

CHATTANOOGA-HAMILTON COUNTY AIR POLLUTION CONTROL BUREAU

Report for the Amnicola Highway / Wisdom Street Investigation

Date Notified: September 21, 2006

CCM: CCM ELR: ELR

Source: The Mueller Company

Mailing Address: 1401 Mueller Ave., Chattanooga, TN 37406

Nature: Burning Odor Nuisance Odor/Nuisance
 Asbestos VE's Permit Condition
 Chemical Spill/Release Other: _____

Detected by: Complaint Patrol Inspection Self Reported
 Other: _____

Recommendations Or Action Taken Unfounded No further action
 Verbal Warning Open Burning Violation Warning Notice #
 NOV Warning NOV Director's Conference
 NOV Court Other: _____

Complaint	Suspected fallout on vehicles that resulted in paint contamination to the vehicle surfaces.
Area affected	East Chattanooga Area: Furthest north detection: 900 block of Creekside Road Furthest south detection: 2800 block of Belle Arbor Avenue Furthest west detection: 3500 block of Amnicola Highway (west side) Furthest east detection: 1500 block of Wilder Street Total area: Approximately 1.1 miles north/south by .5 mile east/west
Environmental Impact	Paint Contamination to approximately 375 to 400 vehicles surfaces. The Air Pollution Control Bureau and other governmental agencies investigated all possible environmental and health issues.

Synopsis:

The Bureau received approximately 87 complaints of damage to vehicle surfaces as a result of some type of fallout. The fallout seemed to cause small rust spots to the vehicle surface. There are approximately 375 to 400 vehicles affected. According to some of the complainants that work and live in the area the fallout has occurred for years but had gotten worse within the last 6-8 weeks. The other complainants stated that the fallout had not been noticed in the past. The most affected vehicles are those that are parked overnight in the area. Vehicles parked in the area during normal working hours appeared to have less damage. The identified area affected is in the East Chattanooga area and is approximately 1.1-miles north/south by .5-mile east/west. Samples were taken and analyzed. A field inspection of the initial sample indicated the brown in color substance was magnetic. Under a microscope iron and sand were found. Laboratory results of samples taken from within the parking lot on Mueller Avenue indicated the major component being 65.5% iron. According to sources found on the Internet, there are three sources of iron: fallout rail dust, brake dust and industry fallout. Mainly affected are surfaces with clear coat. However, non-clear coat surfaces were affected as well. Findings from the investigation indicate that iron most likely being emitted from The Mueller Company was attaching itself to surfaces when moisture was present and this caused the paint contamination. Fallout continued during the investigation until December 23, 2006. The Mueller Company was shutdown from December 23, 2006 till January 3, 2007. During the shutdown, The Mueller Company installed additional air pollution controls on already existing controls on the #28 stack. The Mueller Company experienced an accidental fire at the #28 point on August 24, 2006. As of January 22, 2007 no additional rust spots have been found. No health effects were identified..

In the map below the area within the thin black lines are where the complainants stated that fallout/rust spots had been a problem for years. The area within the red lines are areas affected, according to the complainants, after the August 2006. The dark black area is where the most damage was found. Complaints were received outside of the identified area but those proved **not to be** consistent with the identified areas.



● = Confirmed locations of affected vehicles ■ = The Mueller Company

Background:

On September 21, 2006 I was contacted by Chattanooga Police Department Sergeant Craig Johnson concerning what appeared to be small rust spots on personally owned vehicles that are being secured in the Chattanooga Police impound lot located at 1201 Wisdom Street. The vehicles are those confiscated relating to an arrest and/or serious traffic accidents. The vehicles are in an uncovered area secured by a chain link fence, known as the police impound lot, for safekeeping until a final disposition is reached. It is possible for some of the vehicles to be released to the owners that could be an individual or financial institute. There were approximately 163 vehicles in the impound lot on September 21, 2006 and all seemed to be affected by the rust spots and/or had a gritty substance on the upper exposed surfaces. The longer the vehicles had been in the impound lot the more extensive the damage. According to Sergeant Johnson the rust spots were noticed on September 21, 2006 and had not been noticed prior to the 21st. Sergeant Johnson stated that because the vehicles are in police custody the City of Chattanooga might be liable for any damage to the vehicles.

