

**APPENDIX I – ATSDR FACT SHEETS**



## Public Health Assessment Summary for the Stauffer Chemical Company Site

This fact sheet summarizes the Agency for Toxic Substances and Disease Registry's (ATSDR) public health assessment for the Stauffer Chemical Company (Stauffer) site in Tarpon Springs, Florida.

The public health assessment was prepared in response to community health concerns and recommendations found in the January 2001 ATSDR Ombudsman Report of Findings and Recommendations.

ATSDR released this public health assessment in April 2003 for comment by community members and other interested parties.

### About the Public Health Assessment

A public health assessment is (1) a thorough review of available historical and current environmental sampling data, (2) a review of other information regarding the levels of exposure to contaminants at and near the Stauffer site, and (3) an assessment of the potential health impact of these exposures on the surrounding community.

While preparing this public health assessment, ATSDR worked closely with community members and leaders, local and state health and environmental officials, citizen's groups, and stakeholders interested in sharing pertinent site information and concerns.

This public health assessment also addresses community concerns regarding past, present, and future exposures.

A number of area residents were particularly interested in the potential impact of Stauffer's past air emissions on the following groups:

- Members of the surrounding community,
- Persons who attended Gulfside Elementary School while the Stauffer plant was operating (1978-1981)\*, and
- Former Stauffer workers\*.

\*see separate ATSDR fact sheet for further information

### Sampling Data Review

In the public health assessment, ATSDR evaluated environmental data from:

- on-site and off-site soil/slag samples,
- groundwater samples from the shallow on-site aquifer,
- groundwater samples from the on-site Floridan aquifer,
- residential, commercial, and irrigation water supply wells,
- surface water and sediment samples from the Anclote River, and
- ambient air monitoring, and
- occupational air samples (for Stauffer workers).

**For more information about ATSDR, please visit our  
Web site: <http://www.atsdr.cdc.gov>.**

ATSDR also evaluated state cancer registry data to determine if cancer rates were higher than normal for the area surrounding the Stauffer site.

## Principal Findings of the Public Health Assessment

Based on its evaluation of available site information and sampling data, ATSDR reached the following conclusions:

### Past Exposures

- In the past, because of harmful levels of air pollution emissions from the Stauffer site and other sources, the Stauffer site was a public health hazard. Of particular concern were past exposures to sulfur dioxide\* and particulate matter\*.
- Former Stauffer workers were intermittently exposed to asbestos-containing materials and other contaminants, such as carbon monoxide, chromium, hydrogen sulfide, lead, silica, and sulfur dioxide at levels that could cause an increased risk of cancer or other adverse health effects. These conclusions are, however, based on limited (1972-1981) data. No worker exposure data are available for the first 25 years of Stauffer operations (1947-1971).
- A few private water supply wells in the site area contained arsenic, lead, or both at levels that might cause adverse health affects. But the elevated levels were not believed to be related to groundwater contamination beneath the Stauffer site.

### Current Exposures

- Currently, the Stauffer site is not a public health hazard; no one is being exposed to harmful levels of chemicals from the site.

### Future Exposures

- Because of harmful levels of arsenic in on-site soil and radium in on-site slag, the Stauffer site could be a future public health hazard if the property is developed for residential purposes.

### Community Health Statistics

- Most cancer rates for areas surrounding the Stauffer site were less than or equal to what would be expected. The exception was rates of mesothelioma in women, which were elevated during the early to mid-1990s. But further investigation indicated these mesothelioma cases were not related to the Stauffer site.

## Where Can I Review the Public Health Assessment Document?

The public health assessment will be available on the ATSDR Web site at [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov). You can also find copies of the document on file for review at the Tarpon Springs Library, located at 138 Lemon Street, Tarpon Springs.

## How Can I Get More Information About This Report or ATSDR's Work in Tarpon Springs?

If you would like additional information or have questions, please phone LaFreta Dalton, toll-free, at 1-888-42ATSDR (1-888-422-8737) Monday-Friday from 9 AM to 5 PM Eastern time.

