Restaurant Investigation #1

ENGINEERING REPORT

June 2006

PREPARED FOR: **SUBROGATION COMPANY #1**

ATTENTION: **MR. JOE WALSH**

INSURED: **FIRE INSURANCE COMPANY #1**

DATE OF LOSS: **SEPTEMBER 2005**

LOSS LOCATION: WAYNESVILLE, OHIO

POLICY NUMBER: N/A

CLAIM NUMBER: <omitted>

IC1 FILE NUMBER: <omitted>

Introduction

At 9:30 A.M. on September 2005, a fire occurred within a Restaurant #1 located in Waynesville, Ohio. The fire resulted in extensive damage to the cottage-style structure and contents.

On October 2005, Mr. Joe Walsh of Subrogation Company #1 of Ohio, contacted Investigation Company #1 (IC1) and requested IC1's assistance in determining the origin and cause of the subject fire. Mr. Walsh was acting on behalf of the liability insurer for Fire Insurance Company #1 of Ohio. Fire Insurance Company #1 provided periodic preventive and corrective maintenance for the Ansul fire suppression systems that were installed in the subject restaurant.

Mr. Mark Schuler, CFEI and Fire investigator for IC1, was assigned to conduct the fire investigation. Per Mr. Schuler, witnesses observed fire emanating from one of four deep fat cooking fryers that were in the process of warming up at the time of the fire.

Mr. Schuler contacted the author of this Engineering Report, Scott A. Jones, PE, CFEI and Senior Mechanical/Electrical Engineer of IC1, (812) 944-9988, to assist in the fire cause determination and evaluation of the performance of the subject Ansul system in preventing extension of the fire outside the kitchen exhaust hood system.

The observations and conclusions from inspection of the subject loss site and interview information are included in this Report. Refer to Mr. Schuler's origin and cause report for site and origin-specific information.

Background

<u>Interview with Mr. Mickey Sanford, Restaurant Owner and Claimant</u>

On October 2005, Mr. Sanford discussed his observations of the events preceding and during the fire. Mr. Sanford's observations were based, in part, on statements made to him by restaurant employees who were present during the fire.

Mr. Sanford reported that the subject structure was originally built as a Restaurant #1 in 1992. Mr. Sanford reportedly purchased the subject restaurant in 2000. A company identified as "Vinnie Contract Group" reportedly installed the kitchen exhaust hood systems including the subject hood over the deep fat fryers.

A company identified as "McVee Clean" reportedly cleaned the kitchen exhaust hoods within 30 days before the fire.

Approximately 20 to 25 minutes prior to the fire, restaurant employees started all four deep fat fryers. The fryers were utilized to cook French fries. It was believed that the two westernmost fryers had stainless steel covers in place over the grease frypots to accelerate the heat up process.

Discussion of Events with Fire Investigator Tom Zimmerman of MIA, Ltd.

On October 2005, the author discussed the events of the loss with Mr. Zimmerman of MIA, Ltd. of Ohio, who was retained by the property insurer for Restaurant #1 to perform the fire origin and cause investigation.

Mr. Zimmerman discussed that stainless steel lids were, in fact, in place atop the two westernmost fryer frypots at the time of the fire. Witnesses reported that the fire originated in the westernmost grease frypot. The grease frypot was reportedly "boiling" around the lid immediately prior to the fire.

A restaurant employee, who was standing approximately 4 feet away from the fryers (and facing away from the fryers), reportedly heard the R-102 Ansul fire system for the fryer hood discharge during the incipient stage of the fire. The employee reportedly breathed the non-toxic potassium-based agent following the discharge.

Observations

On October 2005, the author inspected the loss site. Mr. Schuler and Mr. Zimmerman were in attendance for the entire inspection. Mr. Pete Rose, PE of MIA, Ltd. and Mr. Sanford were in attendance for a portion of the inspection.

The roof structure at the mid-section of the structure was extensively damaged during the fire as shown in the front (east), side (north), and rear (west) views in *Photographs 1 through 3*, respectively. Electrical service was received from an underground service connection on the back side of the structure. By the time of the author's inspection, the meter and current transformers had been removed (*Photograph 4*).

Fryers Inspection

The four gas-fired Frymaster Model BIMH452-2RCSD fryers appeared as shown in the east to west view in *Photograph 22*. *Author's note: the Frymaster fryers will be designated as Fryers # 1 through 4 for the remainder of this report. The easternmost fryer*

is designated as Fryer #1 and the westernmost fryer (i.e., the fryer of reported fire origin) is designated as Fryer #4.

The gas burner systems and controls for Fryers #1 and #2 appeared as shown in *Photograph 5* with extensive cooking oil residue built up throughout the compartment. The gas burner systems and controls for Fryer #3 and #4 appeared as shown in *Photographs 6 and 7,* respectively. Again, the burner and control systems were coated with residual cooking oils. Fryer #4 was identified with the manufacturer's ratings plate shown in *Photograph 8.*

As shown in *Photograph 39*, both Fryer#3 and #4 had stainless steel covers in place over the grease frypots.

