

Health Consultation

GILA CROSSING PRESBYTERIAN CHURCH

DISTRICT 6, GILA RIVER INDIAN COMMUNITY,
MARICOPA COUNTY, ARIZONA

EPA FACILITY ID: AZD981621881

MARCH 11, 2005

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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DISTRICT 6, GILA RIVER INDIAN COMMUNITY,
MARICOPA COUNTY, ARIZONA

EPA FACILITY ID: AZD981621881

Prepared by:

Gila River Indian Community
Department of Public Health,
Office of Occupational Safety and Health Office
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

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Acronyms

ACM	Asbestos Containing Material
AHERA	Asbestos Hazard Emergency Response Act
ATSDR	Agency for Toxic Substance and Disease Registry
CV	Comparison Value
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
(f/ml)	Fiber per milliliter
f/cc	Fiber per centimeter cubed
GRIC	Gila River Indian Community
HEPA	High Efficiency Particulate Air Filter
LOAEL	Lowest Observed Adverse Effect Level
MCL	Maximum Contaminant Level
MRL	Minimal Risk Levels
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOAEL	No Observed Adverse Effect Level
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PLM	Polarized Light Microscopy
RfD	Reference Dose
Str/mm ²	Structures per millimeter squared
Str/cc	Structures per cubic centimeter
TEM	Transmission Electron Microscopy

SUMMARY AND STATEMENT OF ISSUES

The Gila River Indian Community (GRIC), Office of Occupational Safety and Health (OSH), through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), has prepared this health consultation at the request of the members of the Gila Crossing Presbyterian Church in District 6. The health consultation serves to address concerns about possible health effects from asbestos exposure from both the exterior and interior of the Presbyterian Church and groundskeeper's residence and to determine if current conditions at the site posed a threat to their health. The data available to the OSH is presented in the background section, followed by a discussion of the health implications, conclusions, and recommendations.

Background

The site is in District 6 of the GRIC Gila Crossing, at the intersection of 51st Avenue and Santa Cruz road, Maricopa County, Arizona. The site is within Section 9, Township 2 South, Range 2 East of the Gila and Salt River Baseline and Meridian (Appendix A photos). The area under investigation encompasses the interior (approximately 2000 square feet) and exterior (approximately 300 square feet). The church is situated in the middle of the property with residential areas surrounding it. 51st Avenue borders the property to the south. Geographical coordinates for the site are 33° 16' 35" north latitude and 111° 09' 60" west longitude.

The site has a variety of bushes and trees planted around the structure. A dirt parking lot surrounds the church. Warning tape has been placed across the front doors that warn of the asbestos contamination. The church faces south towards 51st Avenue. Handicap signs are lined in front of the church and parking blocks are directly in front of the signs. The shell of a small condemned building, which houses plastic chairs and has only half of the walls up sits southeast of the church. The grounds keeper's residence is sixty feet away and directly northeast of the church. There are two entrances to the southwest and southeast of the church property off 51st Avenue. There are two dirt roads leading off the property to the northwest. The Gila Crossing Presbyterian Church was built in the late 1960's. According to discussion with the church pastor there are 40-registered church members, age ranging from 65 years old to infancy, consisting of mostly women. Approximately half of the congregation is children ranging from infancy to 12 years of age.

Demographics

The population in GRIC District 6 is approximately 2335 according to records (1). The area surrounding the church consists of approximately 230 residents living within a one-mile radius of the site according to the District 6 Coordinator. Aside from the groundskeeper residence, the nearest residence outside the church property is approximately 600 feet. Child specific census data was not available at the time this health consultation was written.

