DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Self Initiated Inspection

P035520847

FACILITY: KAR NUT PRODUCTS COMPANY (Kar's Nuts)		**SRN / ID:** P0355
LOCATION: 1200 E 14 MILE ROAD, MADISON HTS		**DISTRICT:** Southeast Michigan
CITY: MADISON HTS		**COUNTY:** OAKLAND
CONTACT: Bill Leva , Director of Operations		**ACTIVITY DATE:** 03/28/2013
STAFF: Robert Elmouchi	**COMPLIANCE STATUS:** Pending	**SOURCE CLASS:** MINOR
SUBJECT: Self-initiated inspection based upon previous odor observation and odor complaints.		
RESOLVED COMPLAINTS:		

On March 28, 2013, I conducted a self-initiated investigation of Kar Nut Product Company (Kar's Nuts) located at 1200 East 14 Mile Road, Madison Heights, Michigan (SRN/ID: P0355). The purpose of this inspection was to determine Kar's Nuts' compliance with the requirements of the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); the administrative rules; and in response to complaints of a foul odor allegedly originating from this facility.

BACKGROUND

On June 7, 2012, I conducted a self-initiated unannounced inspection of Kar's Nuts (see activity report CA_P035518124). This inspection was motivated by odor observations I conducted a few months earlier where it appeared that a strong oil-like odor originated from Kar's Nuts. I had detected the foul odor only one time and because the AQD had not received any foul odor complaints against Kar's Nuts, I did not conduct additional odor observations.

During the month of March 2013, the AQD received three foul odor complaints in which it was alleged that Kar's Nuts was the source of an odor that was foul and, on occasion, caused the complainants to experience irritation and cough. On March 22, 2013, I conducted a complaint investigation, which resolved complaints C-13-00488, C-13-00499 and C-13-00506 (see Activity Report CA_P035520746).

INSPECTION

On March 28, 2013, I met with Mr. Bill Leva, Director of Operations; Mr. Mike Zborowski, Sanitation Supervisor; and Mr. Jeff Toomajanian, Maintenance & Facility Manager. We discussed the roasting process and then inspected the roasting operations.

There are two roasting lines in the roasting room. Each roasting line consists of a cooking section and a cooling section. Roaster No.1 is located on the west side of the roasting room. Roaster No.2 is located on the east side of the roasting room.

The exhausts associated with the roasting room are (see attached photos):

- Cooking exhaust – one stack associated with each roaster. Oil particulates are controlled by a mist eliminator. The mist eliminator is model OME, which is manufactured by Heat and Control located in Hayward, California (Tel. 510-259-0500; website - http://www.heatandcontrol.com/).
- Cooling exhaust – one stack associated with each roaster. Nut skin particulates are controlled by using a stainless steel screen. The stainless steel screen is changed and washed between shifts. This cleaning cycle is needed to prevent screen clogging.
- Oil heat exchanger – one stack associated with each heat exchanger.
- Oil filter – one stack associated with each oil filter.
- Comfort ventilation exhaust – a single roof vent that exhausts general plant interior air and is not designed to exhaust air contaminants from a process.

The roasting process steps are:

- Bulk product is placed in a hopper that dispenses the raw product on a conveyer.
- The conveyer transports the product (nuts and/or kernels) through a hot oil curtain, which is heated to approximately 320° F.
    - Currently, Kar's Nuts uses a highly refined cotton seed oil to roast product.

- The hot oil contacts the product for approximately 6 minutes.
  - Approximately 4% of the roasting oil is absorbed by the product.
  - Approximately 0.5% of the roasting oil is estimated to be exhausted (mass balance estimate).
- The product then passes through a cooling section where heat and some particulates (mostly peanut skins with adsorbed oil) are exhausted via a cooling tower.
- The bulk product is collected and transported to packaging.

Kar's Nuts enforces a policy, which has been enacted to ensure food safety. Before entering the facility I was required to read an educational document, which specifies prohibited activities that might compromise product quality and food safety. Before entering the food processing areas, I was required to wear multiple types of disposable over garments (coat, hair net, beard net and booties), which are used to maintain a clean food handling environment.

We proceeded to the roaster room where I observed Roaster No. 2 in operation. I observed that oil appeared to be condensing on the exterior surface of an upper section of the ventilation pipes. I also observed what appeared to be a vertical drip of dark oil on the exterior surface of the top section of the exhaust stack as it penetrated the roof. It remains uncertain whether this drip is oil that has condensed inside the building or if the assumed oil drip originated higher up.

We then proceeded to the roof where I was able to observe the exhaust stacks associated with the roasting room (see Images 2 and 3). The four stacks associated with the heat exchangers and the oil filtration exhausts did not appear to have significant deposits on the roof that I associated with their respective exhausts. The two cooling towers had indications of material deposited on the roof. It was explained that the deposited liquid and solids were associated with the daily cleaning of the stainless steel screens.

