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Utility to increase cleanup pace for chemical seeping near river

PG&E to begin environmental project this year

By Benjamin Spillman
The Desert Sun
September 4th, 2003

LA QUINTA -- A major California utility will hasten the pace of an environmental cleanup project aimed at keeping a toxic chemical from seeping into the Colorado River.

Officials from Pacific Gas and Electric Co. told regional water quality regulators Wednesday they would start taking the chemical out of the ground late this year -- not early 2005, as previously planned.

The expedited cleanup plan follows concerns that an underground plume of the chemical chromium 6 was creeping too close to the Colorado River for the comfort of some water regulators. "They have come up with a really tight schedule," Robert Perdue, an assistant executive at the Colorado River Basin Region of the California Regional Water Quality Control Board, said of the company.

Earlier this summer, staffers for the Palm Desert-based regional board threatened to foist a mandatory cleanup plan on PG&E if the company didn't agree to a quicker schedule.

Board members cited data they said indicated the plume was within 600 feet of the Colorado River. The river is a major drinking water source for about 18 million coastal and inland Southern Californians, and supplies irrigation water for crops in the Coachella and Imperial valleys. It is also the source of inflow water for the Salton Sea.

"(The contamination) is obviously traveling toward the river," said John C. Clairday, an attorney for Metropolitan Water District of Southern California.

Metropolitan draws water from the river into its aqueduct about 30 miles downstream from the cleanup site.

"It certainly is a concern to Metropolitan as a drinking water (problem)," Clairday said.

The site is home to PG&E's Topock Compressor Station, a facility that compresses natural gas so it can continue its journey from the Southwest United States to utility customers in central and Northern California.

"If that station didn't work, Central and Northern California could not get gas," said Linda Gonsalves, manager of the cleanup project for PG&E.

The chromium problem is rooted in the company's mid-20th century efforts to prevent equipment at the compressor station from corroding.

Beginning in 1951 and continuing into the 1960s, PG&E dumped wastewater containing chromium into a wash near the compressor station. Today, PG&E uses different methods

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and materials to clean the works at Topock.

PG&E and chromium 6 gained notoriety for a groundwater contamination incident in the Mojave Desert town of Hinkley, near Barstow. The contamination and efforts to wrest a \$333 million settlement from the company were dramatized in the 2000 Julia Roberts' movie, "Erin Brockovich."

The company has been working for years with the state's Department of Toxic Substances Control to develop a cleanup plan for the Topock site situated in remote desert about 15 miles east of Needles.

Metropolitan and the regional water quality board wanted faster action. PG&E had asked the state to reaffirm the more methodical Department of Toxic Substances Control as the "lead agency" in charge of the cleanup.

The dispute sparked what Perdue called an "excruciating bureaucratic process" of negotiation between the company and regulators.

Ultimately the California Environmental Protection Agency ruled the Department of Toxic Substances Control would remain in charge, but PG&E agreed to hasten the work.

"We always knew there would be a big expenditure coming up -- this is not out of line," Gonsalves said of the cleanup. She said the company has spent \$2 million in the past two years on the effort. She said PG&E will have a progress report on the cleanup by mid-2004. At that time it may also recommend a final remedy, she said.

Benjamin Spillman can be reached at 778-4643 or by e-mail.

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Water board wants chromium 6 removed

Contamination near Needles prompts panel to draft cleanup order for PG&E

By Benjamin Spillman
The Desert Sun
June 26th, 2003

The local branch of a state water quality board wants a toxic chemical removed from groundwater beneath an isolated, desert energy station so it won't seep closer to the Colorado River.

Staffers at the Colorado River Basin Region of the California Regional Water Quality Control Board want Pacific Gas and Electric Co. to start cleaning an underground plume of chromium 6 that has contaminated water in an aquifer near Needles.

They've drafted an order that outlines a cleanup plan but have not yet enacted the measure. The draft was distributed to the board Wednesday.

"It is our tool, I guess, for cleanups," said Robert Perdue, an assistant executive for the water quality board's regional branch.

There is no evidence the plume has reached the Colorado, but the regulatory effort has caught the attention of Metropolitan Water District of Southern California, the state's largest water agency.

Metropolitan, which delivers water to about 18 million people around Los Angeles, deployed a team of consultants to the Wednesday board meeting in La Quinta.

"We would see this in the same way we see the uranium tailings in Moab, Utah, or the perchlorate coming out of Henderson, Nev.," said Metropolitan spokesman Adán Ortega, citing two prominent sources of river water contamination. Perchlorate, a chemical used in rocket fuel, seeps from a defunct factory into the river. Traces have appeared in downstream wells — including some in the Coachella Valley.

Unlike perchlorate, however, chromium 6 has not shown up downstream.

But just as one group of water quality regulators is raising red flags about the PG&E site, another agency says it already has prompted the company to embark on the cleanup effort, albeit on a slower schedule.

One official at the state's Department of Toxic Substances Control wrote that the water quality board's suggestion that chromium approaching the river caused "undue alarm" among water users.

"Given the already heightened public concern over the perchlorate contamination affecting the Colorado River, (state regulators) have a common responsibility to protect the public from unnecessary hysteria based on inaccurate information about the PG&E investigation," wrote Karen Baker, head of the toxic substances department, in a June 23 letter to Phil Gruenberg, chief of the local branch of the water quality board.

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The two agencies held a teleconference on the issue after the board meeting.

PG&E and chromium 6 gained notoriety for a groundwater contamination incident in the Mojave desert town of Hinkley. The contamination and efforts to wrest a \$333 million settlement from the company were dramatized in the 2000 Julia Roberts' movie, "Erin Brockovich."

Baker's department has led cleanup efforts at the Needles site on behalf of the government since 1996 and workers there report the company has cooperated throughout the process.

They expect PG&E's \$5 million to \$8 million decontamination project to start bearing fruit in early 2005, one year after the water quality board wants results.

"We don't believe it is getting to the river," said Aaron Yue, who works in the geology and corrective action branch for the toxic substances department.

A representative for PG&E was not available for comment.

The site in question is PG&E's Topock Compressor Station 15 miles east of Needles on land owned by the Bureau of Land Management.

The station compresses natural gas before it is sent through pipelines to PG&E territory in central and northern California.

From 1951 to 1985, the company used a chemical containing chromium to prevent corrosion in the compressor's works. Until the 1960s, the water quality board says PG&E dumped untreated wastewater into a wash they say drains to the river.

According to the toxic substances department, there is an isolated plume near Needles of groundwater 2,500 feet long and 2,000 feet wide that is contaminated beyond the 50 part per billion standard for drinking water.

At its center, there is a concentration rate of 13,000 parts per billion, said Alfredo Zanolria, a toxic substances department geologist working on the project.

But the desolate location of the site means few, if any, people have ingested any of the water, Zanolria said.