Site Investigation

In November 2003 as part of the process of remodeling the church, a set of parishioners, ranging in age from 21 to 61 old years, scraped old sprayed ceiling material for approximately five days prior to painting the church ceiling. During the scraping and painting a second set of parishioners (ages 38 to 71 years old) assisted in clean up of the scraped material. In the days following, the parishioners discovered that some of the previously painted ceiling material in addition to other white material fell onto the church floor covering the pews and anything that was in its way on the way down from the ceiling. The second set of parishioners proceeded to pick up the fallen material using a shop vacuum cleaner. The vacuumed material was deposited in garbage cans and some of the material was deposited on the soil behind the church. Various furnishings that were covered by the white material were removed from the church, and scattered about the northern outside perimeter. The parishioners were eventually made aware that the white material might be asbestos containing material (ACM). Eleven parishioners were possibly exposed to this ACM. This sequence of events took place over a 2 week period. After learning that the white material might be ACM, remodeling at the church was ceased until further notice.

According to records, on December 9, 2004, GRIC Occupational Safety and Health (OSH) conducted initial environmental bulk sampling at the site. Three bulk samples were taken from the interior of the church and submitted to Fiberquant Analytical Services of Phoenix, AZ for analysis. These samples had an asbestos content greater than 1%, which is the regulatory level used to define an ACM. All three samples were found to contain 2-5% chrysotile asbestos. After receiving these sample results, GRIC OSH recommended that the Gila Crossing Presbyterian Church be closed until the ACM could be properly remediated.

On December 20, 2003, the GRIC OSH conducted asbestos air sampling at the Gila Crossing Presbyterian Church. Three air samples were collected from the church interior, two from the exterior and one blank field sample. These samples were submitted to Fiberquant Analytical Services in Phoenix, AZ for analysis. Four of the five samples contained 2-5% Chrysotile asbestos. Sample results of the interior and exterior samples are listed in Tables 1 and 2. One interior sample was overloaded and could not be analyzed. The field blank was not analyzed and no reason was given. No personal monitoring was conducted because work inside the church had ceased based on the recommendation of the GRIC OSH.

On March 18, 2004, Spray Solutions Environmental remediation service set up two negative air machines to lower air contaminants in the chapel. They returned on March 19, 2004 to decontaminate the storage room by using a High Efficiency Particulate Air Filter (HEPA)* to vacuum the walls, floors, and by wet wiping all room contents (5).

* HEPA (High Efficiency Particulate Air Filter): At least 99.9% efficient in the filtration of airborne particles 0.3 micron in diameter

HEPA filters are at least 99.9% efficient in the filtration of airborne particles 0.3 microns in diameter.

The GRIC Department of Environmental Quality (DEQ) was contacted by representatives of the Gila Crossing Presbyterian Church, requesting assistance for remediation of the interior and exterior of the church. On March 24, 2004 the GRIC DEQ agreed to assist with soil remediation of the exterior of the church only and remediation efforts were completed March 30, 2004 (2). The church is seeking funding for the remediation of the interior. The GRIC OSH will oversee interior remediation of the Gila Crossing Presbyterian Church when funding is secured. The GRIC OSH will conduct post remediation air and soil sampling of the exterior and property perimeter.

Currently, no one is allowed inside the Gila Crossing Presbyterian Church unless they have received proper asbestos training or the asbestos remediation is complete. A remediation service has been chosen, but the funding has not been secured to continue the remediation of the interior of the church. The exterior of the church must undergo post-soil sampling to determine if remediation is complete. Also, the Gila Crossing Presbyterian Church property boundary must be sampled to determine if asbestos may have reached neighboring properties.

Environmental Contamination

The GRIC OSH conducted several environmental samplings at the Gila Crossing Presbyterian Church. A discussion of the sampling events and the results of sample analyses follows.

In late November 2003, the GRIC OSH was contacted by a spokesperson for the Gila Crossing Presbyterian Church to request testing of a white material that had been scraped or had fallen from the ceiling of the church. On December 9, 2003 initial bulk sampling results of the white material at the site indicated the presence of chrysotile asbestos (3).

