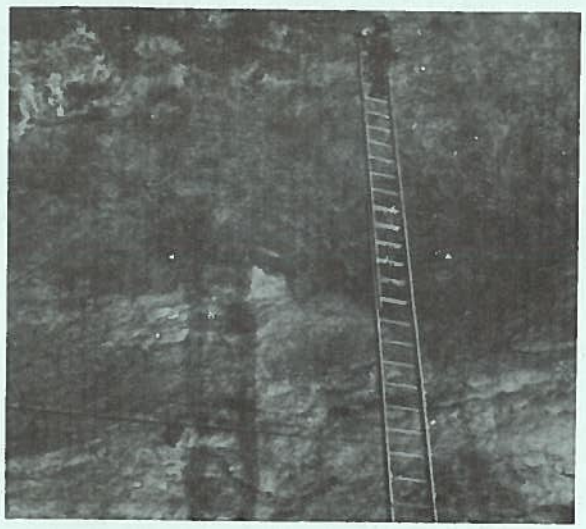
The ore-bearing formations lay 150 feet below the surface in the southeastern part of the field, and more than 350 feet deep in the northwest. All lay within the Boone Formation — water-bearing strata that would have flooded the working mines, had the pumps not operated day and night.

The lead and zinc occurred in flint rock so hard that diamond drills could not cut it, but brittle enough that the up-and-down action of the chisel bit on a churn drill could break it up. Such churn drills, which made virtually all the discoveries, raised and dropped a string of tools weighing a ton or more.

Once promising deposits were located, contractors sunk a 5' x 7' or 6' x 6' shaft, then men dug out horizontal chambers, or drifts. Earliest hand tools were drill steel and hammer, later compressed air drills, and finally drills with threaded tungsten carbide bits. Dynamite blasted

At the peak of activity in the Tri-State Mining District, Eagle-Picher's Central Mill processed up to 15,000 tons of ore a day. The chat, or "tailings," a by-product of the milling process, was sold for highway and railroad bed (ballast) and still is used in construction.

Sectional ladders up to 100 feet tall provided the men access to mine ceilings for recovering ore or trimming the roof for safety. Three pairs of men held supporting guy ropes. Later, tall telescoping cranes with a pair of automatic drills mounted on Caterpillars replaced the tall ladders.



huge tonnages of ore free as mechanization came and technology improved.

In early mining, shovelers gathered the broken ore into cans of half-ton capacity for transport to the surface. Shovelers were paid by the can, and a good worker could fill 100 cans a day. Mules were used to move the cans in strings of eight in the level areas of the mines, and hoists lifted the cans to upper levels. The mules, the trucks that replaced them, and all other equipment that was used in the mines were lowered through the same 5′ x 7′ or 6′ x 6′ openings.

When diesel trucks replaced the mules, they were dismantled on the surface, lowered with cables, then reassembled in the mines. A hundred miles or more of roads connected the mines, but the sharp flint shards that covered the roads so damaged the tires that some were recapped 25 times.

A giant step in mechanized mining came with the Caterpillar-mounted drill jumbo, which was 35 feet tall and permitted the taking of ore from the ceiling and other high areas. It was so successful that a number of 65 and 70-foot jumbos were built using 2-section telescoping masts. They replaced the dangerous sectional ladders up to 100 feet in length, steadied by six men holding guy ropes. Removing the ore from the high roofs was an extremely treacherous job, and the early roof trimmers were well paid.

Continued on page 4

ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS AS OF JANUARY 10, 1984

PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY
SOUTHEAST		
Atoka	80,800	65.1
Broken Bow	776,876	84.6
Pine Creek	77,700	100.0
Hugo	157,600	100.0
CENTRAL		
Thunderbird	105,925	100.0
Hefner	69,800	92.6
Overholser	12,000	75.5
Draper	85,900	85.9
SOUTH CENTRAL		
Arbuckle	59,385	94.9
Texoma	2,587,520	98.1
Waurika	203,100	100.0
SOUTHWEST		
Altus	56,253	42.3
Fort Cobb	78,015	99.5
Foss	149,322	61.2[2]
Tom Steed	86,998	97.8
EAST CENTRAL		
Eufaula	1,918,482	82.3
Tenkiller	545,860	85.0
Wister	27,100	100.0
Sardis	287,280	95.0
NORTHEAST		
Eucha	55,800	70.1
Grand	1,302,040	87.3
Oologah	544,240	100.0
Hulah	30,594	100.0
Fort Gibson	359,029	98.3
Heyburn	6,600	100.0
Birch	18,974	98.8
Hudson	200,300	100.0
Spavinaw	29,500	98.3
Copan	39,122	90.1
NORTH CENTRAL		
Kaw	428,600	100.0
Keystone	597,929	97.1
NORTHWEST		
Canton	92,185	94.5
Optima	100	---[1]
Fort Supply	13,900	100.0
Great Salt Plains	31,400	100.0
STATE TOTALS	**11,116,129**[3]	**90.3**[3]