Nor is it known to be used for any agricultural or business purposes, he said.

Benjamin Spillman can be reached at 360-1532 or Benjamin.Spillman@thedesertsun.com

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Concern over contamination at compressor fairly recent

By LEWIS CLEVENGER
TIMES NEWS STAFF

TOPOCK, Ariz. — The Topock Gas Compressor facility on the California side of the Colorado River 15 miles southeast of Needles, California, has operated for nearly 50 years, but concern about the possibility of contamination there is fairly recent.

It wasn't until 1987 that the first measures were taken to determine if contamination of either surrounding soils or ground water might be present, according to an overview of the process, published in March 1998 by the California Environmental Protection Agency.

The facility, which opened in 1951, compresses natural gas for transportation through pipelines to California-based Pacific Gas and Electric natural gas customers in central and northern California. During compression, however, the gas heats up considerably and must be run through two cooling towers to bring the temperature down before it can be safely sent through the pipeline. Operators of the facility originally added a chromium-based sub-

stance to the cooling water to prevent corrosion of the equipment. The water containing hexavalent chromium was then disposed of by discharging it into an injection well in the ground.

In the mid-60s, however, treatment to convert toxic hexavalent chromium to non-lethal trivalent chromium began, although the water was still discharged into the ground until the early 70s. At that point, the injection well was abandoned and replaced by four large evaporation ponds, each single-lined, which stored the water until it evaporated naturally.

The original evaporation ponds were subsequently closed in 1985, at which time the chromium added to the cooling water was replaced by an environmentally safer phosphate additive and four new evaporation ponds were constructed. The new ponds were double-lined to protect against leakage.

In 1987, the owner, PG&E, reported that between 1951 and 1969, approximately 6 million gallons per year of untreated water containing hexavalent chromium had been discharged into the Bat Cave Wash area near the

river.

Additional investigations, tests and some cleanup were conducted between 1987 and 1995. Included were soil tests indicating very low concentrations of chromium, the overview continued. In addition, records indicate the utility removed sludge and contaminated soil accumulated at the bottom of the four original evaporation ponds.

Monitoring of ground water at several locations throughout the site has been conducted continually since then, according to the California Department of Toxic Substances Control, an arm of the CEPA.

Based on the sampling report, due to the CEPA before the end of the year, the toxic substances agency will determine if further corrective actions are required, and, if so, when and what type to be implemented. At that time, PG&E will formulate a corrective action report and submit it to the agency.

DTSC will, in turn, review the recommendations, open them to the public for comment and select the most favorable plan for implementation.

October 14, 1998

Study: Chromium isn't in Colorado river water

See related story, Page A8
By LEWIS CLEVENGER
TIMES NEWS STAFF

TOPOCK, Ariz. — California-based Pacific Gas and Electric Company is nearing completion of a study to determine the extent of soil and groundwater contamination by hexavalent chromium at the utility's Topock Gas Compressor site.

The facility of approximately 100 acres is located on the California side of the Colorado River near the Havasu National Wildlife Refuge, and about 16 miles southeast of Needles, California. Topock, Arizona, is about one-half mile northeast, while Park Moabi, California, is found about a mile to the northwest. Located within 35 miles of the facility are the Ft. Mojave, Chemchuevi and Colorado River Indian reservations.

The tests were mandated by the California Environmental Protection Agency to determine the extent of contamination by potentially harmful agents, specifically hexavalent chromium.

So far, results are encouraging, according to Patrick Ritter, project consultant for the testing program, who is in charge of conducting the tests. Examiners collected 140 soil samples ranging from one to 200 feet in depth. The procedure calls for drilling several wells, 18 so far, in the area surrounding the site, as well as 30 random samplings of the river at a dozen locations and 30 different depths, he continued.

"While some wells in close proximity of the compressor site did show detectable levels of hexavalent chromium, the element was undetectable in the outlying wells," Ritter said. "That shows us that the chromium is not spreading."

More than 30 samples taken from various locations and depths in the river at the same time revealed no traces of chromium either, he said. Water-level tests accomplished during the testing period explain why, he added.

"Our measurements indicate the water table is almost flat, meaning that the chromium that is present in the wells is not being pushed into the river," Ritter said. "For the most part, the river is what is called a 'losing river.'"

Essentially, that means the river is feeding the wells through underground streams branching out from the riverbed, instead of the wells contributing to the river by flowing into it, he explained. The flow of river water into the wells from the river prevents the chromium from spreading outward, he added.

While neither agency has listed hexavalent chromium as a threat to the environment or its inhabitants, the tests were mandated to determine the extent of dispersion and provide a base for cleanup if the California agency deems it necessary. Thus, neither has set a maximum-acceptable level for chromium contamination in the environment.

At this time, the area in question is void of human habitation, and there are no wells in the region providing drinking water for residents, he said. That begs the question of whether a threat may or may not exist, he added.

"There is no immediate threat to human health or impacts on the environment, and no one is drinking the water or being exposed to any danger, so we don't know yet if there is a threat," Ritter said.

At any rate, the Department of Toxic Substances Control, a division of the California Environmental Protection Agency, will make the ultimate decision as to whether a clean-up of the site is necessary in the future, he added.

"We want it (testing) to be complete as possible in order to establish a firm, factual base from which future decisions can be made with confidence," Ritter said. "That could take weeks, even months."

River found to be free of chromium pollution

by HOWARD DECKER
Daily News

NEEDLES — The heavy metal chromium, which was introduced years ago into the aquifer near the Topock Gas Compressor Station, is not presently a hazard to human health and is not finding its way into the Colorado River.

Patrick Ritter of the Ecology and Environment Inc., a firm hired by the compressor station owner, Pacific Gas and Electric (PG&E), said that water in which the chromium can be found is more like a stagnant pool, "just sitting there" and is not presently a health hazard and not found in the river.

From 1951 to 1985, the compressor station utilized a chromium-based substance which was added to water to be used in the plant's cooling tower to prevent corrosion. During the 1950s and 1960s, treated cooling tower wastewater containing hexavalent chromium was discharged to the nearby Bat Cave wash area, which is normally a dry stream bed that feeds into the Colorado River.

According to a report by PG&E to the California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC), in the mid-late-1960s, PG&E began treating the cooling tower wastewater to convert hexavalent chromium to trivalent



Staff photo by Les Stukenberg

Diane Gapuz of Pacific Gas & Electric and Patrick Ritter of Ecology & Environment Inc. spent part of Wednesday afternoon at the *Mohave Valley Daily News* giving updated information on the testing ground water for contamination near the PG&E Topock Gas Compressor Station south of Needles.

lent chromium, which is a more benign form of the metal.

In 1985 the plant, which compresses natural gas for transportation through PG&E pipelines, began using a "more environmentally-safe phosphate additive" which was disposed of in lined wastewater ponds.