Also, if you would like this information available in Greek or Spanish please call; translation services could be provided.

## ATSDR's Public Health Assessment Recommendations and Planned Follow-Up Actions

### Provide health education to residents, former Gulfside students, former Stauffer workers, and health care providers:

ATSDR will provide health education to area residents and former (1978-1981) Gulfside Elementary students through distribution of (1) community newsletters, (2) chemical-specific and exposure-related fact sheets, and (3) public health fact sheets.

ATSDR will provide health education to former Stauffer workers, focusing on healthy habits for respiratory illness care and prevention.

ATSDR will provide health education to local health care providers, including health information related to (1) taking patients' environmental exposure histories, and (2) available contaminant-specific case studies and fact sheets.

If necessary, based on the needs of the Tarpon Springs community, ATSDR will provide health education materials in Greek.

### Conduct follow-up activities for private well users:

ATSDR will follow-up with users of those water supply wells that contained elevated levels of arsenic and lead. ATSDR will determine the status of the wells and ensure that users are informed of potential risks from past well use.

### Determine appropriate health activities for former Stauffer workers:

ATSDR will conduct a one-day workshop of medical and health scientist experts for the purpose of identifying appropriate follow-up health activities or screening for former Stauffer workers. ATSDR also plans to invite a former worker, who lives in the community, a community representative, and an area physician to attend this workshop.

### Review new site data:

As they become available, ATSDR will review new site data for potential public health implications, including the results of the recent geophysical and hydrogeologic site investigations.

### Conduct public health surveillance:

ATSDR will work with the Florida Department of Health to monitor the annual incidence of mesothelioma and lung cancer in the site area.



# Environmental Health Concerns at Gulfside Elementary School

This fact sheet summarizes the Agency for Toxic Substances and Disease Registry's (ATSDR) findings related to exposure of students and staff at Gulfside Elementary School to chemicals from the Stauffer Chemical Company (Stauffer) site in Tarpon Springs, Florida. The complete findings are contained in the revised public health assessment which has recently been released to community members and other interested parties for public comment.

**Children can safely attend and adults can safely work at Gulfside Elementary School. Currently, children and adults at the school are not exposed to chemicals from the Stauffer Superfund site at levels that could harm their health.**

## Soil at Gulfside Elementary School

Soil at the school has been tested and found to be safe. The metals in the school's soil are found there naturally. The amounts of these metals are at naturally occurring levels.

Radiation levels in the school's soil are also safe and will not harm children or workers at the school.

## Current Air Conditions at the School

No evidence was found that the Stauffer Superfund site is currently polluting air at the school.

## Past Air Conditions at the School Since 1981

From 1982 to the present, no evidence was found

that students were being exposed to pollutants from the Stauffer Site.

## Short-term (Brief) Exposure to Pollutants in Air Before 1982

Computer modeling showed that students occasionally might have been exposed to sulfur dioxide in air from the Stauffer facility. Because, however, wind usually blew pollutants away from the school, these exposures were very infrequent.

On the occasional days when the wind blew pollutants toward the school, sulfur dioxide levels in outdoor air might have caused the following health effects in some children and school personnel:

- cough and throat irritation,
- wheezing and shortness of breath, and
- an increase in heart rate and breathing rate.

Children and adults with asthma who were exercising outdoors while being exposed were at the greatest risk of these effects.

## Uncertainty Issues for Brief Exposures

Some uncertainty exists in these conclusions. First, air samples were not taken at the school during this time, and second, the sulfur dioxide levels were estimated based on a computer model.

Uncertainty about possible health effects from brief exposures also comes from using human studies. Because of variations in the ways humans react to such exposures, it is difficult to

pinpoint what harmful effects might occur at different levels of sulfur dioxide in air.

## **Long-term Exposures to Sulfur Dioxide in Air Before 1982**

A computer model predicted that from 1978 to 1981, long-term air levels of sulfur dioxide at the school and in some residential areas near the Stauffer facility were elevated.

Therefore, some children and adults who attended the school during those years might also have had additional exposure at their homes. The estimated yearly sulfur dioxide levels in these areas are similar to those associated with a small increase in lung- and heart-related mortality in adults, particularly in adults with pre-existing lung and heart disease.