1. In initial filling stage
2. Temporarily lowered for maintenance
3. Conservation storage for Lake Optima not included in state total

Data courtesy of U.S. Army Corps of Engineers, Bureau of Reclamation, Oklahoma City Water Resources Department, and City of Tulsa Water Superintendent's Office.

$1.2 Million in Water Grants Presented to 15 Communities

At the January meeting of the Oklahoma Water Resources Board 15 communities in emergency straits were awarded grants ranging from $10,000 to $100,000 each. The $1,212,220 was provided by interest earnings on the $25 million water development fund administered by the OWRB Planning and Development Division.

The cities, towns and rural water or sewer districts which will receive financial assistance are: Cherokee County Rural Water District #8, $53,000 for water lines, standpipe and pump station; Sequoyah County Rural Water District #4, $86,000 for water lines and hookups; Mayes County Rural Water District #3, $100,000 for standpipe storage for fire protection; Cherry Tree Rural Water District (Adair County), $10,000 for master meter, booster pump and pressure tank; Cherokee Housing Authority (Cherokee County), $64,000 for improvements to water systems of three Indian communities; Town of Dustin (Hughes County), $100,000 for water treatment plant; Nowata Municipal Authority, $97,000 for raw water intake structure; Town of Crowder (Pittsburg County), $100,000 for 8-inch water main, hydrants; Hulbert Public Works Authority (Cherokee County), $100,000 for raw water intake, improvements to treatment facility, construction of storage tank; Town of Kenefic (Bryan County), $90,000 for new well, water line, meters and standpipe; Drumright Utilities Authority (Creek County), $100,000 for two wells, water treatment facility, storage tank; Town of Taft, $86,620 for sewer line, manholes, water lines, fire hydrants; and the Town of Rocky (Washita County), $25,000 for the repair and reinsulation of water storage tank.

Rules and regulations of the Board spell out "emergency" as "a situation where the life, health or property of the persons served by the entity is endangered."

Brighter Days, continued from page 2

The ore was milled on the premises or nearby by many small 40 or 50-ton-per-hour mills, until the Central Mill was completed in 1932. At its peak, the capacity of the Central Mill was 15,000 tons a day, making it the largest lead-zinc concentrator in the world. By its closing in 1970, the mill had processed 66 million tons of ore.

A by-product of the milling was coarse flint chat, or tailings, which accumulated in large piles, one reaching 12 million tons at the Central Mill. It was the Central Mill that breathed new life into the Picher field, permitting small miners, or "gougers" to go back into the old mines, and with little investment recover the remaining ore for shipment to the Central Mill.

The Central Mill was sold at auction in September, 1973. Life finally drained from the Picher field with the closing of the Lawyer Mine southeast of Picher and abandonment of the Last Frontier Mill at Lincolnville in 1976, where the last underground ore was milled.

The huge caverns were left open to invasion by surface runoff and ground waters of the Boone Formation. The iron sulfide minerals left exposed by mining had oxidized in the oxygen-rich atmosphere of the working mines. As the waters seeped in, these oxidized sulfides dissolved readily, forming an acid mine water caustic enough to dissolve normally insoluable lead and zinc concentrates.

Finally, in 1979, like ghosts revisiting a favorite place, the acid mine waters spilled from the shafts and boreholes near Commerce, Oklahoma.

This monthly newsletter, printed by the Central Printing Division of the Office of Public Affairs, Oklahoma City, Oklahoma, is published by the Oklahoma Water Resources Board as authorized by James R. Barnett, executive director. Ten thousand copies are printed and distributed monthly at an approximate cost of 20 cents each.

MARY E. WHITLOW, Editor **BARRY FOGERTY, Writer** **MIKE McGAUGH, Layout**

OKLAHOMA WATER NEWS
Oklahoma Water Resources Board
1000 N.E. 10th P.O. Box 53585
Oklahoma City, Okla. 73152