

Health Consultation

KERR-MCGEE SITE
EVALUATION OF VICH SPRING AND GOLDEN HILLS SUBDIVISION

SPRINGFIELD, GREENE COUNTY, MISSOURI

EPA FACILITY ID: MOD007129406

JANUARY 18, 2006

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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Prepared by:

Missouri Department of Health and Senior Services
Division of Community and Public Health
Section for Environmental Public Health
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

STATEMENT OF ISSUES AND BACKGROUND

Statement of Issues

The Missouri Department of Natural Resources (MDNR) has requested the Missouri Department of Health and Senior Services (DHSS), in conjunction with the federal Agency for Toxic Substances and Disease Registry (ATSDR), complete a health consultation for the Vich Spring and Golden Hills Subdivision in Springfield, Greene County, MO. This health consultation focuses on residents' exposure to possible petroleum contamination in their residential yard soils.

Background

The Springfield Kerr-McGee facility is currently classified as a closed site with a Missouri Hazardous Waste Management Facility Permit. The site is still undergoing corrective action, and Kerr-McGee is still responsible for any contamination originating from their site. The facility formerly treated railroad ties with creosote wood preservative. Several solid waste management units, three surface impoundments, and a land farm treatment unit are all located on the site. When Kerr-McGee stopped operating, the solid waste management units, three surface impoundments, and the land farm treatment unit went through a closure process. The closure included the removal of contaminated soil and the placement of final covers or caps on the surface impoundments. Corrective measures also included the installation of several recovery trenches, extraction wells, and groundwater monitoring wells to track the movement of remaining underground contamination. The areas where contamination remained in place after closure was finished, such as the surface impoundments, entered a period of post-closure maintenance and long-term monitoring to ensure that the cap remains stable and further contaminant migration does not occur.

Kerr-McGee was required to investigate the type and amount of contamination at their wood treating facility as part of the facility closure. A dye trace study showed that dye injected in groundwater near Kerr-McGee surfaced at Vich Spring (approximately 1/2 mile, Figure 1). As a result, Kerr-McGee investigated the Vich Spring area from approximately 1972 to 1988. The results were reported in their Resource Conservation and Recovery Act (RCRA) Facility Investigation Report in 1992.

The Golden Hills Subdivision is a fairly new subdivision southwest of the Vich Spring location. It is located off of Westwood Drive, north of Kearney Street, in Springfield (Figure 1). Bedrock blasting that was necessary to install sewer lines for the development of the subdivision has reportedly changed the local flow of groundwater in the area. This caused the old Vich Spring to stop discharging and the water to surface as a new spring in the subdivision. The new spring was named Woodlawn Spring.

During a site visit on January 5, 2005, which took place after a four-inch rain, City of Springfield staff, Kerr-McGee staff and MDNR staff observed a large volume of water discharging to the surface from a ditch bank (Woodlawn Spring). The water smelled like creosote and had an oily

sheen. The water surfaced in a residential yard and then flowed into a concrete culvert that empties into a storm water retention basin in the Golden Hills Subdivision.

On January 13, 2005, MDNR sent Kerr-McGee a letter requiring them to do additional investigation to determine the type of contamination, and possible sources of the material under their Missouri Hazardous Waste Management Facility Permit. On January 20, 2005, Kerr-McGee took two sediment and four water samples of Woodlawn Spring and in the retention basin, which indicated detectable levels of Polycyclic Aromatic Hydrocarbons (PAHS) and Total Petroleum Hydrocarbons (TPHs).

Although Kerr-McGee appears to be the source of at least some of the contamination, there are several other businesses in the area that could be contributing to the contamination of Woodlawn Spring. PAHs are fairly common and found in substances such as crude oil, coal, coal tar pitch, creosote and roofing tar.

Since the discovery of the new discharge at Woodlawn Spring and the initial investigation, Kerr-McGee has purchased and fenced most of the storm water retention basin. However, during significant runoff events, water has backed up into a portion of the storm water retention basin outside of the fence and not owned by Kerr-McGee.

Community Concerns

On August 22, 2005, staff from MDNR, DHSS, and ATSDR attended a public meeting hosted by the community. The agencies were invited to answer questions and give information to the residents about contamination in the subdivision. Many of the residents were unaware of the contamination. The residents had many questions about the contamination such as:

- where did it come from;
- what is going to be done about it;
- what chemicals are present;
- what are the health affects; and
- are the residential yards in the neighborhood safe to work and play in.