The risk of these effects existed while people were being exposed. Because of the relatively low levels of exposure from 1978 to 1981, it is unlikely that former students and adults who were exposed in the past are currently at risk of harmful effects.

Some uncertainty exists in deciding if people are currently at risk. This uncertainty arises because the available human studies determine the health risk for adults while they were being exposed to sulfur dioxide.

Since the exposures for the former students and adults at the school stopped more than 20 years

ago, it is uncertain if they would experience adverse effects now. Also, the human studies only evaluated adults—not school-age children.

## **Particulate Matter**

No quality air monitoring data or reliable estimates from computer modeling are available for the school.

Because this information is lacking, it was not possible to estimate accurately exposure to particulate matter for children who attended the school. Therefore, it was not possible to determine if particulate matter in air was a hazard to students at the Gulfside school.

## **How can I get more information about sulfur dioxide?**

If you would like additional information or have questions, please phone LaFreta Dalton, toll-free, at 1-888-42-ATSDR (1-888-422-8737) Monday - Friday from 9 AM to 5 PM Eastern time.

Also, if you would like this information available in Greek or Spanish please call; translation services could be provided.

**For more information about ATSDR, please visit our Web site:  
<http://www.atsdr.cdc.gov>.**



# Exposure to Sulfur Dioxide at the Stauffer Chemical Company Site

This fact sheet summarizes the Agency for Toxic Substances and Disease Registry's (ATSDR) findings for sulfur dioxide. The complete findings are in the Tarpon Springs, Florida, Stauffer Chemical Company (Stauffer) revised public health assessment, which ATSDR has released to community members and other interested parties for public comment.

**Current Sulfur Dioxide Levels in Air**  
Current air levels of sulfur dioxide in Tarpon Springs and surrounding areas are safe and should not cause harmful effects.

## Past Sulfur Dioxide Levels in Air

Since 1982 sulfur dioxide levels in air have been at safe levels. Exposure to these levels of sulfur dioxide is unlikely to cause harmful effects.

## Short-term (Brief) Exposures to Sulfur Dioxide in Air Before 1982

Air samples taken from 1977 to 1981 at the Anclote Road monitoring station showed that nearby residents were periodically exposed to high levels of sulfur dioxide. The highest hourly sulfur dioxide detected was 840 parts per billion (ppb) on April 15, 1979. Typical hourly levels during this time were between 1 and 10 ppb.

Based on measured levels at the Anclote Road monitoring station, the areas of concern include

- the Flaherty marina,
- residential homes southwest of the Stauffer

- facility along the shore of the Anclote River,
- residential homes west of the Stauffer facility, and
- commercial and industrial businesses east of the Stauffer facility along Anclote Road.

The people living in these areas might have experienced the following health effects:

- cough and throat irritation,
- wheezing and shortness of breath, and
- an increase in heart rate and breathing rate.

During 1977-1981, children and adults with asthma who exercised outdoors while exposed were at the greatest risk of these effects.

Air modeling of sulfur dioxide emissions from the Stauffer facility shows that people (especially those with asthma) who lived farther away in, for example, Tarpon Springs and Holiday Estates, were also at risk for some harmful health effects. These effects include coughing and wheezing, increased heart and breathing rate, and a narrowing of the airways leading into the lungs' airways.

## Uncertainty Issues

Some uncertainty exists in these conclusions because (1) environmental sampling was only conducted at the Anclote Road monitoring station, and (2) sulfur dioxide levels at other locations were estimated based on a computer model.

There is also some uncertainty about the possible health effects from brief exposures. Our data

comes from human studies. With such studies it is often difficult to pinpoint what harmful effects might occur at different levels of sulfur dioxide in air.

## **Long-Term Exposures to Sulfur Dioxide in Air Before 1982**

When the Stauffer facility was operating, long-term (yearly) average sulfur dioxide levels at the Anclote Road monitoring station were elevated.