The comfort ventilation exhaust appears to have discolored the roof with what appears to be oil particulates. The discoloration cause by the deposits was significant enough to be visible in an aerial image copied from Google Maps (see Image 3). The areas darkened by the exhausted air contaminants are visible in the aerial photograph (e.g. interior surface of the rain caps, exterior of each stack below the rain caps, roof surrounding the base of each roaster stack, and the roof surrounding the comfort ventilation stack). The two roaster cooking exhaust appeared to have the most profound deposition of air contaminants, which is assumed to be collected cooking oil and condensed oil vapors. I observed that the exhaust contaminant had collected on the interior surfaces of the rain caps and exhaust stacks. The collected material dripped down the exterior surface of the exhaust stack and created a dark coating on the stack as well as puddles of semi-congealed liquid on the surface of the roof. The significant deposition of material on the roaster exhaust stacks interior and exterior surfaces plus the observed depositions of the roof appear to indicate that if Kar's Nuts is the source of the foul odor then the comfort ventilation and the roaster stacks are likely candidates for detailed evaluation. The exhaust stacks are cleaned at least twice each year, therefore it appears that the oil mist eliminator may not be adequately controlling particulate and vapor exhaust.

We then returned to the building interior and proceeded to observe the oil mist eliminator mesh pads that were changed-out (but not cleaned) after the inspection on March 28, 2013. It appeared easy to determine which face of the mist eliminator pads were the top because clumps of dark material appeared to have fallen on the top of the mesh pads. I touched the bottom of one mist eliminator pad, which left an easily detectable oil film on my finger. It appeared that touching the top of the mist eliminator pad also left an oil film on my finger but it was difficult to detect with certainty. From this observation I was not able to determine if the

We concluded the inspection in the conference room where we conducted the closing meeting and discussed conducting an experiment to determine if swapping a used mist eliminator pad with a clean mist eliminator pad will have a detectable impact on odor observations. In closing, Mr. Leva stated that Kar's Nuts wants to comply with the applicable regulations and Mr. Leva expressed a positive desire towards working with AQD to resolve complaints.

RESEARCH

On March 29, 2013, I telephoned Heat and Control and spoke with Mr. Steve Grocott who is a Service Manager in the Service Department. Mr. Grocott stated that Heat and Control does not manufacture the oil mist eliminator (OME) pads for the Heat and Control model OME installed on the roasters at Kar's Nuts. Mr. Grocott stated that the mist eliminator pads are manufactured by Amacs [http://www.amacs.com/, which is a manufacturer of process tower internals].

Mr. Grocott described the OME pads as being constructed of two layers of mesh; a fine mesh sandwiched between two course meshes. Mr. Grocott stated that the manufacturer rates the oil mist eliminator control efficiency at 95%. Mr. Grocott also stated that the oil mist eliminator pads are not promoted as being designed to control odor.

Mr. Grocott also provided the following information:

- The primary cause of the OME pad not performing to manufacturer specifications is the operator setting the fan speed too high. The high fan speed results in an increased exhaust velocity, which increases the potential of the exhaust gas to entrain and exhaust collected oil particulates.
- A process operator is often motivated to increase the exhaust fan speed because commercial food processing usually occurs in a sealed room designed to keep out contaminants. Operating an exhaust fan in a sealed room creates negative air pressure, which decreases the exhaust fan speed, which in turn motivates the process operator to increase the exhaust fan speed.
- A ribbon (or other thin and light weight material) can be used to determine if a room is under negative pressure by holding a ribbon next to the door latch and then open the door slightly. If the ribbon moves towards the room interior then the room has a negative pressure relative to its exterior.
- Mr. Grocott also commented that oil on a roof can damage the roof depending on the construction materials.

COMMENTS

As of this inspection there are more questions than answers. Even though it appears that the roasting process at Kar's Nuts is the source of the foul odor, more observations of a foul odor with sufficient duration and intensity will be needed to make a determination of the company's compliance status with regards to R 336.1901.

