June 5, 1991

reply to: Donald M.R. Johnson
499 Palmtree avenue
London, Ontario
N6H 3P7

Canada Trust
Branch number 110
Platts Lane
London, Ontario N6H 1S5

re: Account Number 514767 - ASHRAE Region II CRC 1988

We wish to close the above account and receive the balance in the form of a cheque made payable to ASHRAE London Canada Chapter.

per:

Donald M.R. Johnson,
signing authority

and

Darryl K. Boyce,
signing authority

copies to: above
Owen Glendon, Chapter Vice-president
Peter Ziebart, Chapter Secretary
Kirk Flowers, Chapter Treasurer

Canada Trust

TO: THE CANADA TRUST COMPANY
215 OXFORD STREET W., LONDON, ONT.

028207

PAY CANADA TRUST ONE THOUSAND ONE HUNDRED TEN DOLLARS

DATE JUNE 7 1991

$ 4,110.92

RE ASHRAE LONDON CANADA CHAPTER

TO THE ORDER OF

ASHRAE
LONDON CANADA CHAPTER

The Canada Trust Company

Authorized Officer

Authorized Officer

15-004 (08/89)

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INTRODUCTION TO ASHRAE

The American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc. (ASHRAE) is a technical society with a worldwide membership of persons interested in the advancement of technology for public benefit.

Created by the merger in 1959 of the American Society of Heating and Air-Conditioning Engineers, founded in 1894, and The American Society of Refrigerating Engineers, founded in 1904, ASHRAE operates on a not-for-profit basis. To encourage the unrestricted improvement and utilization of technology without regard to product promotion, ASHRAE has neither corporate nor organizational members.

ASHRAE activity in recent years has become significantly broader. Growth in membership, total fiscal expenditures and research expenditures reflect this.

ASHRAE's Bylaws state that the Society's objective is to advance the arts and sciences of heating, refrigeration, air conditioning, ventilation, their allied arts and sciences and related human factors for the benefit of the general public. In meeting its mission, ASHRAE considers the effect of its technology on the environment and natural resources in recognition of the need to protect the welfare of posterity.

ASHRAE achieves its objective in the following ways:

- Encourages and conducts scientific research in the study of principles;

- Promotes the unrestricted dissemination of knowledge and information by publishing and fostering the publication of scientific and educational data;

- Engages in educational activities and encourages the adoption and maintenance of high standards of instruction and professional training;

- Cooperates with governmental agencies, educational institutions, International Associates and other groups having the same or similar aims and objectives;

- Establishes standards and procedures with the proviso that all such activities are conducted solely for the advancement of engineering science;

- Organizes regions, chapters and student branches congruent with members' interests and geographic locations

* ASHRAE is currently supporting 49 research projects.
* ASHRAE has 81 current voluntary consensus standards.
* ASHRAE publications include ASHRAE Journal (monthly), ASHRAE Insights (monthly), ASHRAE Transactions (semiannual), ASHRAE Handbook (annual), and numerous bulletins and reports.
* ASHRAE's Professional Development Seminars were attended by more than 750 people in 1987.

Membership: More than 50,000 members in more than 120 countries
Chapters: 153 chapters in the United States, Canada and abroad

ASHRAE is very active at this time in two areas which impact dramatically on the general public.

The first involves the area of Indoor Air quality.

ASHRAE is concerned with the technical means for conditioning of the indoor environment and with the specification and creation of conditions that provide a comfortable and healthful air quality for the occupants of indoor environments. ASHRAE is also concerned that the design and maintenance of systems that provide comfortable and healthful indoor environments be consistent with the goal of optimizing energy use in buildings.

ASHRAE and its predecessor societies have over 90 years of professional history in solving indoor air quality problems. Ventilation has been a primary concern throughout this period;

indeed, one of the predecessor societies included "ventilating" in its title. In 1973 ASHRAE issued the only ventilation standard developed by consensus by a non-government agency. ASHRAE has sponsored research on indoor air quality in the past as well as provided presentations and publications of research results on indoor air quality.

Beginning in the early 1970's energy problems constituted a large part of ASHRAE's interest. In North America, ventilation has traditionally been the primary solution to controlling indoor air quality and because the energy required for heating, cooling, and transporting ventilation air for buildings in North America approaches 10 percent of the total energy consumption, there has been considerable attention devoted to reducing ventilation.

In many cases ventilation has been reduced to the point of causing indoor air quality complaints, since the concentration of internally generated pollutants increases with reduced ventilation. Therefore, reduced ventilation is one cause of recent increased concern about indoor air quality.