EPA Method 600/R-93/116 was used for the fiber analysis. Polarized Light Microscopy (PLM) analysis is best used to identify asbestos in bulk sampling. Current Environmental Protection Agency (EPA), National Emission Standards for Hazardous Air Pollutants, (NESHAP), and Occupational Safety and Health Administration (OSHA) regulations designate a result of less than or equal to 1% asbestos as “negative” and greater than 1% (>1%) asbestos as “positive”. Samples containing layers that have been determined to be positive may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be “negative” (6). Laboratory microscopic analysis of the bulk samples taken from the Gila Crossing Presbyterian Church detected 2-5 % chrysotile asbestos for all three-bulk samples (Table 1.)

Table 1 **Gila Crossing Presbyterian Church**
Asbestos Bulk Sampling Results
Source: Randall Lange Report

SAMPLE NUMBER	ASBESTOS RESULTS	% Of Asbestos	EPA <1% BY VOLUME
GM04009	Chrysotile	2-5%	Yes
GM04010	Chrysotile	2-5%	Yes
GM04011	Chrysotile	2-5%	Yes

Based on December 9, 2003 bulk samples results, the OSH recommended that air sampling be conducted to document air concentrations of asbestos. No personal air monitoring took place because work inside the church had ceased based on the recommendation of the GRIC OSH. On December 20, 2003 sampling was conducted on the exterior and interior of the site using 25 millimeter (mm) diameter and 0.4 micrometer (μm) pore size filter cassettes. Three air samples were collected from the church interior, two from exterior and one blank field sample. Total volume of each sample was approximately 1200 liters (4). The samples were prepared and analyzed using EPA approved methods (Asbestos Hazard Emergency Response Act (AHERA) (Appendix A to Subpart E - Interim Transmission Electron Microscopy (TEM) analytical methods, United States Environmental Protection Agency (US EPA) 40CFR Pt. 763, Mandatory Method) protocol (7). TEM method determines the types of asbestos fibers present, as well as the length, width, and aspect ratios (length:width) of asbestos structures. The results of the four analyzed samples indicated chrysotile asbestos >5 micrometers (μm). Chrysotile asbestos is slightly higher than the ATSDR Comparison Value (CV). According to the ATSDR Health Guideline asbestos is listed as “carcinogenic to humans”. Sampling was conducted 2-3 weeks after closure of the church; consequently there was little or no activity prior to sampling. Therefore, asbestos levels could have been higher during scraping and painting activities. The laboratory analysis results of the six air samples are listed below in Table 2.

Table 2 **Gila Crossing Presbyterian Church**
Interior and Exterior Air Sampling Results
Source: Randall Lange Report

SAMPLE NUMBER	LOCATION SAMPLED	AIR SAMPLING RESULTS[†]	ATSDR COMPARISON AIR VALUE
PX04012	Interior Near Alter	0.103 f/cc	0.000004 f/cc
PX04013	Interior Front Entrance	0.159 f/cc	0.000004 f/cc
PX04014	Interior Middle of Sanctuary	Not Analyzed*	0.000004 f/cc
PX04015	Exterior Near Front Entrance	0.015 f/cc	0.000004 f/cc
PX04016	Exterior Near NW Corner	0.019 f/cc	0.000004 f/cc
PX04017	Exterior Opened in Field	Not Analyzed**	0.000004 f/cc

*PX04014: Loose material – too heavily loaded to count – not prepared to read.
**PX04017: Not analyzed – no reason given.

On May 18, 2004, two asbestos samples were taken from the groundskeeper’s residence and the results were negative (8).

Clean up status

Post remediation sampling of the church exterior has not yet been conducted by GRIC OSH. Post remediation sampling will consist of air, soil and perimeter sampling of the Gila Crossing Presbyterian Church property boundary to determine if asbestos may have reached neighboring properties.

Under USEPA regulations, GRIC OSH sampling results concluded there was an immediate risk to public health and the environment.