In 1996, PG&E and the DTSC entered into an agreement to conduct an investigation at the Topock site based on the corrective action process of the Resource Conservation and Recovery Act (RCRA).

The compressor station is

approximately 15 miles southeast of Needles and just south of I-40/Route 66 and the Burlington Northern Santa Fe Railroad tracks.

On Wednesday, Ritter and Diana Gapuz, a news representative for the public relations department from PG&E's San Francisco office, met with *Mohave Valley Daily News* Managing Editor Darryle Purcell and a reporter to give the newspaper an update on the environmental investigation in regard to the chromium from the plant.

Ritter said that at the time of a previous visit to the

newspaper in March of 1998, PG&E had put in a number of wells to monitor the chromium in the aquifer and had some results, but had not then finished their field studies.

"Since then, we've put in a lot more wells," he said, "and taken some more samples. We have now finished the field investigation portion," he said, "and have put in what we think is a sufficient number of wells, and taken a number of samples from those wells."

He said that they have drilled 27 wells in the area of the plant, and sampled 11 other wells. "We have data from 38 wells and that's a pretty good sample," he said.

They have also sampled the river 36 times in a number of different locations and depths, he said.

"The chromium is not in the river," he said. "After sampling for three years, at 36 different times and many different locations and depths, we never detected any sample of chromium in the water."

He said the latest round of wells were put in close to the Colorado River, just 50 to 70 feet from the edge and there was no chromium in those wells.

In one area, in a cluster of three wells drilled to different depths, the highest level of chromium was found. These

See PG&E on A5

9-13-99

• PG&E

Continued

wells are a few hundred feet to the northeast of the compressor station. The wells are about 700 feet from the river.

"We now have a situation where there is chromium in the groundwater but no one is using that water," Ritter said, "there are no drinking water, Indian Tribal or agricultural wells in the area."

The nearest homes to the plant are at Park Moabi, about one mile northwest of the facility and Topock, which is one half mile east-northeast of the plant, on the other side of the Colorado River.

"We didn't think we'd find chromium in the wells near the river or in the river and that was confirmed just very recently," he said.

"The reason we're here today," he said on Wednesday,

"is we're finished (with the investigation portion of the work) and we've just submitted our data (to the government) and we're talking to everybody about it."

When the hexavalent chromium was utilized in the plant, such use was legal and there is no record of exactly how much of the chromium was introduced into the ground. Ritter estimated that around six million gallons per year of chromium-laden water was removed from the plant and introduced into the ground in the 1950s and 1960s.

Chromium was found in wells in the vicinity of the plant but wells in areas further away did not have evidence of chromium in them, he said. The water in the aquifer in the cooling plant area is heavily mineralized, so much so that even without

See related story on Page A6

the chromium, it is not drinkable, Ritter said.

The chromium is in the alluvial aquifer, he said, the aquifer nearest the surface. The water table in the area is very flat, he said, and the underground water is not really moving anywhere.

The Colorado River in the area is losing water into the groundwater, he said, in a situation called a 'losing river.' "Most measurements taken in the area indicate the water level inland is lower than the water level in the river," he said.

There is a bedrock mountain range just southwest of the plant, the Chemehuevi Mountains, he said, which forms a natural barrier to the water. "The water is not going to move through hard rock," he said.

The chromium in the water discharged from the plant would not float or sink, but would mix or disperse with the water already in the aquifer, he said. Testing indicates the chromium is not in a deeper aquifer. The highest level of chromium was detected about 70 feet from the surface.

If the DTSC mandates that PG&E perform corrective measures to clear the chromium from the aquifer, there are a couple of ways this might be done, Ritter said.

First, the chromium could be dealt with in place in the ground. Reducing agents could be injected into the aquifer to cause the chromium to turn into a less-harmful form. Or, the water could be pumped out of the aquifer, treated, and the resulting non-toxic water disposed of.

Ritter said PG&E will look

at the situation, and "come up with a plan that can be done efficiently, safely and as rapidly as possible while being reliable and with a minimum environmental impact."

Gapuz said PG&E has two other compressor stations in California, one at Hinkley near Barstow and another along Highway 5 near Kettleman City. "Chromium was used in all three stations," she said.

"We're a little further along" with the cleanup on the other two sites, she said, noting that PG&E is "ready to close out" the cleanup of Kettleman City. At the facility near Hinkley, soil cleanup is completed and they are in the process of cleaning up the groundwater, Gapuz said.

The next step, Ritter said, is for PG&E to prepare a "very detailed characterization report" on the ground-

water situation.

When the report is finished, he said, everyone with a stake in the outcome and the public will be informed. Then, work will begin on a corrective measures study.

Federal and state agencies, regulatory bodies, public groups, Indian Tribes, the press and state legislators will be invited to participate in coming to a consensus on how the cleanup should be accomplished, he said.

"Hopefully, it will bear fruit and everyone will agree, that we'll build credibility and rapport and maybe the process will go faster," Ritter said.

Information on the cleanup effort will be available at the Needles Library and Golden Shores/Topock Library Station.

PG&E investigation, actions described

NEEDLES — The Resources Conservation and Recovery Act (RCRA) correction action process is designed to evaluate the nature and extent of releases of hazardous substances at a site, according to the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC).

The process also identifies, develops and implements appropriate corrective measures to protect public health and the environment.

The first step in the corrective action, the RCRA Facility Assessment (RFA) is the corrective action process, an investigation to determine whether or not potential hazardous substances or other constituents of concern exist in soils or groundwater at or near a facility.

A lead agency, such as the DTSC, gathers information about potential chemical releases relative to chemical usage, storage and treatment at the site.

This may involve a visual site inspection, file review and initial sampling or other investigations. The agency prepares and issues an RFA report, which indicates whether further investigation needs to be undertaken.

RCRA Facility Investigation (RFI): The owner, in this case, PG&E, develops an RFI Workplan outlining the specifics of the planned investigation. The investigation may include both soil, surface water and groundwater.

DTSC reviews and approves the RFI Workplan before the investigation begins. After the investigation begins, an RFI Report is prepared, summarizing field work results. DTSC oversees field work, reviews and approves the RFI report, and involves the public by issuing fact sheets and conducting briefings and public meetings, if there is interest in the work.

Interim Measures: Action is taken if there is an immedi-

ate threat to human health or the environment or if interim action will facilitate addressing the site. Such measures can happen at any time during the corrective action process. Prior to implementing interim measures, an Interim Measures Workplan must be prepared and approved by the DTSC. The public has the opportunity to provide input on Interim Measures and is kept informed of these activities.

Corrective Measures Study: Remedial or cleanup operations for the site are evaluated and a remedial plan is proposed if necessary. DTSC reviews the study, receives public input on the proposed remedy selection, and selects options for implementation.