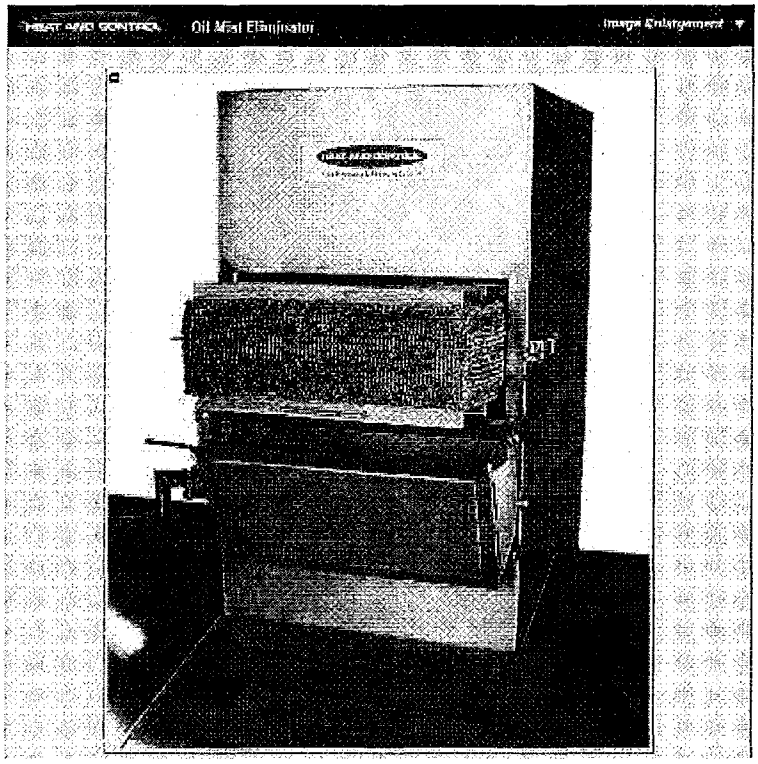

Image 1(Oil Mist Eliminator) : Website image of Heat and Control oil mist eliminator model OEM.

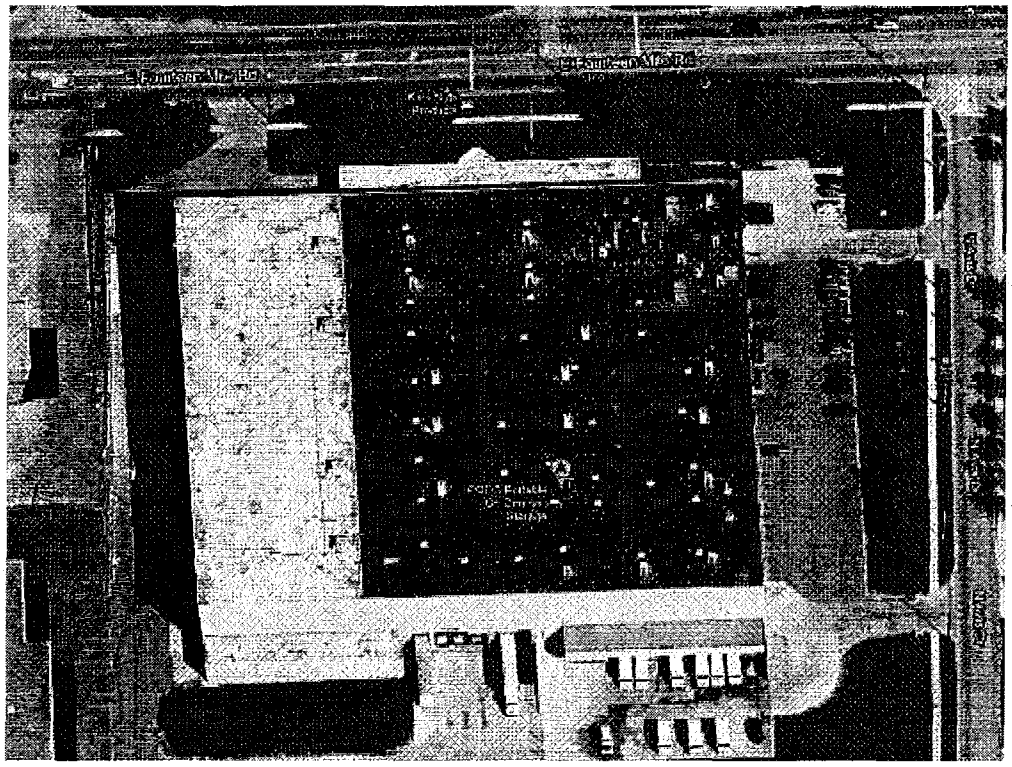

Image 2(Kar Nut Products) : Aerial view of Kar Nut Products building from Google Maps.