DISCUSSION

Introduction

Exposure to, or contact with, chemical contaminants drives both the ATSDR health assessment and health consultation process. People may be adversely affected by

[†] See Appendix C for information regarding units and conversions used in Table 2

chemicals only if exposure occurs; that is, they must come into contact with the chemicals and absorb them into their bodies. The presence of a chemical or contaminant in the environment does not always result in contact and contact does not always result in the chemical or contaminant being absorbed into the body. The most common ways that people come in contact with contaminants is by inhalation (breathing), ingestion (eating or drinking) or by dermal contact (absorption through the skin) with a substance containing the contaminant.

To determine whether people are exposed to site related contaminants the environmental and human components leading to human exposure are evaluated. This analysis consists of evaluating the five elements of an exposure pathway: (1) a source of contamination; (2) a media such as air or soil through which the contaminant is transported; (3) a point of exposure where people can contact the contaminant; (4) a route of exposure by which the contaminant enters or contacts the body; and (5) a receptor population.

Exposure pathways can be complete, potential, or eliminated. For an exposure pathway to be complete all five elements must be present and exposure must have occurred. A potential pathway is missing at least one of the five elements, but could be complete in the future. An eliminated pathway is missing one or more of the five elements and will never be completed.

Exposure pathways

Indoor Air

The source of contamination stemmed from the renovation project at the Gila Crossing Presbyterian Church. Parishioners scraped the ceiling material of the church prior to painting the ceiling. The ceiling material had ACM. It was transported through the air and the painters, cleaning parishioners, and others that entered the church inhaled some of the finer particles. No personal protective equipment (PPE) was worn by the painters or cleaning parishioners. Renovation workers were fed inside the church during the scraping process and may have accidentally ingested some ACM.

Ambient air

Again, the source of contamination stemmed from the renovation project at the Gila Crossing Presbyterian Church. The cleaning parishioners removed some of the furnishing from the church that contained ACM and placed them outside on church property. Also, the ACM was vacuumed and placed on the soil and in various garbage cans that are located outside the church (Appendix A photos). The asbestos was transported through the air and may have been inhaled by the painters and cleaning parishioners as they worked. Non-participants of the renovation who were outside the church may also have inhaled asbestos or ACM. Spray Solutions Environmental cleaned up the outside area on March 19, 2004 (5).

Soil

Soil outside the church was contaminated with chrysotile asbestos by the transport of ACM that was either vacuumed or was on the furniture that was removed and subsequently, placed on the soil. Non-participants of the renovation who were outside the church may also have inhaled asbestos or ACM. This area was cleaned by Spray Solutions Environmental on March 19, 2004, but no post soil sampling was conducted.

Groundwater

The groundwater pathway was considered but eliminated because asbestos fibers are not able to move through soil. They are generally not broken down to other compounds in the environment and will remain virtually unchanged over long periods (9).

ATSDR Comparison Values and Health Guidelines

To evaluate possible health outcomes as a result of exposure, contaminants present in air were found to be as high as 0.159 f/cc which were compared with ATSDR Comparison Values (CV) of 0.000004 f/cc of air and found to be slightly higher. ATSDR Health Guidelines list asbestos as an EPA Group A- Human carcinogen, based on the 1986 cancer assessment guidelines (10). The exposure duration was estimated as intermittent for a two week period. According to the church pastor, most hours worked ranged from 3 to 7 hours per day. The parishioners worked at night after their primary jobs. All sample results found in the interior of the church were discussed in the Environmental Contamination section.

Normally, estimated exposure doses are compared to health guidelines such as ATSDR's minimal risk levels (MRLs) or USEPA's reference doses (RfDs). MRLs and RfDs are doses below which non-cancerous adverse health effects are not expected to occur. They are derived from toxic effect levels obtained from human population and laboratory animal studies. These toxic effect levels can be either the lowest observed adverse effect level (LOAEL) or a no-observed adverse effect level (NOAEL). In human or animal studies, the LOAEL is the lowest dose at which an adverse health effect is seen, while the NOAEL is the highest dose that did not result in any adverse health effects. LOAELs have been classified into "less serious" and "serious" effects. "Serious" effects are those that evoke failure in a biological system and can lead to morbidity or mortality (e.g., acute respiratory distress or death). "Less serious" effects are those that are not expected to cause significant dysfunction or death, or those whose significance to the organism is not entirely clear. Health effects data are discussed in terms of three exposure periods: acute (14 days or less); intermediate (15–365 days); and chronic (365 day or more). Data regarding the adverse health effects associated with acute duration exposure to asbestos inhalation are lacking or too limited to support the derivation of a Minimal Risk Level (MRL) (9).