Corrective Measures Implementation: A plan for the design and construction of the corrective measures is reviewed and approved by DTSC. DTSC oversees construction and monitoring activities. The public is kept informed of this activity.



School spirit: River Valley High School cheerleaders celebrate a friend's truck at a pep rally held Friday evening.

Mohave Valley Daily News

Bullhead City, Arizona

September 29, 1998

Consultant says hexavalent chromium near PG&E station poses no threat

By HEIDI WISSLER

The Daily News

TOPOCK — Hexavalent chromium has been found in isolated areas near Pacific Gas and Electric Company's (PG&E) Topock Compressor Station, however, there is "no threat to human health or the environment."

For nearly two years, PG&E has been collecting soil samples, drilling wells and taking other water samples from and around the compressor station located about 15 miles southeast of Needles and approximately one-half mile from Topock. The California Environmental Protection Agency directed PG&E to conduct the studies after a former industrial well was sampled in 1995 and the level of chromium was "higher than had been seen before," according to Patrick Ritter, environmental engineer with Ecology and Environment, consulting engineers on the project.

PG&E's Topock station has been in operation since 1951 — it compresses natural gas for transportation through pipelines to its service territory in central and northern California.

"During the 1950s and 1960s, untreated cooling tower wastewater containing hexavalent chromium was discharged into the Bat Cave Wash area, which is normally a dry stream bed that feeds into the Colorado River," according to a Hazardous Waste Investigation pamphlet. "In

the mid to late 1960s, PG&E began treating the cooling tower wastewater to convert hexavalent chromium to trivalent chromium. In the early 1970s, PG&E discharged treated wastewater to an injection well near the Bat Cave Wash and later stored wastewater exclusively in single-lined evaporation ponds ... These evaporation ponds have been closed and are no longer in use."

In 1985, PG&E stopped using chromium and started using a phosphate additive and built four new evaporation ponds with double-lined bottoms for holding phosphate-based wastewater.

PG&E reportedly released quantities of hexavalent chromium into the environment during a 16-year period from 1951 — it has been more than 25 years since the chromium was discharged into the Bat Cave Wash

Chromium in the hexavalent stage is considered carcinogenic and toxic in relatively small concentrations, which is the reason for the investigation around the Topock Compressor Station.

The field investigation has included soil boring at various depths, the installation of 18 wells as well as sampling 29 preexisting wells, and the collection of water samples from the Colorado River at 12 different locations.

Through soil testing, Ritter said hexavalent chromium was found in a "couple of isolated areas right near the original source ... it is not widespread."

"In most of the well samples it's actually non-detect or less than the drinking water standards, most of the water samples have shown that," Ritter said.

"In the area immediately adjacent to the station (within 2,000 feet of the station), the highest level we recorded was 12.6 parts per million."

The testing reveals that hexavalent chromium is present in the ground water in isolated areas. However, Ritter said this does not mean there is a health hazard because nobody is drinking the

•Chromium -

Continued

"This is a fairly isolated or remote area, there are no people living around here," Ritter said.

"There are no drinking water wells, people are not drinking the water here. It's not widespread in the soil and there is no threat of soil contact and we know it is not in the river. ... In this situation, our studies have shown it is not a threat to human health or the environment."

In addition to testing the ground water, PG&E has measured the water table and the hydraulic gradient.

"We've evaluated where is the water moving or is it moving at all," Ritter said. "What we have found is that the water level gradient in this area is extremely flat and that there is not a high hydraulic gradient pushing this stuff, pushing this chromium toward the river or other areas. It's very, very flat. In fact, many of the measurements that we have taken show that the water level in the Colorado River is higher than the water level here."

All of the Colorado River water samples have been non-detect, PG&E said.

Today's News-Herald
Lake Havasu City, Arizona
September 29, 1998

Gas facility gets A on report card

By DAVID BELL
Today's News-Herald

A gas compressor facility in Topock does not contribute to river pollution, an ecological engineering firm said last week.

Preliminary results from an investigation by Ecology & Environmental Consulting Engineers into the Topock Gas Compressor Station near Topock Bay found no hexavalent chromium had leached into the ground water or the river. The investigation was directed by the California Environmental Protection Agency, Department of Toxic Substances Control.

Patrick Ritter, who supervised the investigation for Ecology and Environmental, said a total of 18 wells have been dug between the plant and the river and another 12 locations in the river have been sampled.

The highest reading obtained was 12.6 parts per million in the ground water just east of the plant. The other readings ranged from 4.22 parts per million in ground water to zero in the river.

"The lower numbers are consistent with treated wastewater flushed by the plant in the 1960s and 1970s," said Ritter. "The gradient is

flat, so we're not seeing anything push to the river. And another good thing is the ground water there isn't used for anything."

Ritter said the investigation will continue, with another four wells being dug to confirm the results of the latest testing. The results will be compiled and sent to the department of toxic substance control for a final determination if clean up is required.

If a clean up is required, a public hearing on the results and necessary measures will be held.

The Topock Gas Compressor Station is located in eastern San Bernardino County about 15 miles southeast of Needles and near the Havasu National Wildlife Refuge. The station began operation in 1951, and compresses natural gas for transportation through pipelines to Pacific Gas and Electric Company's service territory in central and northern California.

As natural gas is compressed, its temperature increases and the gas is cooled in two cooling towers before transportation. From 1951 to 1985 PG&E added a chromium-based substance to the water in the cooling tower to prevent corrosion of the tower equipment. The cooling

water was then discharged into the nearby Bat Cave Wash area, a dry stream bed that feeds into the Colorado River.

In the mid-1960s, PG&E began treating the cooling water to convert hexavalent chromium to trivalent chromium. In the 1970s, the company discharged the treated cooling water into an injection well near Bat Cave Wash and later stored the wastewater in single-lined evaporation ponds.

In 1985 Pacific Gas changed to a more environmentally safe phosphate additive and built four new evaporation ponds.

It was estimated that between 1951 and 1969 about six million gallons of untreated cooling water was discharged into the Bat Wash area each year.

In 1996, Pacific Gas and Electric entered into an agreement with the Department of Toxic Substances Control to conduct an investigation of possible contamination of the area's ground water and Colorado River.

Information on the investigation including preliminary findings will be found at the Charles C. F. Memorial Library.

Press Dispatch
Barstow & Victorville, California
September 27, 1998

► ENVIRONMENT
Contamination found
on PG&E land

BARSTOW — A hazardous waste investigation at a Pacific Gas and Electric Co. compressor station 15 miles southeast of Needles has turned up evidence of chromium contamination within 1,000 feet of the facility.

Since March, the California Environmental Protection Agency's Department of Toxic Substances Control has been investigating the possibility that chromium-based substances at PG&E's Topock Gas Compressor Station had contaminated ground water.