Hood System Inspection

The exhaust hood system over the fryers appeared as shown in *Photographs 9, 10, and 11* with all of the steel chevron grease traps lying on the fryers as shown. As shown in the photographs, oxidation and heat damage decreased from Fryer #4 to Fryer #1.

The exhaust duct was encased in a decorative stainless steel shroud over the vertical run from the hood (*Photographs 12 and 13*) to a miter weld to a horizontal run (*Photograph 14*) situated above the ceiling tiles. The duct terminated in an upblast ventilator that had positioned on the roof (*Photograph 15*).

Ansul Fire Suppression System Inspection

The fryer exhaust hood system was protected by an Ansul R-102 pre-engineered, wet chemical fire suppression system. The system was positioned immediately to the west of the west of the hood and appeared as shown in the progressive top-to-bottom views in *Photographs 16 through 21*). As shown in *Photograph 22*, the trigger system for the nitrogen pressurization bottle was in the "FIRED" position.

The Ansul system had one plenum nozzle mounted above the filters as shown in *Photographs 23 and 24* and one upward-facing duct nozzle. The cooking equipment was protected by 4 surface nozzles that are shown in *Photographs 25 through 28*, oriented from east to west.

The author observed that the natural gas emergency shutdown valve that was actuated from the Ansul cabinet tripped shut.

Pull Station Inspection

There were 4 system-actuation fusible links mounted in the hood above the filters as shown in *Photographs 29 through 32* oriented from east to west. All links had released from the heat of the fire with the exception of the easternmost link.

Three fire suppression system manual pull stations we positioned at the kitchen exit, one for each of the kitchen systems (*Photograph 33*). The middle pull handle, which was designated "FRYER" had been pulled at some point during the event (*Photograph 34*). The electrical metallic tubing (EMT) conduit that connected the pull station to the Ansul cabinet had been substantially disrupted by the roof collapse.

Building Plans Inspection

The author reviewed the kitchen area wall construction plans (*Photograph 35*) and elevations to determine the required construction of the wall sections behind the fryers. The wall section for the region behind the fryers was designated by Note 12 on the drawing (*Photograph 36*).

Note 12 (*Photograph 37*) read as follows:

> *"PROVIDE METAL FURRING/STUDS & USG DUROCK (OR EQUAL.) IN LIEU OF DRYWALL BEHIND OOKING EQUIPMENT"*

As shown in *Photograph 38*, the area behind the fryers consisted of flammable construction with the use of wood furring strips under Durock (i.e., cement) board.

Discussion/Observations

Inspection of the fryer hood structure and chevron grease filters revealed that the most extensive damage to the structures occurred directly over Fryer #4, which was the westernmost fryer, consistent with witness reports.

Inspection of the in situ condition of Fryer #3 and #4 grease frypots (reference *Photograph 39*) revealed that stainless steel covers were in fact in place over the grease frypots.

Inspection of the Ansul R-102 pre-engineered fire suppression system revealed that the system actuated during the event. A witness report revealed that the system actuated during the incipient stage of the fire *before* the kitchen was evacuated. It is not know whether system fired due to fusible link or manual pull station actuation.

It is believed by the author with a reasonable degree of engineering certainty that the fire suppression system fired in a timely manner, which resulted in the release of agent to the surface, plenum, and duct nozzles. Stainless steel covers were in place over Fryer #3 and #4 grease frypots, which completely obviated proper delivery of fire suppression agent to the flaming grease. Consequently, the proper operation of the fire suppression system was obviated by the covers that typically would prevent contamination of the grease when the fryers were shutdown.

It is believed by the author with a reasonable degree of engineering certainty that the insured provided satisfactory preventive and corrective maintenance to ensure proper operation of the system at the time of the fire. It is believed that the insured created no conditions that degraded the timely and proper performance of the fryer fire suppression system including the natural gas emergency shutoff valve.

The engineering investigation is ongoing to identify factors that led to extension of the fire damage. As noted in the Observations section of this report, the kitchen wall structure was not constructed in compliance to the building plans. Flammable construction was utilized behind the fryers. Other factors that affected extension including the grease loading in the exhaust duct.

Should IC1's assistance be necessary to identify the failure mode of Fryer #4 temperature control system and factors leading to fire extension, the author will assist in the development and/or execution of test protocol(s) per the client's direction. *Pending further direction, this file is considered closed.*

The analysis and conclusions are based upon information reviewed to date, plus general engineering knowledge and experience. Information reviewed at a later date may warrant modifying or augmenting the conclusions.

We appreciate the opportunity to work with you on this evaluation. Please let us know whether we can be of further assistance to you.

Sincerely,

IC1

Scott A. Jones, P.E., C.F.E.I.
Senior Mechanical Engineer/Electrical Engineer