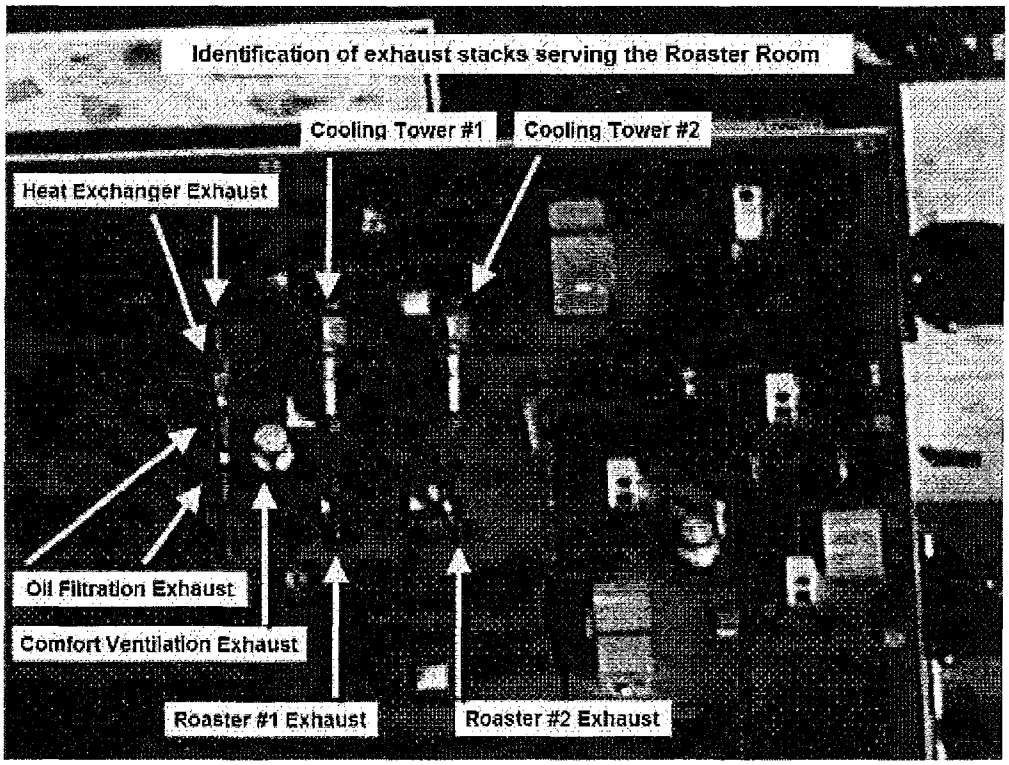

Image 3(Stack Identification) : Northeast section of Kar Nut Products roof identifying the exhaust stacks that serve the Roasting Room.

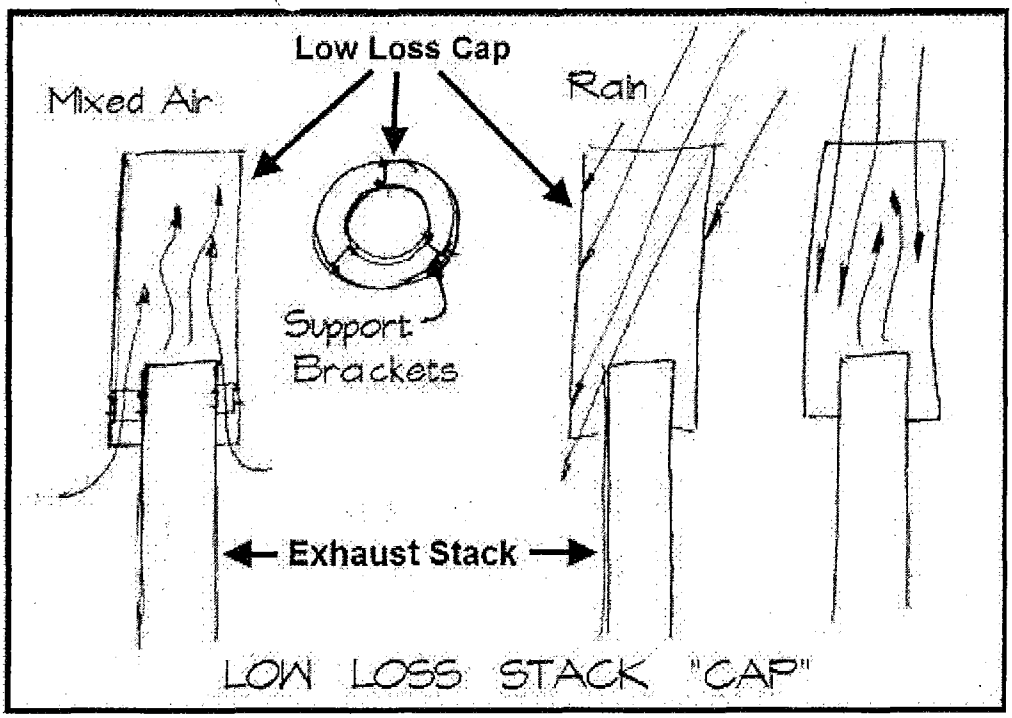

Image 4(Low Loss Stack 2.jpg) : Sketch of low loss exhaust stack cap. Image modified for use in report. Image source: http://www.anvilfire.com/21centbs/forges/low_loss_stack_cap.htm

NAME Robert Simonetti DATE 7/11/13 SUPERVISOR CJE