My inspection of the vehicle surfaces indicated that a gritty substance attached itself to the surface and resulted in rust spots. Using a razor blade I took a sample of the substance from one of the vehicles and found the sample to be magnetic. The visible description was very tiny brown metallic slivers. The Bureau Air Monitoring Manager, Kathy Jones, inspected the sample under a microscope and determined the sample to contain iron and sand.

City of Chattanooga Fleet Services Superintendent Brian Kieshe contacted me and advised me of rust spots and/or a gritty substance on vehicles owned by the City of Chattanooga that have been parked either behind the Police Service Center or the city garage. An order of new 64 Ford Taurus's was received by the City of Chattanooga at the city garage on September 8, 2006. According to Mr. Kieshe fallout caused rust spots on the vehicles between September 8, 2006 and September 25, 2006. Some of the vehicles were parked behind the Police Service Center and the others remained in the parking lot of the city garage between September 8, 2006 and September 25, 2006. According to Mr. Kieshe the vehicles were inspected when received and did not have the spots on them. My inspection of the vehicles indicated the spots were consistent with those found on vehicles in the police impound lot.

Due to the type of substance and location of the affected vehicles, I contacted Chris Carson of the Mueller Company and advised him of the complaint and of my findings. The Mueller Company is the only known industry in the affected area that emits a large amount of iron. Mr. Carson stated that he was not aware of any events that could have caused fine particles to go that far from the plant but did state that the height of the landfill was higher than it had been since 2001 but was still below the allowed height. Mr. Carson stated that when the landfill is disturbed, fine particles could blow off of the Mueller property. Mr. Carson also advised me of a fire in the #28 dust collector that occurred on August 24, 2006.

Over the next several days and weeks the Bureau received approximately 87 complaints about rust spots on vehicles. In addition to receiving the complaints I went to surrounding businesses in an attempt to determine a perimeter of the situation and a time frame.

My inspection of the affected vehicles in the total area indicated that vehicles parked in the areas overnight were more affected than those parked in the area during normal business hours. I also found that the closer to Mueller the vehicles were parked the more extensive the damage was. Vehicles parked during normal business hours at 1350 Mueller Ave., directly across the street from The Mueller Company seemed to be the most heavily affected. According to the owners of the vehicles the damage occurred over a one to two year period but recently had gotten worse. The vehicles in all of the affected locations are business owned/leased or personally owed/leased.

Known Causes of Paint Contamination:

Based on information found on the Internet, there are three sources of paint contamination as found in this situation:

1. Rail Dust- produced from the friction of train wheels against railroad tracks. Iron particles can land on vehicles if they are parked or travel near a railroad and during the transporting of the vehicles. No information could be found to determine how far rail dust can travel. It is recommended that upon receipt of vehicles, they are inspected for surface contamination.

There is a highly used railroad track/railroad yard approximately 3,080 feet from the impound lot.

2. Brake Dust – particles produced from the friction of brake pads rubbing against the rotor. The impound lot is approximately 550 feet from the nearest roadway (Wisdom Street)
3. Industrial fallout

The only known industry, in the area, that emits iron particles is the Mueller Company. Mueller is approximately 1,458 feet from the impound lot. There are woods between the impound lot and Mueller. The Mueller Company is a permitted source and operates a ductile and gray iron foundry. The Mueller Company is a major source of particulate matter, volatile organic compounds, carbon monoxide, and hazardous air pollutants. The Mueller Company manufactures valves, chiefly for portable water systems. The facility is comprised of an iron foundry, machining equipment, painting equipment, and assembly equipment necessary to produce complete valves. Mueller's particulate matter emissions result largely from sand transfer, metal melting, pouring, machining and coating. According to information submitted by Mueller to the Bureau, Mueller is well below the amount of particulate they are allowed to emit:

FACILITY WIDE PARTICULATE EMISSIONS AS REPORTED BY MUELLER FOR 2006

Permitted	Actual
87.76 tons per year	47.30 tons per year

A theory was proposed by Mueller suggesting that there is something in the air that was weakening the effectiveness of the clear coat and contributing to the paint contamination.

Investigation

Test and Inspection Results:

Attempts were made to determine the probable cause(s) for the paint contamination. Testing included all possible known causes and the theory proposed by Mueller. This included air monitoring, pH readings and daily inspections of surfaces.