Concern was also expressed about flood-transported contaminants being where children play and where people can easily come in contact with the soil in that area.

MDNR staff discussed the upcoming sampling that Kerr-McGee would be conducting east of the subdivision and near the storm water retention basin. Because many residents expressed concern about contamination possibly being in their residential yard soils, MDNR and Kerr-McGee agreed to sample a small number of yards in the subdivision. The yards were chosen based on neighborhood agreement or evidence that there may be a problem related to these contaminants. Possible locations discussed during the meeting included a yard across the street from the retention basin, one south of the hole by the ditch, and one on the far corner of the subdivision away from the contaminated sediment. MDNR could not justify sampling every yard in the subdivision (45) without probable cause.

Site Investigation

On August 23, 2005, MDNR and Kerr-McGee contract staff collected soil samples within the subdivision and one groundwater sample from Woodlawn Spring. Kerr-McGee also began their work to fully characterize Woodlawn Spring during that same week. Kerr-McGee is planning to sample discharge from the spring during or immediately following periods of high flow, install monitoring wells and exploratory trenches in the area east of the subdivision, and take additional soil and sediment samples. Kerr-McGee has installed a new pipe at the discharge point of Woodlawn Spring to direct the flow of water under the street and into the retention basin.

During the August 23, 2005 sampling event, MDNR and Kerr-McGee contract staff collected nine composite surface soil samples (0-3 inches) from six residential yards in the Golden Hills Subdivision. Composite soil samples are made up of several smaller samples taken from a large area to be representative of the area. The samples were split, with MDNR taking their portion to their laboratory for analysis and Kerr-McGee contractor doing the same. Tables 1 and 2 list the results for the samples in which detectable levels of contaminants were found. Six of the samples did not have any contaminants at detectable levels. Contaminants were detected in three of the samples; however, the levels were below values considered harmful for long-term residential use.

DISCUSSION

Sampling results were compared to health-based comparison values established by the MDNR and ATSDR. The MDNR has developed the Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance, which define Default Target Levels (DTLs) for chemicals of concern that are protective of human health and the environment. These levels are designed to prevent adverse health effects over long-term exposure.

ATSDR has developed comparison values (CVs) that are media-specific concentrations used by health assessors to select environmental contaminants of concern. Contaminant concentrations that are less than the CV are unlikely to pose a health threat. Contaminant levels above the CV do not necessarily indicate that a health threat is present, but that further evaluation of the chemical and pathways is needed. The ATSDR CVs listed below are Environmental Media Evaluation Guides (EMEGs), Reference Dose Media Evaluation Guides (RMEGs), or Cancer Risk Evaluation Guides (CREGs).

EMEGs are media specific concentrations of substances to which humans may be exposed during a specific period of time without experiencing adverse health affects. EMEGs can be derived for acute, intermediate, and chronic duration exposures. Acute exposure is defined as exposure that occurs for less than 14 days. Intermediate exposure occurs for more than 14 days but less than 364. Chronic exposure occurs for more than 365 days. RMEGs also represent concentrations of substances to which humans may be exposed without experiencing adverse health affects; however, RMEGs apply only to chronic exposure. Both EMEGs and RMEGs have different values for adults and children. CREGs are media-specific comparison values that

are used to identify concentrations of cancer-causing substances that are unlikely to result in an increase of cancer rates in an exposed population.

Kerr-McGee's contract laboratory found the following PAHs in the soil samples; pyrene, fluoranthene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno (1,2,3-cd)pyrene, and benzo(g,h,i)perylene in the residential soil samples. Benzo(b)fluoranthene was found alone in one sample and bis (2-ethylhexyl)phthalate was found alone in another sample. However, the levels were found below those that are anticipated to cause adverse health affects. MDNR's laboratory found that the sample taken closest to the fenced area of the storm water retention area had detectable levels of benzo(a)pyrene and TPHs. The level of benzo(a)pyrene detected was 0.17 milligrams per kilogram (mg/kg). The MRBCA DTL for benzo(a)pyrene is 0.19 mg/kg. Since the samples were composite samples, it is possible that there are areas where the concentration of benzo(a)pyrene is above the MRBCA DTL. The level of TPHs was insignificant and well below the MRBCA DTL. Adverse health affects are not expected to occur from exposure to this area.

Although the area inside of the fence was found to have levels of contaminants above health concern, exposure is not occurring within this area. Trespassing in the fenced area is not recommended. Exposure should not be occurring to the discharge waters of Woodlawn Spring with the installation of the new drainage pipe that captures the water and carries it over into the retention basin. The area east of the subdivision is under investigation by Kerr-McGee. The investigation will determine where the contamination is originating and where it is migrating.