Although 29 wells have been sampled since June, the majority of contamination is within 1,000 feet of the facility, Patrick Ritter, project consultant to PG&E, said.

VICTORVILLE DAILY NEWS
March 28, 1998

Needles PG&E site investigated

By **DAVID CRUDGE**
Staff Writer

BARSTOW — A hazardous waste investigation has started at a Pacific Gas and Electric Co. compressor station 15 miles southeast of Needles.

The California Environmental Protection Agency's De-

partment of Toxic Substances Control is investigating the possibility that chromium-based substances at PG&E's Topock Gas Compressor Station contaminated soil and groundwater.

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Chromium-based additives are considered to be acutely toxic and carcinogenic.

Barstow Desert Dispatch

Barstow, California

September 25, 1998

EPA finds contamination on PG&E land near Needles

► **HAZARD:** Chromium limited to area around compression facility.

By **DAVID DRUDGE**

Staff Writer

BARSTOW — A hazardous waste investigation at a Pacific Gas and Electric Co. compressor station 15 miles southeast of Needles has turned up evidence of chromium contamination within 1,000 feet of the facility.

Since March, the California Environmental Protection Agency's Department of Toxic Substances Control has been investigating the possibility that chromium-based substances at PG&E's Topock Gas Compressor Station had contaminated ground water.

Although 29 wells have been sampled since June, the majority of contamination is within 1,000 feet of the facility, Patrick Ritter, project consultant to PG&E, said.

"I think we've made a lot of progress since we began," Ritter said. "We've put in a number of wells and we're getting close to finishing our site characterization."

Because Topock is about 1,500 feet from the Colorado River, contamination was a great concern. But so far no chromium has migrated into the river, evidence shows, Ritter said.

"We've tested now 30 samples in the river at 12 different loca-

tions, and so far it's just not detected," Ritter said. "And, as far as the ground water surrounding the facility is concerned, nobody is drinking the water there. Forget for a minute that Topock is even there, the water is so poor that nobody would want to drink it anyway."

The Topock compressor station occupies about 100 acres near the Havasu National Wildlife Refuge. It opened in 1951, compressing natural gas for transportation through pipelines that served Central and Northern California.

From 1951 to 1985, PG&E added chromium-based substances to the water in cooling towers to prevent corrosion of equipment. The untreated cooling tower wastewater was then discharged according to prescribed practices of the time into a dry wash near the facility.

"Everything was done openly and with the concurrence of the regulatory agencies and according to the law," Ritter said. "Today, we do it differently of course, but industries in general do a lot of things differently these days."

Certain chromium-based additives are considered acutely toxic and carcinogenic, such as the compounds discharged near the Topock station. But in this situation it shouldn't be considered dangerous because nobody is exposed to it, Ritter said.

Daily Press
Victorville, California
September 25, 1998

PG&E land studied for hazardous contamination

► ENVIRONMENT:

Contamination limited to area around facility.

By DAVID DRUDGE
Staff Writer

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COUNTY / REGIONAL-

Hazardous waste being investigated

David R. Garvin
West News Service
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into the 1960s Pacific Gas and Electric used chromium-treated water to cool its compression equipment at the Topock gas compressor station, reported Patrick Ritter, senior engineer for Ecology and Environment, a consulting firm hired by Pacific Gas and Electric.
As much as six million gallons of water tainted with chromium was either released into nearby Bat Cave Wash or later injected

into the ground. During this period the station used the chromium treatment method on water used in cooling towers to prevent corrosion of pipes, Ritter said.
In the later 1960s PG&E began treating discharged water to convert hexavalent chromium into a less-harmful trivalent chromium. In the 1970s the plant's waste water was stored in lined evaporation ponds which have since been closed and are no longer in

use. In 1985 the station began using a phosphate additive in the cooling water which is said to be environmentally safe, according to the California Environmental Protection Agency.
In coming months PG&E will pay to drill several wells around and downstream of the compression station to determine the extent of ground water contamination and to ensure hexavalent
See Hazardous, Page 8

Hazardous

From Page 6

chromium has not entered the Colorado River, Ritter said.
"We understand the Colorado River is a precious resource in this region, and that's why we will test and make sure chromium has not entered the river. To date, information we have indicates chromium has not reached the river," Ritter said.
Water from these wells will be tested, and the results of those tests will be made available later this year, Ritter said.
While the form of hexavalent chromium can be harmful in certain concentrations if drunk by humans and animals, Ritter pointed out no one draws ground water from the affected area.
The closest residences to the site are Topock, Ariz., half a mile east and across the Colorado River, and Park Moabi, Calif., located one mile northwest of the facility.

Depending on the extent of pollution of local ground water, PG&E has agreed to take appropriate action to clean up the environment, according to a California Environmental Protection Agency report. Ritter said there may be ways to convert hexavalent chromium to its less toxic cousin trivalent chromium in ground water, and a clean-up might involve removal of the substance from the soil in Bat Cave Wash and other potentially affected areas.

cc: Mike Whelan
John Busterud

Needles PG&E site investigated

By **DAVID DRUDGE**
Staff Writer

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Chromium-based additives are considered to be acutely toxic and carcinogenic.

Winter storm to strike

This weekend's weather promises to be nasty, with wind, rain and possible snow battering the Victor Valley, the National Weather service is forecasting.

There is a 60 percent chance of rain today, with thunderstorms and snow down to the 3,000-foot level, possibly lower, NWS weather spotter Darren Marlow said. Winds are expected to reach 35 mph with gusts higher.

The Victor Valley is slightly higher than 3,000 feet in elevation, so snow is a distinct possibility.

The California Highway Dept. reported fog in the Cajon Mts. late Friday night. CHD officials were investigating a traffic collision on Interstate 15 near Barstow. High temperatures should be in the low to mid-40s with a near freezing.

On Sunday, there will be a

MANDELA / From A1

Mandela has criticized Clinton's threat of force when Iraq's Saddam Hussein blocked United Nations arms inspectors.

Clinton was not pleased when Mandela traveled to Libya. U.S. officials believe Gadhafi was behind the downing of Pan Am 103, which killed 270 people.

During the news conference, Clinton appeared to take a more flexible stand on the issue of Nigeria's leader, Gen. Sani Abacha, than his senior officials have of late.

"There are many military leaders who have taken over chaotic situations in African countries but have moved toward democracy, and that can happen in Nigeria. That is purely

Just two weeks ago, Assistant Secretary of State Susan Rice said, "Nigeria needs and deserves a real transition to democracy and civilian rule, not another military regime dressed up in civilian clothes."

She also said an electoral victory by any military candidate in forthcoming presidential elections in Nigeria would be unacceptable.

Despite any difference in tone, administration officials said Clinton was laying out the same criteria.

Clinton also said he believes it was important he address how the United States has dealt with Africa in the past.