Comfort has long been an ASHRAE concern. Stuffy, odorous environments may not be unhealthy, but they reduce the sense of well-being and may affect performance. Acute health effects, such as burning eyes, chest symptoms, and transmission of airborne disease are also important. Chronic or delayed health effects are probably the most difficult to establish, often taking decades to appear. ASHRAE is concerned with all three of these as they relate to indoor air quality, and must provide designs and operating strategies suitable for the various types and uses of buildings. At the same time, energy conservation will remain important.

The provision and maintenance of healthful and acceptable indoor air quality is a responsibility which is widely shared, and can only be accomplished with the active cooperation of all concerned. It is the responsibility of designers and installers to ensure that building systems are effective in reliably providing and maintaining the designed indoor air quality. To do this, the design professions must know what contaminant sources may be

present and in what strength. They must also provide the owners, operators and occupants with the most effective operating and maintenance procedures. Owners, operators and occupants have a responsibility not to introduce new or stronger contaminant sources than can be accommodated in the original design, to maintain the mechanical systems, and not to modify the building without having appropriate adjustments made to the mechanical systems.

While the shared responsibility complicates the attainment and maintenance of desirable indoor air quality, there is a further complication in that these responsibilities are sequential. The design professions exercise their responsibility during design and construction, while the owners, operators and occupants bear their responsibility throughout the life of the building.

When problems with indoor air quality arise, the ventilation system is the first system faulted for the condition; it is equally often the system that is relied upon for a solution. Although indoor air quality may be impaired by inadequate ventilation, HVAC systems seldom are the direct cause of these problems with a few exceptions such as contamination by bioaerosols or duct fibres.

ASHRAE Recommends:

1. ASHRAE Standard 62, a comprehensive ventilation standard which recognizes the balance between conserving energy and providing for human health and comfort, should be widely disseminated and referenced by building codes.

2. Support by federal government for research in all non-proprietary areas of indoor air quality (health effects, measurement methods, modelling, and control technology) should be substantially and selectively increased. This research should address the dangers of indoor air pollution to populations identified at risk. Cost effective and efficient means of reducing health risks must be identified in his research.

3. The private sector should be involved in improving performance standards and for enhancing its members' educational and professional practices.

4. Governments should examine the existing policy options and develop others as needed to encourage reduction of indoor air pollution.

5. Governments should assist in communication of technical information through joint sponsorship of research, publications, and conferences.

6. Local governments, assisted by federal governments, should provide educational, technical, legal or financial assistance for the remedial actions required.

<u>The second area involves the depletion of the ozone layer which has been linked to the use of chlorofluorocarbons.</u>

ASHRAE recognizes the effect of technology on the environment. Consequently, the Society expresses concern that the result of environmental damage may be significant if the release of chlorofluorocarbons (CFCs) is found to cause undesirable environmental change. Further, due to the magnitude and importance of this issue to the public, ASHRAE will direct a substantial portion of its technical expertise and resources towards resolving the issues.

Chlorofluorocarbons (CFC's) are synthetic chemical compounds used for a variety of essential purposes, including the refrigerant or working fluid in refrigeration and air-conditioning equipment, and as blowing agents for thermal insulation. CFC's are stable compounds and when released into the atmosphere, may have long lifetimes. Because the environmental impacts of CFC's remain uncertain within the scientific community, ASHRAE recommends careful evaluation of these questions.

ENVIRONMENTAL CONCERNS

Stratospheric Ozone

In 1974, a hypothesis was proposed that CFC's migrate to the stratosphere, where ultraviolet radiation from the sun may decompose CFC's releasing chlorine; the chlorine, in turn, reacts with the ozone in the stratosphere -- thus reducing the concentration of ozone in the upper atmosphere. The stratospheric ozone layer has a protective role in filtering some of the sun's ultraviolet radiation (UV-B). Increased levels of UV-B at the earth's surface, if of sufficient magnitude, may increase the incidence of skin cancer in humans, damage crops, and affect aquatic life. Responding to the potential danger predicted by the proposed theory, the U.S. Environmental Protection Agency (EPA) issued a ban of the use of CFC's in "non-essential" aerosol uses in 1978. The banning of CFC's in aerosols reduced the consumption of CFC' substantially in the U.S.

Antartic Hole

In 1985, a seasonal thinning of the ozone layer was identified over the Antartic region. This thinning phenomenon is commonly referred to as the "Antartic hole". This hole appears at the end of the Antarctic winter and recloses soon thereafter. Scientific expeditions continue to document this physical phenomenon each year using a combination of ground-based measurements and satellite data.

Several theories have been proposed to explain the physical phenomenon -- the two most prominent are chlorine chemistry and atmospheric dynamics. In the fall of 1987, chemical measurements from aircraft at various altitudes were included. Preliminary analysis of the data by the scientists indicates that the Antarctic phenomenon is a result of both chemical and dynamic forces.