CONCLUSIONS

The Golden Hills Subdivision and Woodlawn Spring portion of this site is considered to be a *No Apparent Public Health Hazard*. This category is used for sites where exposure to contaminated media may be occurring but the exposure is not expected to cause adverse health affects.

1. The residential yards within the Golden Hills Subdivision do not contain contamination at levels of health concern.
2. Contaminants have been found in the water and soil within the storm water retention basin area inside the fence. However, because of the fence, exposure is not expected to occur.
3. Contaminants have been found in the discharge water of Woodlawn Spring. However, because of the recently installed drainage pipe, exposure is not expected to occur.

RECOMMENDATIONS

1. DHSS recommends that Kerr-McGee and MDNR continue to investigate the possible contaminant migration in the area east of the subdivision.
2. DHSS recommends that the fence remain in place and residents stay out of the fenced area, because contamination was found in the retention basin.

PUBLIC HEALTH ACTION PLAN

This Public Health Action Plan (PHAP) for the Vich Spring and Golden Hills Subdivision site contains an explanation of the actions to be taken by the Missouri Department of Health and Senior Services (DHSS), the Agency for Toxic Substances and Disease Registry (ATSDR), and other stakeholders. The purpose of the PHAP is to ensure that this public health consultation not only identifies public health hazards, but provides an action plan to mitigate and prevent adverse human health effects resulting from past, present, and future exposures to hazardous substances at or near the site. Below is a list of commitments of public health actions to be implemented by DHSS, ATSDR, or other stakeholders at the site:

1. DHSS/ATSDR will address community health concerns and questions as they arise.
2. DHSS/ATSDR will review additional sampling data as it becomes available and provide guidance regarding possible health risk if necessary.
3. DHSS/ATSDR will provide a public health consultation on the information from the additional investigation.

Preparers of the Report:

Kristi Campbell, Cherri Baysinger, Missouri Department of Health
and Senior Services

Attachments:

Tables:

Table 1. Sample results from the Kerr-McGee Contract Laboratory.

Table 2. Sampling Results from MDNR's Laboratory.

CERTIFICATION

This Vich Spring and Golden Hills Subdivision site, Springfield, Missouri, Public Health Consultation was prepared by the Missouri Department of Health and Senior Services (DHSS) under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with the approved methodologies and procedures existing at the time the health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.

