

# Health Consultation

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Dioxin contaminated Aerial Spraying Landing Locations  
Kellner, Icehouse and Sixshooter Canyons

GLOBE DIOXIN

GLOBE, GILA COUNTY, ARIZONA

CERCLIS NO. AZ2141190064

MAY 29, 1998

**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**

**Dioxin Contaminated Aerial Spraying Landing Locations  
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**CERCLIS NO. AZ2141190064**

**Prepared by:**

**Arizona Department of Health Services  
Office of Environmental Health  
Under Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry**

## BACKGROUND AND STATEMENT OF ISSUES

The Agency for Toxic Substances and Disease Registry (ATSDR) received a petition request from the Honorable J.D. Hayworth, Congressional Representative from the 6th Congressional District of Arizona, to investigate reported health concerns associated with the 1965-1969 aerial spraying of herbicides in a rural area south of Globe, Arizona. The Arizona Department of Health Services (ADHS), Office of Environmental Health (OEH), in cooperation with ATSDR, conducted an investigation. This health consultation documents the findings of that investigation.

Globe, Arizona is a city of approximately 5,000 people located in the transition area of central Arizona between the upper Sonoran desert and the high chaparral. The elevation ranges from 3,500 to 7,800 feet above sea level. Annual rainfall is approximately 15 inches per year. The community is in a traditional mining area, with the location of several open pit copper mines providing employment to the local population. The area of concern is located approximately 3 miles south of the city, in the foothills of the Pinal mountains. Three parallel canyons, the Kellner, Icehouse, and Sixshooter, run north from the mountains toward Globe. These canyons are inhabited by several hundred persons who have built homes along the streams that run for most of the year. The area is vegetated with low scrub brush and scrub oaks, although the canyons have large sycamore trees in significant numbers.

The three canyons were sprayed with herbicides in an attempt to decrease scrub vegetation and increase water run off in order to increase foraging capacity for open range cattle operations. These programs used the aerial application of several herbicides, including 2,4,5-T and Silvex. Both of these herbicides later were found to contain 0.5 parts per million (ppm) of 2,3,7,8 TCDD (tetrachlorodibenzo-p-dioxin), or dioxin, as it is more commonly known, a contaminant by-product of the manufacturing process. The spraying was conducted by the US Department of Agriculture and the US Forest Service from 1965 to 1969. Complaints by area residents of spray drift during the 1969 operation led to the suspension of the program. The herbicides were mixed with a carrier fluid to obtain a mixture equivalent of between 4 and 6 pounds (lbs) of herbicide per gallon of the mixture. The amount of herbicides applied to each acre of land within the spray area varied from 1 and 2 lbs per acre.

Immediately following the June 8 - 11, 1969 spraying, complaints were registered with the Forest Service alleging illnesses and birth defects among area residents as well as animal birth defects.

In 1970, the US Department of Agriculture and the Forest Service began an investigation in response to reported incidents of illness and deformities. This investigation included some environmental sampling. Conclusions reached by this investigation stated that no known health impacts would result from the limited exposures to the herbicides used. Residents of the area filed a class action suit against the herbicide manufacturers and settled out of court in 1981.

As a result of the Times Beach, Missouri incident, in which a suburb of St. Louis was evacuated by the EPA due to dioxin contaminated oil sprayed on the dirt roads, the EPA conducted the

National Dioxin Study in 1985, and the Globe site was examined again. EPA reported that the helicopter landing sites were contaminated with TCDD, but the quantities detected were in amounts that did not present a danger to the local population. This low risk assignment was justified based upon the remote location of the landing sites and the relatively low levels of TCDD found at the sites. The Arizona Department of Environmental Quality conducted environmental sampling of the area in 1991-1993 and did not detect any TCDD in any samples. An independent contractor for EPA reviewed all previous data collected on the site in 1995 and concluded that no further action was required. Findings in these reports included:

- The nearest domestic water well is approximately 1 mile from one of the landing sites, and a total of approximately 20 people are served by wells within 4 miles of the site. There are no municipal wells within 4 miles of the site.
- There are no drinking water intakes or fisheries located within 15 miles downstream of the site. There are no aquatic-sensitive environments within 15 miles downstream of the site.
- There are no residences, schools, or day care facilities on or within 1 mile of the site. There are approximately 400 people within 4 miles of the site.
- Due to advances in laboratory detection methods, previous test sites where no TCDD was detected now have detectable levels of TCDD.