- I obtained a vehicle white front-end grill from the City of Chattanooga garage that was clean. I placed the grill at 1350 Mueller Avenue approximately 150' from the Mueller Company, on September 27, 2006 at approximately 3:30 p.m. I inspected the grill on September 28, 2006 at approximately 9:30 a.m. and the grill had rust spots on it consistent with those found on vehicles in the impound lot and surrounding identified areas.
- Using a magnet, I took samples of iron or metal shavings in the parking lot of 1350 Mueller Ave. across from the Mueller Company. Using the proper chain-of-custody procedures the sample was sent for analysis to Technical Laboratories, Inc. On October 12, 2006 the Bureau received the results which were as follows:

Iron %	65.5
Soluble Iron ppm	520
Chlorides ppm	730
Soluble Calcium ppm	3,100
Soluble Magnesium ppm	270
Soluble Sodium ppm	760
Soluble Potassium ppm	42

ppm = parts per million

- On October 6, 2006 I placed some iron shavings that were obtained from inside the Mueller facility in a petrie dish and sprayed distilled water on it. The dish was kept in my office area over night. On October 7, 2006 the filings had caused rust spots on the dish.
- On or about November 1, 2006, a PM10 monitor was placed atop the Police Service Center located on Amnicola Highway. A PM10 monitor at the WDEF TV Station Building located on South Broad Street was monitored during the same time for comparison. The findings indicated that there is no inhalation risk in the ambient air for iron in this situation. It also indicates no significant difference of PM10 levels between the two locations. The monitor does not allow particles larger than PM10 to reach the filter.

Vehicle Hood Inspections and pH Readings

At the request of the Bureau a hood from a vehicle was prepared by the City of Chattanooga Fleet Services by applying a white base coat to both sides of the hood. One side had clear coat applied over the base coat. The purpose of the prepared hood was to make daily inspections and document the findings. The following is a recap of the inspections.

Date	pH	Findings
11/07/06	pH level readings were not taken until 11/21/06	Hood placed at the south end of the City of Chattanooga garage area on an asphalt parking lot. The hood was placed on a support putting the hood approximately two feet from the surface in a horizontal position.
11/08/06		Very fine gritty substance. Dew was present. The entire hood was wiped clean.
11/09/06		Very fine gritty substance. Dew was present. The entire hood was wiped clean.
11/10/06		An increased amount of a gritty substance. Dew was present. The entire hood was wiped clean.
11/13/06		Very fine gritty substance. Dew was present. The entire hood was wiped clean.
11/14/06		Very fine gritty substance. Dew was present. The entire hood was wiped clean.
11/15/06		There had been heavy overnight and morning rains. No gritty substance was found. The entire hood was wiped clean
11/16/06		There had been heavy overnight and morning rains. A gritty substance was found. The entire hood was wiped clean.
11/17/06		A gritty substance was found. A sample was taken and found to be magnetic. This was the first time the substance was tested. The entire hood was wiped clean.
11/20/06		A few very small rust spots were found on the base coat and clear coat sides. Hood wiped but rust spots could not be wiped off.
11/21/06		4.0 Dew
11/22/06	N/A	No obvious change found. Hood wiped and rust spots remain.
11/27/06	N/A	I began using a magnifying glass and identified additional rust spots that would not wipe off. Upper half of hood wiped clean.
11/28/06	4.0 Dew	No additional spots were found. Upper half of hood wiped clean. No additional spots found.
11/29/06	4.5 Dew	Using a magnifying glass, additional spots were found in the area that I do not clean daily. Gritty substance present.
	4.5 Dew	pH reading taken at the police impound lot
	4.0 Dew	pH reading taken at the Hunt Nissan off of Shallowford Road at Hwy 153
11/30/06	5.5 Rain	Additional rust spots in non-cleaned area using a magnifying glass. No additional rust spots in areas that I clean daily.
12/1/06	6.0 Rain	No additional rust spots found.