Health Effects

Asbestos is primarily a human health hazard through the inhalation of asbestos fibers in air. Although, short-term exposure health effects are still unknown, long-term human and animal exposure to asbestos fibers through inhalation is associated with a buildup of scar-like tissue in the lungs known as asbestosis, and with lung cancer and a cancer of the lining of the lung (or pleura) and other internal organs known as mesothelioma. Asbestos is characterized by a gradual decline in respiratory function, coughing, and breathlessness. Both lung cancer and mesothelioma may be relatively symptomless until they reach an advanced stage. All three of the above conditions are typically diagnosed through chest x-rays and lung function tests. Evidence of asbestos exposure, in the form of pleural changes (such as a thickening of pleural tissue, or the formation of pleural “plaques”) can often be seen on chest x-rays even in the absence of disease. The time period between exposure to asbestos and the occurrence of lung disease or cancer is long, usually between ten and 40 years (11).

EPA has classified asbestos as a human carcinogen (Group A) based on 1986 cancer assessment guidelines. Also, based on 2003 cancer assessment guidelines EPA classified asbestos as carcinogenic to humans, according to Agency for Toxic Substance and Disease Registry (ATSDR) Health Guidelines (11).

However, the duration of exposure varies for the church members who participated in the scraping and painting of the ceiling and the clean up of the ACM. The longest exposure time was approximately 8 hours for one day during renovating. The average time was 3 to 4 hours/day for the two-week exposure period. No studies are available on the acute (short-term) effects of asbestos in animal or humans at the low levels found. That makes it difficult to determine possible health effects other than to state known intermediate or chronic health effects.

Summary of Findings

The following information summarizes GRIC OSH's analyses, findings, and limitations.

- Parishioners had an acute (short-term) exposure to asbestos at low levels due to the disturbance of ACM at Gila Crossing Presbyterian Church. No studies are available on acute (short-term) effects of asbestos in animals or humans at these low levels. The lack of acute effects data makes it difficult to determine possible health effects other than to state known intermediate or chronic health effects. High levels of asbestos exposure over a long period may cause serious illness, however, the low levels of asbestos detected and the short length of exposure found at Gila Crossing Presbyterian church make it very unlikely that parishioners exposed to asbestos will become ill from that exposure.
- GRIC research indicates that asbestos levels found in the Gila Crossing Presbyterian Church are low compared to levels found in literature that are

associated with adverse health effects. Maximum exposure was 0.159 f/cc, which is slightly above the OSHA permissible exposure limit (PEL) of 0.1 f/cc for an 8-hour period for a worker. No work at the Gila Crossing church was recorded over 7 hours per day. Repeated and exceeded PEL exposure could possibly lead to the asbestos related diseases mentioned in the Health Effects section. Asbestos samples in the church were taken weeks after church was closed, so it is possible that higher short-term peaks could have existed during the two-week renovation period in November 2003. OSHA regards the asbestos PEL as a target guideline for regulatory purposes only. OSHA does not establish any level of “safe” exposure (12).

- Since adverse health effects from asbestos usually appear many years following the first exposure to asbestos, there should be concern with asbestos exposure to the younger parishioners due to the lack of health effects data stemming from acute exposure. People exposed should discuss their short-term exposure with their primary care physician for further evaluation, which might include a chest x-ray or lung function test. It is unlikely that a chest x-ray would show anything at such an early stage, but it would set up a baseline for future use.