Technical Project Officer, CAT, SPAB, DHAC

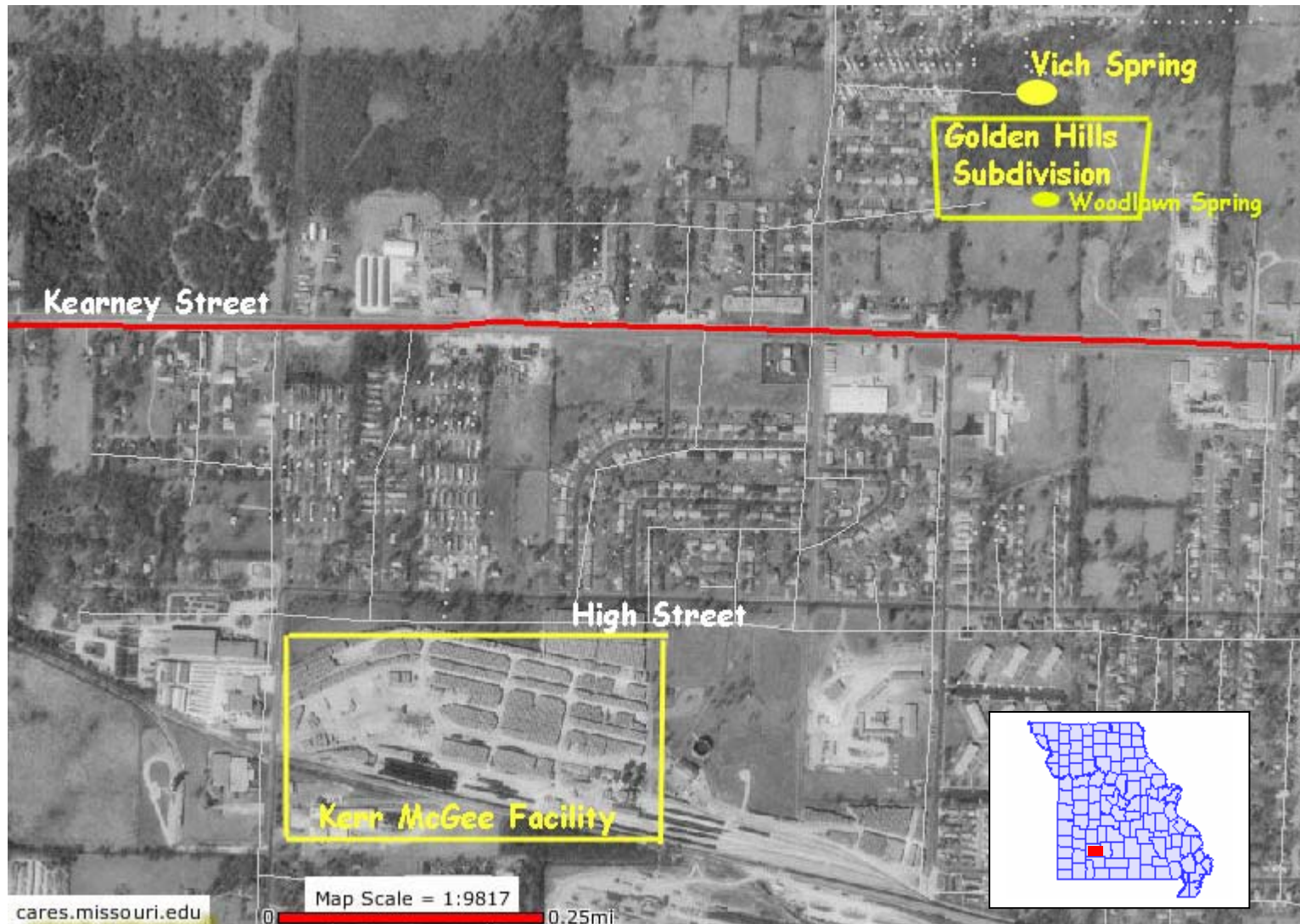
The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

Team Lead, CAT, SPAB, DHAC, ATSDR

References

1. Lancaster Laboratories. Analytical Results. 2005 September 14.
2. Missouri Department of Natural Resources, Environmental Services Program , Sampling Results. 2005 September 9
3. <http://cares.missouri.edu/index.asp>

Figure 1. Map of Kerr-McGee Facility and Golden Hills Subdivision, Springfield, Missouri



Map modified from www.cares.missouri.edu. The location of Vich Spring, Woodlawn Spring, and Golden Hills Subdivision are approximate.

**Table 1. Sample results from the Kerr-McGee Contract Laboratory
(August 23, 2005)**

Sample #	Contaminant	Sample Result (mg/kg)	MRBCA DTLs (mg/kg)	ATSDR Comparison Value (mg/kg)
SS-2	Pyrene	0.059 J	751	2,000 (child, RMEG) 20,000 (adult, RMEG)
	Fluoranthene	0.056 J	1190	2,000 (child, RMEG) 30,000 (adult, RMEG)
	Benzo(a)anthracene	0.059 J	1.84	NA
	Chrysene	0.06 J	183	NA
	Benzo(b)fluoranthene	0.23	1.84	NA
	Benzo(k)fluoranthene	0.078 J	18.4	NA
	Benzo(a)pyrene	0.12 J	0.19	0.1 (CREG)
	Indeno(1,2,3-cd)pyrene	0.096 J	1.12	NA
	Benzo(g,h,i)perylene	0.1 J	625	NA
SS-5	Benzo(b)fluoranthene	0.074 J	1.84	NA
SS-8	Bis(2-Ethylhexyl)phthalate	0.2 J	117	NA

Table 1. is a listing of the sample results from the Kerr-McGee contract laboratory that had detectable values. All values are listed in milligrams per kilogram (mg/kg).
 "J" = denotes a sample that is an estimated value.
 NA = values were not available.

**Table 2. Sampling Results from MDNR's Laboratory.
(August 23, 2005)**

Sample #	Contaminant	Sample Result (mg/kg)	MRBCA DTLs (mg/kg)	ATSDR Comparison Value (mg/kg)
02	Benzo(a)pyrene	0.17	0.19	0.1 (CREG)
	Total Petroleum Hydrocarbons as No.2 Diesel	56.9	4140	NA

Table 2. is a listing of the sample results from MDNR's laboratory that had detectable values. All values are listed in milligrams per kilogram (mg/kg).
 NA=Not available.