



# The I-ENG-A Report

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It was determined that the product used for cleaning the A/C unit contained potassium hydroxide and sodium metasilicate... both classified as hazardous.

## **ENVIRONMENTAL: SICK BUILDING SYNDROME IN RESIDENTIAL OCCUPANCIES**

We, in the insurance claims business as: companies, adjusters, risk managers, attorneys and investigative engineers, have been aware for some time that "Sick Building Syndrome" has become a serious problem for the industry and building owners. Residential claims of serious magnitude have also been occurring which include a wide spectrum of variables such as: carbon monoxide, cleaning chemicals, mold, fungi, air conditioning/heating systems, lead contamination, water and sewage problems. In these types of cases, very serious monitoring and testing of industrial/office environments as well as management/employee interviews may be necessary to determine if the real or imagined problems can be remediated.

In this residential case, an elderly lady named Mrs. Jones, who suffers with breathing problems, contacted Ace Air Conditioning (AAC), to have her rooftop air conditioner cleaned. The rooftop air conditioning unit was cleaned apparently using excessive chemicals and Mrs. Jones was subsequently unable to use her home. She was forced to stay in a hotel until the alleged environmental problems could be investigated and resolved. The assignment was to determine the origin and cause of the problems Mrs. Jones was having with her home and whether it was a problem in the air conditioner, ducts, ceiling, walls or floor coverings, and whether any of these items would have to be removed from the home and replaced. The insurance company provided instructions to proceed with an investigation of the home to determine if the problems were associated with the cleaning materials used to wash and clean the air conditioning system or if some other problem existed.

The procedure involved environmental auditing procedures as outlined by the department of Environmental Quality. A physical testing, inspection and investigation of Mrs. Jones' home, in conjunction with the insurance representative, was undertaken. Mrs. Jones had an extensive file that she had accumulated as she had contacted people within the state involved with environmental air quality and standards. She relayed this information and had also retained an attorney to represent her.

After the cleaning of the air conditioner was completed she had a severe attack to the corneas of her eyes due to apparent chemicals in the air, and this was confirmed by her doctor, which after treatment cleared in a few days. Mrs. Jones employed an environmental consultant to conduct extensive air tests in her home. Government protocol and chemical standards research was completed to establish the requirements for use and exposure of this chemical.

On the first inspection, it was clear that there was a foreign element present in the air inside the home. Sophisticated air testing would be necessary under established protocol and procedures to determine the magnitude. Mrs. Jones was very cooperative and informed us that she would forward the test results to us as soon as they were available.

It was determined that the product used for the cleaning contained potassium hydroxide and sodium metasilicate. Those two elements in the cleaning material are classified as hazardous.

Report by:  
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# SICK BUILDING SYNDROME

Further testing indicated that the portion of the cleaning material most hazardous was potassium hydroxide. The effects of over-exposure can be acute burning and irritation of the eyes and skin. It was also noted that if ingested, the concentrate may burn or severely irritate both the esophagus and stomach. The data closely agreed with the problems experienced by Mrs. Jones.

Mrs. Jones relayed to our personnel that during the cleaning, AAC said that they used a substantial amount of the liquid in the cleaning process and had flooded the air conditioning unit and its insulating blanket, which then ran down into the duct system and ceiling area. They asked for \$450 extra to correct the problem. Mrs. Jones had been hospitalized because of pneumonia, a sore throat and burning eyes. The doctor stated that her symptoms were from exposure to the chemical.

It was determined that potassium hydroxide is a highly alkaline, basic substance, that is used for cleaning in controlled situations following established levels of concentration. The potential for possible effects of the chemical were examined and it was determined that they can have very serious effects. Screening methods for the residence were established to determine levels of airborne bacteria, fungi, pathogenic fungi and thermophilic actinomycetes as a result of microbial contamination and associated problems.

After completing laboratory work, the indoor bacterial levels were found to be less than the established limits; total fungi levels were in

acceptable ranges and all indoor airborne levels of thermophilic actinomycetes were equal to, or less than, the outdoor control. However, the insulation samples taken from the air conditioner unit did contain elevated levels of fungi. This is a potential aerosolization of propagules (spores, hyphae, metabolites and volatiles). The insulation sample removed from the a/c unit is also highly alkaline, indicating there is alkaline residue in the insulation of the HVAC system. Elevated levels of fungi and alkaline Ph were discovered in the insulation of the HVAC system.

From the results, a certified procedure was outlined to clean up the residual effects of the potassium hydroxide. Once the established cleanup is completed in conformance with thorough procedures of remediation as outlined in the report, no latent or long-term effects from the contamination should be present.

The origin, cause and total responsibility of the problem and associated cost were the responsibility of AAC. They were the perpetrators of this situation. If they had established proper procedures and controls initially, these problems would not have arisen. Their inability to react and clean this system properly should be remediated at their own expense.

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