Based on modeled sulfur dioxide levels, residents in Tarpon Springs, Holiday Estates, and the surrounding areas were likely to have been exposed for many years to elevated yearly sulfur dioxide levels.

These sulfur dioxide levels are similar to those associated with a small increase in lung- and heart-related mortality in adults, particularly in those with pre-existing lung and heart disease.

But the risk of these effects only existed while people were being exposed. And because of the relatively low levels of exposure, it is unlikely that people who were exposed in 1977-1981 are currently at risk of harmful effects.

As stated, some uncertainty exists in deciding whether people are currently at risk. This uncertainty comes from using human studies that determined health risk from current, ongoing exposures. But also as stated, the exposures for nearby residents stopped more than 20 years ago.

## **How Can I Get More Information About Sulfur Dioxide?**

If you would like additional information or have questions, please phone LaFreta Dalton, toll-free, at 1-888-42-ATSDR (1-888-422-8737) Monday-Friday from 9 AM to 5 PM Eastern time.

Also, if you would like this information available in Greek or Spanish, please call; translation services could be provided.

**For more information about  
ATSDR, please visit our Web site:  
<http://www.atsdr.cdc.gov>.**



# Exposure to Particulate Matter at the Stauffer Chemical Company Site

This fact sheet summarizes the Agency for Toxic Substances and Disease Registry's (ATSDR) findings on particulate matter (PM) at the Stauffer Chemical Company (Stauffer) site in Tarpon Springs, Florida. The complete findings are included in a public health assessment recently released for review and comment to community members and other interested parties.

## What is PM?

PM consists of solid particles and liquid droplets in the air that people breathe. PM can contain many different types of chemicals, including acids and metals. Numerous natural and man-made sources of PM are found in both outdoor and indoor environments.

## How Can PM Affect My Health?

Human population studies have shown that PM is linked to lung and heart conditions and that these effects are most often experienced by sensitive individuals; examples include children, the elderly, and persons with pre-existing illnesses.

Science has not established a safe level of PM.

## How Can I Be Exposed to PM From Stauffer Chemical and Other Sources?

ATSDR used environmental air data plus computer modeling to estimate what past exposures (1977-1981) might have been.

ATSDR has determined that in the community in immediate proximity to the plant, the previous

operations at Stauffer increased the levels of PM exposures.

During the years 1977-1981 Stauffer was one of several sources of outdoor PM exposures to the community.

After the Stauffer Plant closed in 1981, PM levels were reduced. Exposures to PM since 1981 are similar to other areas in Florida and the United States.

## How Could Past Exposure to PM in the Vicinity of Stauffer Affect My Health?

Human population studies, available monitoring data from the Anclote Road monitoring station between 1977 and 1981, and the estimates of historic levels of PM during this time frame show that persons residing or working in the following areas might have experienced an adverse health effect:

- The Flaherty Marina (before 1982),
- Residential homes built before 1982 southwest of the Stauffer facility along the shore of the Anclote River,
- Residential homes west of the Stauffer facility built before 1982 and within 1,540 feet of the kiln, and
- Commercial and industrial businesses east of the Stauffer facility along Anclote Road, built before 1982 and within 1,540 feet of the kiln.



According to these human population health studies, short- and long-term PM exposures, similar to those around the Stauffer Plant during 1977–1981, can be linked to a variety of adverse health effects on the lung and heart. Some of these effects can be serious.

Based on our best estimates and professional judgement, persons exposed to PM attributable to Stauffer were more likely to have experienced symptoms of lung and heart diseases and reductions in lung function than the other, more serious health effects reported in the scientific literature.

Sensitive populations (such as children, the elderly, and persons with pre-existing illnesses) were at greatest risk for these effects. Other exposed persons had a much lower chance of experiencing any of these health effects.

### **How do the Community's Concerns Relate to ATSDR's Evaluation of PM?**

Community members have expressed concerns about certain lung diseases.

These concerns are consistent with the effects of PM exposures found in health studies of other communities.

ATSDR has not determined that these reported illnesses are elevated in the community or that PM exposures from Stauffer or other sources caused them.

