

Commercial Investigation #2

June 2006

Mr. Kim Chi
Indiana

Cc: Mr. Chuck Morris
Insurance Company #1
South Carolina

Re: *Insured:* Radio Station #1
 Inspection Location: Indiana
 Claim No.: <omitted>
 Date of Loss: April 2006
 ICI Project No.: <omitted>

Dear Mr. Chi,

On April 2006, a fire occurred at the Radio Station #1. Mr. Chuck Morris of Insurance Company #1 of South Carolina, who was acting on behalf of Radio Station #1's property insurer, retained the services of Investigation Company #1 to provide engineering services for the determination of the fire origin and cause and well as overview of the restorative effort.

The author of this engineering memo, Scott A. Jones, P.E., C.F.E.I and Senior Mechanical & Electrical Engineer of Investigation Company #1, (812) 944-9988, was assigned to provide engineering overview of the restorative effort.

I have reviewed your memo of May 2006 that discussed the requirement to replace the service and distribution panels within the structure, even in areas where there is no direct fire damage and/or smoke infiltration. In addition, I reviewed the \$91,400 estimate from an area electrical contractor to carry out the demand.

The purpose of this memo is to respectfully request your consideration for an alternate restoration plan for the structure that will provide the same level of public safety without undue economic burden.

Discussion

Section 11.7, “Insulation Integrity” of the *National Electrical Code (NEC) Handbook*, NFPA 70 – 2005, permits evaluation of an electrical system following a hazard event to determine the “...*quality or condition of the insulation of conductors and equipment.*” Section 110.7 of the *NEC Handbook* teaches: “*The principle causes of insulation failures are heat, moisture, dirt, and physical damage (abrasion or nicks) occurring during and after installation.*”

The *NEC Handbook* further teaches that trained personnel may test to determine the quality of the electrical insulation present in a system. The most common method cited is: “*In an insulation resistance test, a voltage ranging from 100 to 5000 (usually 500 to 1000 Volts for systems of 600 Volts or less), supplied from a source of constant potential, is applied across the insulation. A megohmmeter is usually the potential source, and it indicates the insulation resistance directly on a scale calibrated in megohms (M). The quality of the insulation is evaluated based on the level of insulation resistance.*”

InterNational Electrical Testing Association (NETA) document, *Maintenance Testing Specifications for Electrical Power Distribution Equipment and Systems – 2005 (NETA Maintenance Testing Specifications)*, is a peer-reviewed standard for testing electrical systems and equipment following any potential peril to an electrical system. The *NETA Maintenance Testing Specifications* provide the test method and criteria of success in unambiguous language for conductors, equipment, and switchgear.

The following are agreed with you:

1. All conductors and equipment in the fire origin region that were directly damaged by the heat of the fire be ripped out and replaced.
2. A service disconnect be installed in a readily accessible location either outside or inside the structure in accordance with the provisions of NEC, Section 230.70.

I respectfully request your approval for the following:

For each conductor that extends outside the direct fire/heat damaged region, the conductor be megohmmeter tested at 1000 Volts DC for 1 minute per *NETA Maintenance Testing Specifications*, Section 7.3.2 Cables, Low Voltage, 600 Volt Maximum. The criterion of success is an insulation resistance of 2 megOhms, regardless of conductor length.

For any conductor discovered <2 megOhms, the sections of conductor be replaced to the next junction point towards the building’s electrical service. If any distribution panelboards are found to be < 2 megOhms, the panelboard grounds will be cleared using clean water and dried. If unable to clear the ground after cleaning, the panelboard will be replaced.

This method, if approved will provide a simple method to identify and repair latent fire and/or smoke damage without replacement of the building's distribution and service systems.

Sincerely,

Investigation Company #1

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