After the news conference, Mandela took Clinton on a tour of Robben Island and the cell block

was published as his autobiography "Long Walk to Freedom." Wardens found and destroyed the buried manuscript, but other prisoners already had smuggled a copy out of the country.

"We were deprived of our studies for four years," said Ahmed Kathrada, Mandela's former cellmate and chairman of the Robben Island Council.

The presidential tour also stopped at the limestone quarry where Mandela and others cracked rocks. Three years passed before they were given sunglasses, and Mandela's eyesight now is weak because of the sun and dust.

"My first thought was to thank God the person who occupied this cell was able to live all those years without having

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Mohave Valley DAILY NEWS

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MAR 30 '98 12:54

VOL. 34 NO. 73

MARCH 26, 1998

PUBLISHED IN BULLHEAD CITY, ARIZONA

Wells drilled to search for toxics near Colorado River

By DAVID R. GARVIN
The Daily News

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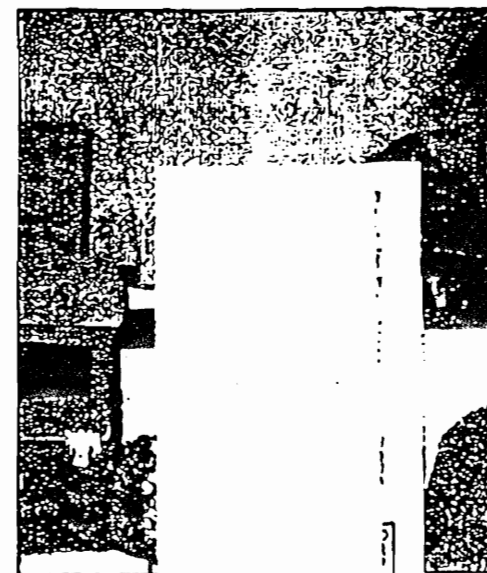
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See Toxic on A5



Johnny Se
Pat Thomp

Studi

By HEIDI V
The Daily News

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son made le

Valley School third grade social studies class as she incorporated a number of hands-on activities into

Supervisors select new juvenile detention site

By FRANK GONZALEZ

The Daily News

KINGMAN — Mohave County supervisors moved a little closer to

would be better off using county-owned property a few hundred yards southeast of the "gateway" property.

as the county's "corporation yard."

"So we don't think there's any contamination on the site," McIntosh said of possible environmental

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Hospital, but he readily died from his in-while en route, Harney

ohol impairment has ruled out as a cause for accident, and Harney ed Thompson may have l off to sleep or taken his tion away from the road moment.

mpson is survived by his er and father and a six-old daughter.

free on bail

up to U.S. District Judge Strand to decide what, ail is appropriate for on. On Wednesday, a ge panel of the 9th it ruled unanimously Symington's appeal rais-substantial question" and irly debatable," justify-ail.

Continued

"We, frankly, would prefer it be at the former (armory) site, but, frankly, we would rather have the facility," McCall said of the need for a new building to replace the overcrowded building behind the courthouse.

Plans for a new building were put on hold in February when it was discovered the contractor hired to build the facility, then estimated at \$2.6 million, had non-existent bonds and insurance documents.

Richard Johns, former owner of August Constructors, is currently in the Mohave County Jail pending charges of fraud and theft.

Funeral Notice

Gerald L. Howell, 64, died March 23. Funeral services will be held in Wichita, Kansas. Arrangements made by Dimond & Sons Silver Bell Chapel.

• Toxic

Continued

station to determine the extent of ground water contamination and to ensure hexavalent chromium has not entered the Colorado River, Ritter said.

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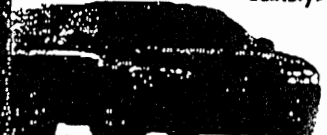
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Regal



Park Ave



'94 Cadillac Sedan DeVille
Leather, 41M
\$15,950



'97 Chevy Monte Carlo
Fully Loaded
\$12,950



'92 Cadillac Sedan DeVille
Leather, Loaded
\$10,950



'98 Buick Skylark
Loaded
\$10,950



► OBITUARIES

Ruby Teal

BARSTOW — Barstow resident Ruby Fern Teal died at Barstow Community Hospital on Wednesday, March 25, 1998. She was 75.

Teal was born in Evansville, Ind. on Nov. 13, 1922. She was a homemaker and lived in Barstow for six years.

Survivors include two sons, Herbert of Barstow and John of Clarkston, Miss.; and five grandchildren and six great-grandchildren.

Visitation will be from 2 to 5 p.m. on Sunday at Mead Mortuary Chapel, 36930 Irwin Road.

Services will be held at 6 p.m. Monday, March 30, 1998, at Mead Mortuary. Interment will be at Riverside National Cemetery.

22495 Van Buren Blvd., Riverside.

Roman Chavez

LOMA LINDA — Longtime Barstow resident Roman Robert Chavez died on Saturday, March 21, 1998, of heart and lung failure at Loma Linda University Medical Center. He was 65.

Chavez was born in Central, N.M., on Nov. 28, 1932. He was a Vietnam War veteran and worked as a clerk at Vons and Safeway stores for 20 years. He lived in Barstow for 45 years.

His survivors include a sister, Margaret Arges of Barstow.

Private family services were held. Interment was at Riverside National Cemetery in Riverside.

► ACTION BRIEFING

24 arrested during sweep

BARSTOW — Barstow sheriff's deputies arrested 24 people during a warrant, probation and parole sweep early Friday in Newberry Springs, Yermo and Daggett.

Charges included outstanding warrants, possession of drugs, child endangerment, being under the influence of drugs and violating parole or probation.

During one warrant search, officers found the components of a functional clandestine drug lab, according to a San Bernardino County Sheriff's Department press release. During another search, officers reportedly found adults and small children living in an unhealthy and dangerous environment.

Child Protective Services took the children into custody and the

9:35 a.m. Gun found on a sidewalk on the 900 block of Ann Street.

1:19 p.m. Vandalism on the 1300 block of Desert Avenue reported.

1:25 p.m. Warrant arrest at Seventh Avenue and West Main Street.

3:12 p.m. A 58-year-old man arrested on suspicion of battery on the 2100 block of West Main Street.

4:10 p.m. Battery on the 700 block of Melissa Court reported.

Sheriff's log

Friday

8:04 a.m. A 20-year-old man arrested on suspicion of being under the influence of drugs on the 35900 block of Fifth Street in Yermo.

8:17 a.m. A 27-year-old man arrested on suspicion of being under the influence of drugs on the 500 block of West Williams Street in Yermo.

8:45 a.m. Child abuse reported on the 29900 block of Stonehenge Road in Newberry Springs.

11:04 a.m. Good theft reported at

Murder trial delayed for two Barstow men

By JENNIFER NEWTON
Staff Writer

BARSTOW — The trial of a former Barstow High School athlete and his alleged accomplice in the slaying of a West Covina man has been delayed until August.