Date	pH	Findings
12/4/06	N/A	<p>Significant changes observed. Rust spots were found on the clear coat side that I clean daily. (M-F) No spots were found on the base coat only side that was cleaned on 12/1/06.</p> <p>According to weather information provided by Mueller:</p> <p>Dec 1 the dominant winds were from the N at an avg. speed of 9.3 Dec 2 the dominant winds were from the SSE at an average speed of 5.6 Dec 3 the dominant winds were from the SSE at an average speed of 4.2 Dec 4 the dominant winds were from the E at an average speed of 4.1</p> <p>The plant operation was as follows:</p> <p>Dec 1: No Bake shutdown at 11 PM Dec 2: Lost Foam shutdown at 2 AM Dec 2: Powder Coat shutdown at 4:30 AM</p> <p>Mueller began the shutdown approximately 14 hours after the areas of the hood were cleaned.</p>
12/5/06	5.5 Dew	No obvious changes.
12/6/06	6.5 Dew	No obvious changes.
12/7/06	N/A	No obvious changes. Using a permanent marker I marked an area approximately 7" by 3" and marked existing rust spots in an attempt to determine the number of spots as they appear.
12/8/06	N/A	The hood had been blow over due to high winds.
12/11/06	N/A	Forty-two additional rust spots found in the 7" by 3" area of the clear coat side. Due to the weekend the areas were not cleaned for two days. No rust spots found on the base coat only side of the clean area.
12/12/06	5.5 Dew	No obvious changes.
12/13/06	5.5 Rain	No obvious changes.
12/14/06	5.5 Dew	No obvious changes.
12/15/06	5.5 Dew	No obvious changes.
12/18/06	6.5 Dew	Eighteen additional rust spots found on the 7" by 3" area of the clear coat side. I tested the gritty substance found and it was magnetic.
12/19/06	5.5 Dew	No obvious changes.
12/20/06	5.5 Dew	No obvious changes.
12/21/06	N/A	No obvious changes. I marked an area approximately ¼ of the area within the 7" by 3" area in an attempt to determine the time it takes for rust spots to appear. I did not clean the ¼ section.
12/22/06	5.5 Rain	There were 5 new rust spots in the ¼ section. The rust spots appeared between 36 hours and 48 hours after the surface was cleaned.

Date	pH	Findings
12/26/06	6.0 Rain	<p>Four new rust spots found on the 7" by 3" area. None were on the base coat only side.</p> <p>I placed magnets covered with light tanned color tape on them in petrie dishes. One was place at 1350 Mueller Avenue (Array) and the other just outside of the police impound lot. I did this because of Mueller shutting down from the night of 12/22/06 to 1/3/07.</p>
12/27/06	N/A	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets.</p>
12/28/06	N/A	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets</p>
12/29/06	N/A	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets</p>
1/02/07	6.0	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets</p>
1/03/07	6.0	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets</p>
1/04/07	6.5	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets</p>
1/05/07	6.0	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets</p>
1/08/07	6.0	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets</p>
1/09/07	N/A	<p>No additional rust spots. No gritty substance found.</p> <p>No findings on the magnets</p> <p>On the afternoon of January 9, 2007, the hood was brought to the Bureau for safekeeping.</p>

The findings of the inspections indicate the rust spots do not occur if the clear coat surface is cleaned daily. Rust spots do occur when the clear coat surface is left un-cleaned for 36 to 48 hours. Rust spots did not occur after the Mueller Company began its shutdown on 12/23/06.

Impound Lot Inspections

Using the impound lot as a controlled environment, I would once or twice a week inspect vehicles received in the impound lot. The following were my findings:

Date Inspected	Findings
11/29/06	Inspected four vehicles received from 11/18/06 to 11/28/06. I used a magnifying glass and looked at the hood surface from the side. I saw iron particles standing on end on the surface. I was able to wipe off the particles.
12/01/06	I re-inspected the four vehicles and the particles had rusted on the surface and I was unable to wipe the rust spots off.
12/07/06	I inspected a silver Chevy Tahoe that was received on November 22, 2006. The Tahoe is the vehicle that I observed iron particles standing on end that rusted. On this day there was a gritty substance on the surface and on the windshield. I was able to wipe clean the surface of the substance.
12/13/06	I inspected three vehicles received since November 29, 2006. One was black and the other two were white. All three had a gritty substance on the surfaces and windshields. The two white vehicles had a large amount of very small rust spots on the surface. I was able to wipe clean the surface of the substance. The spots were consistent with the spots that I found on the hood located at the City's garage.
12/19/06	Four vehicles had been received since December 11, 2006. Three were white and the other was dark gray. All four had a gritty substance on the surfaces and windshields. I was able to wipe clean the surface of the substance. The three white vehicles had a large number of very small rust spots on the surfaces. The spots were consistent with the spots found on the hood at the City's garage.
12/29/06	I checked with Police Personnel and one vehicle had been received since December 22, 2006 (the shutdown date for Mueller). That vehicle was dark in color and was not inspected.
1/02/07	The Chattanooga Police impounded a 2000 white Oldsmobile on December 31, 2006. I inspected the vehicle and found no spots or gritty substance.
1/03/07	I checked the 2000 Oldsmobile and no rust spots and no gritty substance found.
1/04/07	I checked the 2000 Oldsmobile and no rust spots and no gritty substance found.
1/05/07	I checked the 2000 Oldsmobile. I found a very small amount of a very fine magnetic substance collected with a magnet. The substance differed from the previously found substance. This was a shining substance versus a dark substance found previously. No rust spots were found.
1/08/07	I checked the 2000 Oldsmobile. No spots or gritty substance found.
1/10/07	I checked the 2000 Oldsmobile. No spots were found or gritty substance found.

Additional Findings:

I discovered on December 29, 2006 that the City of Chattanooga received twelve new white 2007 Ford Crown Victoria's. Four were received on 12/26/06, four on 12/27/06, and four on 12/28/06. I inspected all twelve and several had rust spots on them. The final assembly of these vehicles took place in St. Thomas, Ontario, Canada. It is assumed the vehicles were most likely transported by train and/or truck. This would support the theory that rail dust and/or break dust as a cause of the rust spots. However, by wetting my finger and rubbing the spots three to five times removed the rust spots. This is unlike the rust spots found on the affected vehicles, as those spots could not be removed. I took a sample from one of the rust spots and found it to be magnetic.

Possible Contributing Factors

- On August 24th, 2006 at approximately 7:00 p.m., Mueller experienced a fire in the #28 dust collector. According to Chris Carson an unknown amount of emissions were emitted from the area. According to weather data and eyewitness accounts the winds were from the NNE during the time of the fire. This would have been in the general direction of the police impound lot. However, I confirmed damage to vehicles also occurred after the August 24, 2006 fire.

Additions to Existing Air Pollution Controls by The Mueller Company

On January 8, 2007, the Bureau was informed that during the shutdown, 12/22/06 to 1/3/07, a HEPA filter was added to the number 28 point source. This point source is estimated to emit 1.80 tons per year of Total Suspended Particulate (TSP) and is permitted to emit 3.60 tons per year.

Recap

- Mueller is the largest emitter of iron in the area.
- On August 24, 2006 the Mueller Company experienced a fire at the #28 point source and emitted an unknown amount of fine particulate.
- On September 21, 2006 the first complaint was received concerning rust spots on vehicles.
- Samples taken indicated a magnetic substance that turned out to be iron with sand present.
- New rust spots continued to be found.
- The closer to the Mueller Company the more extensive the paint contamination.
- The Mueller Company shutdown on December 23, 2006.
- A HEPA filter was installed on the #28 point source during the shutdown.
- The Mueller Company began operation on January 3, 2007.
- No new rust spots have been detected since the shutdown and to date.

Recommendation

Based on the above investigation, the findings indicate that iron that was most likely being emitted by the Mueller Company during the period on or before August 24, 2006 and December 23, 2006 would attach itself to vehicle surfaces, after rain or if dew was present, resulting in rust causing the damage. The rust spots ceased to be found after Mueller shutdown and an addition was made to the #28 point source.

I recommend that the Mueller Company be issued a Notice of Violation and required to appear before the Director, Chattanooga-Hamilton County Air Pollution Control Bureau, for the nuisance rule (Rule 14) of the City of Chattanooga Air Pollution Control Ordinance.


John C. Schultz - Investigator

1-22-07

Date

Reviewed by:



Date:

1-22-07

Comments:

No notice of violation to be issued due to lack of any real evidence as to cause by Mueller. Acid depositor seems to be the real culprit.