### **How Certain is ATSDR About the Health Conclusions Relating to PM Exposures?**

ATSDR recognizes the uncertainty in our health conclusions regarding PM exposures from Stauffer Chemical and from other sources. Some of that uncertainty comes from estimating the amount of PM that people breathed while Stauffer was operating. Also, some scientists believe that the PM-disease links found in human population studies do not provide conclusive evidence that low-level exposure to PM actually causes lung and heart effects. Other uncertainties in our health conclusions are discussed in the public health assessment.

### **Where Can I Get More Information About This Report or ATSDR's Work in Tarpon Springs?**

If you would like additional information, have questions or wish to express concerns, please phone LaFreta Dalton, toll-free, at 1-888-42-ATSDR (1-888-422-8737) Monday–Friday from 9 am to 5 pm EDT.

**For more information about ATSDR, please visit our Web site: <http://www.atsdr.cdc.gov>.**



# Former Worker Exposures at Stauffer Chemical Company Site

This fact sheet summarizes the Agency for Toxic Substances and Disease Registry's (ATSDR) findings on former worker exposures at the Stauffer Chemical Company (Stauffer) site in Tarpon Springs, Florida. The complete findings are contained in a public health assessment which has recently been released for public comment to community members and other interested parties.

## How did ATSDR evaluate former worker exposures?

For the years 1972 through 1981 ATSDR reviewed and evaluated worker exposure data from several sources. For the first 25 years of the facility's operation, no occupational exposure data are available.

## What did ATSDR conclude from its evaluation of former worker exposures?

ATSDR concluded that

- former workers were intermittently exposed to asbestos or materials containing asbestos at levels that indicate an increased theoretical risk for lung cancer,
- former worker exposures to asbestos are not likely to cause non-cancerous health effects such as asbestosis,
- former workers were intermittently exposed to nickel and chromium at levels that indicate an increased theoretical risk of lung cancer, nasal cancer, or both, and

- former workers were intermittently exposed to levels of carbon monoxide, chromium, hydrogen sulfide, lead, nickel, phosphorous compounds, sulfur dioxide, total dust, quartz, and silica at levels that can cause adverse health effects.

## What did ATSDR conclude about the current vital status of former workers?

ATSDR obtained a list containing the names of 2417 former Stauffer workers. Approximately 30% of these former workers could not be traced to determine vital status or place of residence. Of the 864 deceased former workers, the causes of death were identified for 64% of them. The leading causes of death were various types of cancers (28%), heart disease (19%), respiratory disease (9%), other forms of heart disease (7%), and cerebrovascular disease (5%). No cases of mesothelioma or bone cancer were identified.

## What follow-up health activities are being considered by ATSDR for Stauffer Chemical Co. former workers?

As a result of its assessment, ATSDR's preliminary conclusion is that a scientific research study of former workers is not appropriate. ATSDR made this determination based on 1) its interpretation of worker exposure data, 2) cause of death information for deceased former workers, 3) Florida Department of Health cancer registry data, and 4) evaluation comments provided by scientists through ATSDR's external peer review process.

ATSDR will hold a workshop in Atlanta, Georgia, for scientific discussion and input for planning the health/medical screening for former Stauffer workers. ATSDR will seek input from medical and scientific experts for the identification and risks of appropriate screening tests. ATSDR believes the screening service will provide valuable information to former workers and their physicians and families.

After the workshop, ATSDR will inform the community and stakeholders of its recommendation for the type of health intervention to be implemented and the planning steps to be taken.

## **How can I get more information about this report or about ATSDR's work in Tarpon Springs?**

If you would like additional information, have questions, or wish to express concerns, please phone PerStephanie Thompson, toll-free, at 1-888-42-ATSDR (1-888-422-8737) Monday - Friday from 9 a.m. to 5 p.m. EDT.

**For more information about ATSDR, please visit our Web site:  
<http://www.atsdr.cdc.gov>.**

## Modeling of Air Emissions at the Stauffer Chemical Company Site

This fact sheet summarizes the Agency for Toxic Substances and Disease Registry's (ATSDR's) air modeling analysis at the Stauffer Chemical Company (Stauffer) site in Tarpon Springs, Florida. The complete findings are included in a public health assessment recently released for review and comment by community members and other interested parties.