Bushawn Carpenter, 23, and Dupree Steele, 22, are charged in the shooting death of 28-year-old

Randy Lutz in February 1997.

Lutz, a conductor for Burlington Northern Santa Fe Railway, was found dead from a gunshot wound to the head on Riverside Drive.

During a court hearing on Friday, defense attorneys Grover Porter and Barry Post filed a request for the case to be dismissed based on testimony from the preliminary hearing.

Judge John Tomberlin said he would notify the attorneys of his ruling.

A trial had originally been scheduled to begin this month. Tomberlin instead set a trial date for Aug. 10.

Carpenter, a 1992 Barstow High School graduate, was a member of the Aztec varsity football and basketball teams and

was the Associated Student Body vice president. He was a law student attending the University of California at Berkeley when he and Steele, also a former Barstow High student, turned themselves in to Barstow police just days after Lutz's death.

Carpenter and Steele remain in custody in lieu of \$1 million bail each.

Pollution at PG&E plant near Needles investigated

By DAVID DRUDGE
Staff Writer

BARSTOW — A hazardous waste investigation has started at a Pacific Gas and Electric Co. compressor station 15 miles southeast of Needles.

The California Environmental Protection Agency's Department of Toxic Substances Control is investigating the possibility that chromium-based substances at PG&E's Topock Gas Compressor Station contaminated soil and groundwater.

"The first step is to take samples. Then, if it's warranted, the next step would be to conduct a corrective actions study," said Patrick Ritter, project consultant to PG&E. "If something is there, we'll look at what needs to be done and how to accomplish the cleanup."

Chromium-based additives are

considered to be acutely toxic and carcinogenic.

The environmental assessment is expected to take about one year. If toxins are present, cleanup could take an additional year.

"We should have some results later this year and, based on what is found, the DTSC will make the decision if we need to put together a plan for cleanup activities," said Mary Rodriguez, PG&E news representative. "Right now we're only at the point of investigating whether contamination is present."

The Topock compressor station occupies about 100 acres near the Havasu National Wildlife Refuge. It opened in 1951, compressing natural gas for transportation through pipelines that served central and Northern California.

When natural gas is com-

pressed its temperature rises. This increase requires the gas to be cooled before it proceeds through the system.

From 1951 to 1985, PG&E added chromium-based substances to the water in cooling towers to prevent corrosion of equipment. The wastewater from the cooling towers was not properly disposed of.

"During the 1950s and 60s, untreated cooling tower wastewater was discharged into the Bat Cave Wash, which is near the facility," Ritter said. "Based on sampling taken in the area, PG&E and the DTSC entered into an agreement to conduct further studies at the site."

Because Topock is about 1,500 feet from the Colorado River, contamination of this major source of drinking water is of great concern.

"Contamination of the near Colorado is obviously a big question and will certainly be part of our investigation," Ritter said. "We've sampled the Colorado River 11 times, and so far each test has come up negative."

The case appears similar to one in the Barstow area. In January 1996, PG&E settled a \$333 million lawsuit with about 650 people for chromium contamination near its plant in Hinkley.

Groundwater in the area Community Boulevard and Sunmer Road was contaminated with chromium VI, an anti-corrosive chemical used at the plant from 1952 to 1966.

Families in Hinkley claim the chromium caused a wide range of serious ailments, including cancer and birth defects.

Ex-Barstow sheriff's deputy gets meritorious service award

By SCOTT VANHORNE
Staff Writer

A former sheriff's deputy from Barstow who foiled a gun heist in December was given a

The woman said there was a car smashed into the front of Big S Sporting Goods.

Andrews, who was driving his civilian vehicle and was not in uniform, spotted his car in the

bers may have armed themselves.

"I knew they had shotguns and shotgun ammo in there," he said.

When a man emerged from the store with his arms filled with

formed officer arrives," he said.

The incident was a lot different than Andrews' daily routine in courtroom bailiff and it did not him yearn for the exciting of being a deputy on the beat.

Lake Havasu City News Herald 7/14/92

Gas plant cleanup plan open for review

A public participation plan regarding cleanup activities around the Topock Gas Compressor Station are available for public review at the Charles C. Royall Memorial Library.

The library is an official information repository for the materials, which include the Public Participation Plan as well as copies of a free, eight-page fact sheet providing information on the site.

The California Environmental Protection Agency, Department of Toxic Substances Control, is the lead agency overseeing a hazardous waste investigation at Pacific Gas and Electric Company's Topock Gas Compressor Station Site.

The facility, which began operation in 1951, compresses natural gas

for transportation through pipelines to PG&E's territory in central and northern California.

As natural gas is compressed, its temperature increases and the compressed gas is cooled in two cooling towers before it is transported through the pipelines.

From 1951 to 1985, PG&E added a chromium-based substance to the water in the cooling towers to prevent corrosion of the cooling tower equipment.

During the 1950s and 1960s, untreated cooling tower wastewater containing hexavalent chromium was discharged into the Bat Cave Wash area, which is normally a dry stream bed that feeds into the Colorado River. Later, lined evaporation ponds were used to dispose

of treated wastewater.

Between 1987 and 1995, investigations and clean-up activities have been conducted at the Topock site. These included shallow soil sampling in the Bat Cave Wash in the vicinity of the previous wastewater discharge area and the clean-up and closure of four evaporation ponds and removal of sludge and contaminated soil.

Chromium concentrations were found to be very low at these shallow depths, and did not pose a significant environmental threat.

Additional samples will be taken at greater depths in the wash. Groundwater monitoring wells have been installed to depths of 200 feet below grade, and surface water samples have been collected and

analyzed for chromium and other metals.

The results of these investigations are expected in late 1998.

Persons interested in reading the information available on the Topock site should stop by the library.

A Public Participation Plan is available for the project and is located in the reference collection. A fact sheet is available as a free pamphlet.

For more information about the materials, call the library at 435-0718.

For information about the Topock Compressor Station site, call Martin Prisco, DTSC public participation manager, at (818) 551-2875.

Study: Chromium isn't in Colorado river water

See related story, Page A8
By LEWIS CLEVENGER
TIMES NEWS STAFF

TOPOCK, Ariz. — California-based Pacific Gas and Electric Company is nearing completion of a study to determine the extent of soil and groundwater contamination by hexavalent chromium at the utility's Topock Gas Compressor site.

The facility of approximately 100 acres is located on the California side of the Colorado River near the Havasu National Wildlife Refuge, and about 15 miles southeast of Needles, California. Topock, Arizona, is about one-half mile north-east, while Park Moabi, California, is found about a mile to the northwest. Located within 35 miles of the facility are the Ft. Mojave, Chomehuevi and Colorado River Indian reservations.