ATSDR Child Health Considerations

ATSDR recognizes that infants and children may be more vulnerable to exposures than adults in environmental contamination situations. Because children depend completely on adults for risk identification and management decisions, ATSDR is committed to evaluating their special interests at the site as part of the ATSDR Child Health Initiative.

The effects of asbestos on children are thought to be similar to the effect on adults. However, children could be especially vulnerable to asbestos exposures because they are more likely to disturb fiber-laden soils or indoor dust while playing. Children also breathe air that is closer to the ground and may thus be more likely to inhale airborne fibers from contaminated soils or dust.

Furthermore, children who are exposed could be more at risk of actually developing asbestos-related disease than people exposed later in life because of the long latency period between exposure and onset of asbestos-related respiratory disease.

For this site, the most at-risk were not children but a young adult in his early twenties and several 30 year olds who helped with the scraping and painting of the church’s ceiling and cleaning up of asbestos contaminated material that collapsed from the ceiling.

Limitations of Toxicological Evaluations

Incomplete data is a problem often encountered during the evaluation process. Of the many thousands of commonly used chemicals, relatively few have been thoroughly evaluated for toxicity. Some information is missing for most chemicals. Information on

the non-carcinogenic adverse health effects of a particular chemical might be available, but not information as to its potential to cause cancer. Information regarding the toxicity of a chemical for short exposures at high concentrations—such as what could occur in the workplace—might be found easily, but information regarding its toxicity at low concentrations for long periods of time might be scarce to nonexistent. In these situations, researchers cannot thoroughly evaluate the health implications of exposures.

Conclusions

- Based on our evaluation and the lack of acute studies, the GRIC OSH has determined the site poses an indeterminate public health hazard. There is insufficient data to determine if exposures are sufficient to result in adverse health effects. The verification code for this article is 324445

Recommendations

- The GRIC OSH should restrict access to the church until remediation is completed. This will eliminate exposure reoccurring to either trespassers and/or the general public.
- Members who took part in the remodeling and cleanup should discuss short- term asbestos exposure with their primary care physician.
- The GRIC OSH will support remediation efforts by providing remediation guidance to follow. It is recommended that GRIC OSH conduct post remediation sampling on the exterior, interior and perimeter of the Gila Crossing Presbyterian Church property to ensure complete remediation.

Public Health Action Plan

The OSH has developed a public health action plan to ensure that recommendations are implemented and are meaningful for the affected families. The public health action plan is described in the following table.

Table 6: Public Health Actions to be Implemented

Public Health Action	Who Will Implement the Action	Time Frame for Implementation	Desired Outcome When Implemented	Public Health Impact
Restrict contaminated area of the site.	GRIC OSH	Completed	People will avoid contaminated areas	Prevent exposure to asbestos at levels that could harm health; prevent disruption of the remedial process
All members taking part in remodeling and cleanup discuss short- term asbestos exposure with primary care physician	Gila Crossing Presbyterian Church members affected	At discretion of exposed parishioners	Provide a current health evaluation by primary care physician	Affected church members have health history to use in the future, if needed
Support the remediation effort and conduct post remediation on interior, exterior and perimeter of property	GRIC OSH	As needed	Remediation completion and follow up measures assured	Assure asbestos remediation and prevent further exposure to church members
Provide this health consultation and other information to the affected church members	GRIC OSH	Information sharing is ongoing; the document will be shared immediately upon completion	As many health questions are answered as possible	Affected church members have the information they need to discuss health effects with their health care providers and can make decisions as to whether they can safely use their property

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Certification

This Gila Crossing Presbyterian Church Public Health Consultation was prepared by the Gila River Indian Community under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with 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

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Appendices

Appendix A – Figures

Figure 1:
2000 Aerial Photo of Gila River Crossing Presbyterian Church, District 6



51st Avenue

Figure 2:
District Six Gila Crossing Presbyterian Church, Main Entrance (before and after exterior remediation)



Figure 3:

Asbestos caution tape covers front door of main entrance of Gila Crossing Presbyterian Church