Climate Modification

Attention has been drawn to potential climate modification by the "greenhouse effect", where atmospheric gases absorb a portion of the infrared radiation being emitted from the earth's surface. Increases in the atmospheric concentrations of these gases may result in the warming of the atmosphere resulting in a modification

of the earth's climate. It is believed that the climatic effects would result in warmer summers and warmer and wetter winters. A several-degree change in the average temperature of the earth could increase the level of the sea due to some melting of the polar ice caps and expansion of the water in the oceans.

The major "greenhouse gases" are carbon dioxide, methane, nitrous oxide, and certain CFC's. Carbon dioxide is believed to be the largest contributor to the greenhouse effect, with CFC's contributing perhaps 15 percent to climatic warming.

International Agreements

It is recognized that any action to minimize CFC emissions needs to be international in scope. In 1982, negotiations were initiated under the United Nations Environment Programme (UNEP) to establish an agreement to protect global ozone.

In March 1985, a "framework convention" was signed which provided for research, data collection, monitoring, and technology transfer. The agreement identified numerous chemicals, including chlorine compounds that are of concern. Provisions were included whereby restrictive measures (protocols) could be developed and imposed on particular chemicals. The UNEP protocol was proposed and signed in September 1987 by twenty-four nations.

The protocol establishes future restrictions on the availability of fully halogenated CFC's. The major provisions will impose a freeze at 1986 levels of CFC's 11, 12, 113, 114 and 115 (in 1989) and of halons 1211, 1301, and 2402 (in 1992). There will be further reductions (based on 1986 production levels) in the identified CFC's of 20 percent in 1993 and 50 percent in 1998. In 1990, the scientific evidence will be reviewed and the provisions of the protocol may be modified at that time.

Voluntary Research

ASHRAE has been involved in research related to the CFC issue. ASHRAE members represent a broad spectrum of the industry that manufacture and use CFC refrigerants. It has supported cooperative research with Federal agencies and encourages continued research

efforts in both the public and private sectors.

Essentiality of Chlorofluorocarbons

Chlorofluorocarbons (CFC's) are essential as refrigerants in the refrigerating and air-conditioning equipment and systems. In addition, CFC's are widely used as blowing agents for rigid, closed-cell foam used as thermal insulation in many applications. The widespread use of CFC's is a result of their unique characteristics of safety, performance, reliability, energy efficiency and cost effectiveness.

Alternate Refrigerants

Interchanging one refrigerant for another in existing equipment creates numerous problems bearing on equipment safety, performance and reliability. Equipment design has been optimized after years of engineering development and field experience.

Present refrigerants have evolved over a span of fifty years of research and have a unique combination of properties such as thermodynamic efficiency, low flammability and low toxicity. Incorporation of any new refrigerant in new designs requires a long-term evaluation of these characteristics.

Ammonia, which is free of chlorine, is frequently the refrigerant of choice in a number of industrial applications; however, it is not used for residential applications nor in places of public gathering. Older refrigerants such as sulphur dioxide (toxic), methyl chloride (toxic and flammable), and propane (flammable) are unacceptable.

Other CFC's containing hydrogen, or fluorocarbons not containing chlorine, have been suggested as possible replacements for CFC 11 and CFC 12, but no direct replacements are now available. Equipment for some applications may be designed using CFC 22, but it is not suitable for all applications. CFC 123 and CFC 134a show promise as alternatives to CFC 11 and CFC 12 respectively, but are not yet commercially available.

ASHRAE Actions

In consideration of the major worldwide impact of the halocarbon issue and its effect on the professions, the products, and the members of the technical society, ASHRAE is committing its resources to assist in arriving at an effective and constructive course of action. The following specific activities are under way or are planned for the near future:

1. Develop workable guidelines to minimize inadvertent losses of CFC's during manufacture, installation, service, and disposal of end products which utilize CFC's.

2. Actively encourage research, including allocation of ASHRAE research funds, to study alternatives to CFC's or alternative technologies and methods of CFC reclamation from CFC-using products at the end of their useful lives.

3. Encourage improved design, practices, standards, leak detection and consideration of refrigerant substitution.

4. Communicate, by way of symposia, seminars and forums, in cooperation with International Associates, the emerging opportunities for technology transfer and reduction of CFC emissions.

ASHRAE is unique among professional technical societies in that for many years it has conducted research in technologies important to the membership. The subjects addressed covered a broad range of topics including not only air-conditioning, heating and refrigeration practices, but also such subjects as thermodynamics, human comfort, and food preservation and storage. ASHRAE itself does not maintain facilities and a staff to carry out research and development activities; rather the Society utilizes experienced members and staff to allocate funds and oversee research that is sponsored at several universities, research institutions, and government laboratories.

In view of the importance of the CFC issue, ASHRAE is encouraging research and, as appropriate, will spend a portion of its research

funds for projects related to this subject. Major emphasis will be placed on those aspects of CFC usage that relate directly to applications involving ASHRAE.