The tests were mandated by the California Environmental Protection Agency to determine the extent of contamination by potentially harmful agents, specifically hexavalent chromium.

he added.

"Our measurements indicate the water table is almost flat, meaning that the chromium that is present in the wells is not being pushed into the river," Ritter said. "For the most part, the river is what is called a 'losing river.'"

Essentially, that means the river is feeding the wells through underground streams branching out from the riverbed, instead of the wells contributing to the river by flowing into it, he explained. The flow of river water into the wells from the river prevents the chromium from spreading outward, he added.

While neither agency has listed hexavalent chromium as a threat to the environment or its inhabitants, the tests were mandated to determine the extent of dispersion and provide a base for cleanup if the California agency deems it necessary. Thus, neither has set a maximum-acceptable level for chromium contamination in the environment.

So far, results are encouraging, according to Patrick Ritter, project consultant for the testing program, who is in charge of conducting the tests. Examiners collected 140 soil samples ranging from one to 200 feet in depth. The procedure calls for drilling several wells, 18 so far, in the area surrounding the site, as well as 30 random samplings of the river at a dozen locations and 30 different depths, he continued.

"While some wells in close proximity of the compressor site did show detectable levels of hexavalent chromium, the element was undetectable in the outlying wells," Ritter said. "That shows us that the chromium is not spreading."

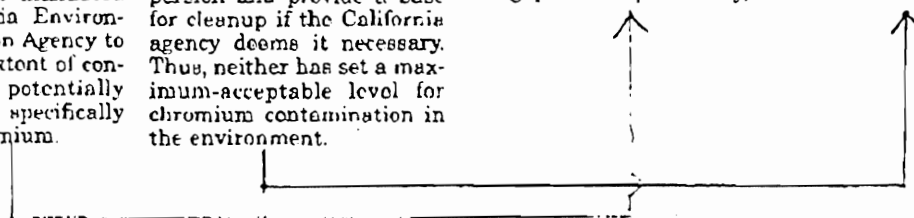
More than 30 samples taken from various locations and depths in the river at the same time revealed no traces of chromium either, he said. Water-level tests accomplished during the testing period explain why,

At this time, the area in question is void of human habitation, and there are no wells in the region providing drinking water for residents, he said. That begs the question of whether a threat may or may not exist, he added.

"There is no immediate threat to human health or impacts on the environment, and no one is drinking the water or being exposed to any danger, so we don't know yet if there is a threat," Ritter said.

At any rate, the Department of Toxic Substances Control, a division of the California Environmental Protection Agency, will make the ultimate decision as to whether a clean-up of the site is necessary in the future, he added.

"We want it (testing) to be complete as possible in order to establish a firm, factual base from which future decisions can be made with confidence," Ritter said. "That could take weeks, even months."





Mohave Valley DAILY NEWS

VOL. 34 NO. 73

MARCH 26, 1998

PUBLISHED IN BULLHEAD CITY, ARIZONA

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By DAVID R. GARVIN
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See Toxic on A3

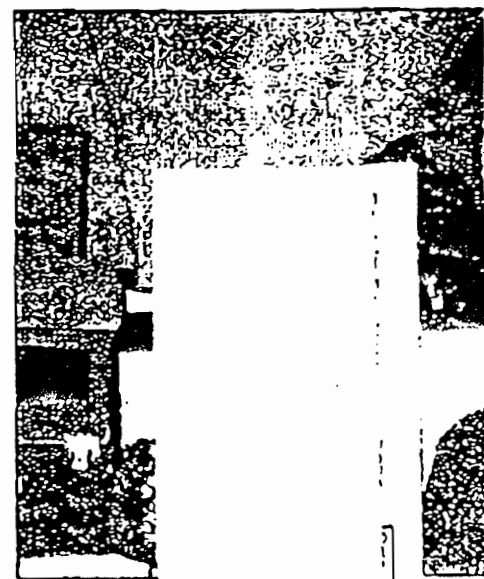
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By HEIDI V
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BULLHE

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Hospital, but he readily died from his in- while en route, Harney

cohol impairment has ruled out as a cause for accident, and Harney ed Thompson may have d off to sleep or taken his ion away from the road moment.

mpson is survived by his er and father and a six- old daughter.

free on bail

up to U.S. District Judge Strand to decide what, bail is appropriate for on. On Wednesday, a panel of the 9th it ruled unanimously Sydnigton's appeal rais- substantial question" and irly debatable," justify- ail.

• Juvenile

Continued

"We, frankly, would prefer it be at the former (armory) site, but, frankly, we would rather have the facility," McCall said of the need for a new building to replace the over-crowded building behind the courthouse.

Plans for a new building were put on hold in February when it was discovered the contractor hired to build the facility, then estimated at \$2.6 million, had non-existent bonds and insurance documents.

Richard Johns, former owner of August Constructors, is currently in the Mohave County Jail pending charges of fraud and theft.

Funeral Notice

Gerald L. Howell, 64, died March 23. Funeral services will be held in Wichita, Kansas. Arrangements made by Dimond & Sons Silver Bell Chapel.

• Toxic

Continued

station to determine the extent of ground water contamination and to ensure hexavalent chromium has not entered the Colorado River, Ritter said.

"We understand the Colorado River is a precious resource in this region, and that's why we will test and make sure chromium has not entered the river. To date, information we have indicates chromium has not reached the river," Ritter said.

Water from these wells will be tested, and the results of those tests will be made available later this year, Ritter said.

While the form of hexavalent chromium can be harmful in certain concentrations if drank by humans and animals, Rit-

ter pointed out no one draws ground water from the affected area.

The closest residences to the site are Topock Ariz., half a mile east and across the Colorado River and Park Moabi, Calif. located one mile north west of the facility.

Depending on the extent of pollution of local ground water, PG&E has agreed to take appropriate action to clean up the environment, according to a California Environmental Protection Agency report. Ritter said there may be ways to convert hexavalent chromium to its less toxic cousin trivalent chromium in ground water, and a clean-up might involve removal of the substance from the soil in Bad Cave Wash and other potentially affected areas.

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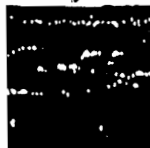
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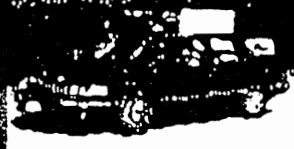
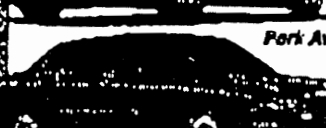
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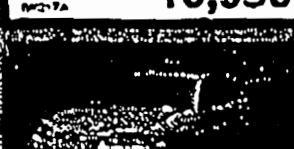
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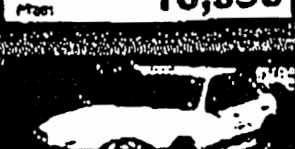
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