### Why was air modeling necessary?

- When conducting public health assessments, ATSDR prefers to base conclusions on sampling data—that is, on direct measurements of contaminant levels that people could actually be exposed to. When that is not possible, ATSDR uses computer models to estimate the contaminant levels. While the Stauffer facility was active, air samples were collected at only certain locations and only at certain times. Therefore, ATSDR used an air model to estimate levels of air pollutants for places where and times when sampling did not occur.

### What model did ATSDR use?

- ATSDR used the ISCST model to evaluate past air emissions from the Stauffer facility. The ISCST, or "Industrial Source Complex - Short Term," model is routinely used to evaluate air emissions from industrial facilities such as Stauffer.

### How does the air model work?

- ISCST is a computer program that predicts how pollutants move through the air. Model predictions

are based on emissions data and local weather conditions.

### What emissions data were used in the modeling analysis?

- ATSDR extensively reviewed information and data from available site reports to determine the types and amounts of pollutants the Stauffer facility released (or emitted) into the air.

- Stauffer representatives and environmental regulators measured the amount of sulfur dioxide, particulate matter (or airborne particles and droplets), and fluorides emitted from Stauffer's stacks. Measurements are available for many former emissions sources, including the nodulizing kiln and the electric arc furnace. ATSDR entered data from these stack tests into the computer model.

- Emissions data were not available for some pollutants, such as metals, that the Stauffer facility released into the air. Therefore, ATSDR could not use the air model to estimate the airborne levels of those pollutants.

## Was information on local wind patterns considered?

■ Yes. ATSDR reviewed more than 30 years of meteorologic data collected at three stations within 20 miles of the Stauffer facility. This data, along with the air emissions data, was entered into the model.

## What did the model find?

■ The model estimated air pollutant levels resulting from Stauffer's air emissions at more than 4,000 locations up to 5 miles from the Stauffer facility. The model predicted that the highest pollution levels were nearest the facility and that these levels decreased with downwind distance.

■ Findings for **sulfur dioxide**: The model predicted that emissions from Stauffer's former kiln contributed most to sulfur dioxide levels near the facility. The predicted levels were highest prior to May 1979, the month when Stauffer increased the height of the kiln stack. The next large decrease in sulfur dioxide levels was predicted for 1981, the year when the Stauffer facility's major production operations ceased.

■ Findings for **particulate matter**: The model results showed that Stauffer's emissions increased the airborne levels of particulate matter near the facility. But, emissions from other local sources also contributed to the particulate levels. These other sources included cars, wind-blown dust, and industrial emissions.

■ Findings for **fluorides**: ATSDR's modeling analysis, and evaluations for other elemental phosphorus facilities, suggest that **Stauffer's emissions did not result in fluorides at levels of health concern.**

## Are the model predictions consistent with sampling results?

■ For **sulfur dioxide**, yes. For example, the annual average air concentrations predicted by the model are within 35% of the measured levels. Further, the model accurately predicted the decline in sulfur dioxide levels that was observed in May 1979, when Stauffer increased the height of the kiln stack, and again in 1981, when the Stauffer facility shut down.

■ For **particulate matter**, it is difficult to determine because other emission sources contributed to the particulate levels measured in the Stauffer vicinity. In addition, because emission rates were not available for all of Stauffer's operations, the levels of particulate matter predicted by the model were likely lower than the levels that actually resulted from Stauffer's emissions.

■ For **fluorides**, it is difficult to determine because reliable sampling data are not available for fluoride levels in the Stauffer vicinity when the facility was active.

## Where can I get more information about this report or ATSDR's work in Tarpon Springs?

If you have questions or would like additional information, please call PerStephanie Thompson, toll-free, at 1-888-42-ATSDR (1-888-422-8737) Monday–Friday from 9 AM to 5 PM EDT. To learn more about ATSDR, please visit our Web site: <http://www.atsdr.cdc.gov>.