Figure 4:

White asbestos in soil located behind the church



Figure 5:

Asbestos Containing Material (ACM) is in lower center of garbage can which was located outside of church



Figure 6:

In the background is the groundskeeper's residents. In the foreground is white asbestos on the soil east of church



Figure 7:
Remediated area located behind the Gila Crossing Presbyterian Church



Appendix B – ATSDR Public Health Conclusion Categories

ATSDR PUBLIC HEALTH CONCLUSION CATEGORIES

CATEGORY A. URGENT PUBLIC HEALTH HAZARD¹	CATEGORY B. PUBLIC HEALTH HAZARD¹	CATEGORY C. INDETERMINATE PUBLIC HEALTH HAZARD	CATEGORY D. NO APPARENT PUBLIC HEALTH HAZARD¹	CATEGORY E. NO PUBLIC HEALTH HAZARD
<p>This category is used for sites where short-term exposures (<1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.</p> <p>Criteria: Evaluation of available information² indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse impact on human health and requires immediate action or intervention. Such site-specific conditions or exposures might include the presence of serious physical or safety hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices which, upon rupture, could release radioactive materials.</p>	<p>This category is used for sites that pose a public health hazard due to the existence of long-term exposures(>1 yr) to hazardous substances or conditions that could result in adverse health effects.</p> <p>Criteria: Evaluation of available relevant information² suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse impact on human health that requires one or more public health interventions. Such site-specific exposures might include the presence of serious physical hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices, which, upon rupture, could release radioactive materials.</p>	<p>This category is used for sites in which Acritical@ data are <i>insufficient</i> with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.</p> <p>Criteria: The health assessor must determine, using professional judgment, the criticality of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.</p>	<p>This category is used for sites where human exposure to contaminated media might be occurring, might have occurred in the past, and/or might occur in the future, but the exposure is not expected to cause any adverse health effects.</p> <p>Criteria: Evaluation of available information² indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.</p>	<p>This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.</p> <p>Criteria: Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future.</p>

¹ Each of these designations represent a professional judgment made in any given case on the basis of critical data that ATSDR regards as sufficient to support a decision. It does not imply, however, that the available data are necessarily complete; in some cases, additional data may be required to confirm or further support the decision.

² Examples include environmental and demographic data; health outcome data; community health concerns information; toxicologic, medical, and epidemiologic data.

Appendix C – Units and Conversions

Standard Operating Procedures for the Analyses of Asbestos Filter Samples by Transmission Electron Microscopy (TEM)

The laboratory data was reported in structures per millimeter squared (str/mm^2). The data was then converted using the formulas provided below to structures per cubic centimeter (str/cc). Structures per cubic centimeter were then compared to ATSDR's Comparison Value of fibers per cubic centimeter (f/cc). For the purpose of this health consultation ATSDR considered fibers per cubic centimeter and structures per cubic centimeter to be roughly equivalent. Generally, str/cc is a more general term and f/cc is more specific, based on the method of analysis.

Two values were calculated for each laboratory raw count. str/mm^2 and str/cc . The str/mm^2 for a category are the structures observed from that category that occur on the average on 1 square millimeter of filter area. The value is calculated as below:

$$\text{str}/\text{mm}^2 = \frac{\text{Raw Count}}{\# \text{ Grid Openings} \times \text{Average Area}}$$

The str/mm^2 values are used for the initial screening portion of the AHERA protocol, in which a final clearance passes if the 5 interior samples (having volumes greater than 1199 liters) have an average str/mm^2 of less than 70.

The other calculated value for each category is str/cc , the average number of structures which would be observed per cubic centimeter of air drawn through the cassette. This calculation is identical to the PCM calculation and is shown below:

$$\text{Str}/\text{cc} = \frac{\text{str}/\text{mm}^2 \times \text{Eff. Filter Area (usually 385mm)}}{\text{Sample Volume (Liters)} \times 1000 \text{ cc/L}}$$