Environmental sampling has been conducted by both the USEPA and ADEQ. See Table 1. Levels of dioxin at the helicopter loading areas were above the EPA's recommended level of 1 part per million (ppb) for residential areas, but since these sites are in remote locations, no removal action was deemed necessary. Sampling of soils and water in Kellner Canyon revealed levels of OCDD (octochlorodibenzodioxin) (a naturally occurring dioxin, resulting from the burning of organic matter) in the parts per trillion (ppt) range. There was some concern regarding the sampling accuracy due to the sample blank for a water sample having 41 ppt of OCDD. No samples showed any detectable levels of TCDD in Kellner Canyon.

## DISCUSSION

Detectable levels of 2,3,7,8-TCDD may persist at many historical phenoxy herbicide mixing and loading locations where product spillage and rinsate have occurred. 2,3,7,8-TCDD may also be found at short distances from the mixing and loading areas. Dioxin was not detected in stream sediment, wildlife or domestic livestock samples collected near Globe. Other herbicide mixing and loading locations, such as those found in agricultural areas and used over longer periods of time, may contain levels of 2,3,7,8-TCDD in excess of values reported in this consultation.

**TABLE 1**  
**Sampling results for Globe Dioxin studies**

EPA sampling 1985		ADEQ sampling 1991-93*	
Helisopt #1 landing area	316 ppt	Helisopt #1	240 ppt
Helisopt #1 loading area	6623 ppt	Helisopt #2	220 ppt
Helisopt #2 landing area	564 ppt	Kellner Canyon sediment	no detect
Helisopt #2 loading area	not sampled	Kellner Canyon surfacewater	no detect
Helisopt #3 landing area	no detect	Kellner Canyon groundwater	no detect
Helisopt #3 loading area	2872 ppt		
Helisopt #4 landing area	no detect		
Helisopt #4 loading area	not sampled		
Helisopt #5 landing area	not sampled		
Helisopt #5 loading area	no detect		
Kellner Creek sediment	no detect		
Icehouse Creek sediment	no detect		
Pinal Creek sediment	no detect		
Blue Tank cattle water basin	no detect		

\* ADEQ records do not specify where at the helispots samples were taken  
Surface water samples were taken during both light and heavy run-off periods  
Groundwater samples were taken at two different private well sites

TCDD is susceptible to photo degradation in the presence of ultraviolet light. Because the sites where the loading and mixing took place are open areas, and the region averages 320 days of sunlight per year, photo degradation would be expected to occur. This would appear to be the case here, as levels of TCDD measured during consecutive sampling surveys revealed decreasing TCDD levels between 1986 and 1993.

Biological sampling of both domesticated animals and wildlife in the area found no detectable levels of TCCD. Domestic animals sampled included cattle that roamed the range in the spray area. See Table 2.

TABLE 2

SPECIES	LOCATION	TISSUES SAMPLED
Coyote	Russell Gulch, N of spray area	liver, kidney, fat
Black Rattlesnake	Icehouse Canyon, near #3	whole
Deer	near Helispot #2, W of road	liver, kidney, fat
Deer	near Helispot #2, W of road	liver, kidney, fat
Javelina	W of Russell Gulch, S of Blue Tanks	liver, kidney, fat
Javelina	W of Russell Gulch, S of Blue Tanks	liver, kidney, fat
Glossy Snake	Kellner Campground	whole
Gambel's Quail	Kellner Canyon	whole
Garter Snake	Blue Tank	whole
Toad	Blue Tank	whole
Leopard Frog	Blue Tank	whole composite

### CONCLUSIONS

Based upon the number of investigations and reviews of the available information, there was not sufficient exposure to the dioxin in the herbicides either during the spray operations or in the following years to cause adverse health effects. Although laboratory detection methods have progressed to allow the identification of TCDD in the parts per trillion range, previous sampling of water and soils in the area failed to detect measurable levels of TCDD in either domestic well water or yard soils.

Due to the extensive testing of both flora and fauna in the area of the deforestation project, all of which revealed no presence of TCDD, further environmental testing would not present any foreseeable benefits. As the soils of the helispots are the only areas that contain any detectable amounts of TCDD, and because these sites are in remote areas, human contact with the contaminant will continue to be minimal. Photodegradation of the TCDD will continue until the substance has completely degraded, thus removing the possibility of human contact in the foreseeable future.

### RECOMMENDATIONS

No further public health follow-up actions are needed at this time.

If future studies determine further action is necessary to protect human health from the TCDD present at the landing sites, appropriate measures should be enacted to mitigate human exposure.

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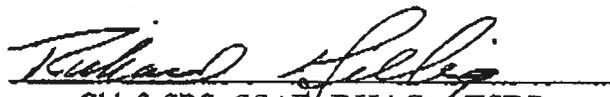
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## CERTIFICATION

The Dioxin Contaminated Aerial Spraying Landing Locations Health Consultation was prepared by the Arizona Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

  
Technical Project Officer, SPS, SSAB, DHAC

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

  
Chief, SPS, SSAB, DHAC, ATSDR