I. MATERIAL SAFETY DATA SHEETS

Material safety data sheets (MSDS) are required as a result of the Occupational Safety and Health Administration (OSHA) published Hazard Communication standard (CFR. 1910.1200) in the Federal Register on November 25, 1983. The purpose of this standard is to require that employers provide information on hazardous materials to employees who work with them. To accomplish this, manufacturers and importers of chemicals are required to evaluate the hazards of their products and inform employers in manufacturing and non-manufacturing industries. These employers must then inform affected employees of safety requirements through training, container labeling and material safety data sheets. It is therefore important everyone can recognize and interpret specific areas of each MSDS. (A sample MSDS is located at the end of this section.) The following is a general discussion of MSDS format. Please note the format of specific MSDS forms may vary somewhat. These areas are:

SECTION I

Manufacturer's Name and Address - This is self-explanatory.

Emergency Telephone Number - This should be used to obtain information in the event of an emergency involving this material.

Chemical Name and Synonyms - This refers only to products that are single substances or compounds, such as oxygen or methyl ethyl ketone.

Trade Name and Synonyms - May or may not be applicable.

Chemical Family - Refers to the generic name of single elements and compounds, such as acid or ketone.

SECTION II

Hazardous Ingredients - Lists the hazardous materials that are in the product. A simplified definition of a hazardous ingredient is a material which produces a flammable gas or vapor, or which short term / long term exposure could cause adverse effects, either under normal use or predictable misuse or emergency.

The percentage by weight or volume of component(s) should be specified. In mixtures, hazardous chemicals in amounts greater than 5 percent must be specified, and frequently, lower percentages must also be specified. In all specified ingredients, the threshold limit value (TLV) should be provided, TLV being defined as a safe exposure level referring to airborne concentrations of substances and represent an exposure level under which most people can work constantly for 8 hours a day, day after day, with no harmful effects.

SECTION III

Physical Data - This section contains physical data relating to boiling point, vapor pressure, vapor density, solubility in water, specific gravity, percentage volatile by volume, evaporation rate, appearance and odor.

Fire and Explosion Hazard Data - The following will serve as an explanation of terms in

this section:

Flash Point - the temperature, (in degrees Fahrenheit), at which a liquid will give off enough flammable vapor to ignite. Whenever you are dealing with flammable liquids, control of ignition sources is critical. Obviously, if the ambient temperature is above the listed flash point, the substance should be handled with a great deal of care.

Flammable or Explosive Limits - the range of gas or vapor concentrations (percent by volume in air) which will burn or explode if an ignition source is present. LEL means lower explosive limit and UEL means upper explosive limit. The range between the LEL and the UEL is known as the flammability envelope. Generally, you will have no means of determining whether vapors from a substance are within the flammability envelope, so remove and avoid all ignition sources when using flammable materials.

Extinguishing Media - lists the fire fighting media suitable for use on the burning material. The important point to remember is that there are different types of fire fighting media for each classification of fire. There are four classes of fires listed as follows:

Class A - paper, wood, straw, cloth, etc.
Class B - flammable and combustible liquids.
Class C - involving energized electrical equipment.
Class D - combustible metals.

Special Fire Fighting Procedures - any special fire fighting media plus necessary personal protective equipment.

Unusual Fire and Explosion Hazards - any unusual hazards and/or conditions that govern them.

SECTION IV

Health Hazard Data - The following three items are detailed in this section: Threshold Limit Value (TLV) and Permissible Exposure Limit (PEL), effects of overexposure, and emergency and first-aid procedures .

Threshold Limit Value (TLV) and Permissible Exposure Limit (PEL).

Both of these refer to airborne concentrations of substances and represent an exposure level under which most people can work constantly for 8 hours a day, day after day, with no harmful effects.

Three categories of TLVs are specified:

Time Weighted Average (TLV - TWA) - 8 hour day/40 hour week to which all workers may normally be exposed day after day, without adverse effects.

Short Term Exposure Limit (TLV - STEL) - maximum concentration to which workers can be exposed for a period up to 15 minutes continuously without suffering from (A) irritation, (B) chronic or irreversible tissue change, or (C) marcosis of sufficient degree to impair self rescue or reduce work efficiency. No more than four 15 minute exposure periods per day are permitted with at least 60 minutes between exposure periods.

Ceiling (TLV-C) - concentration that should not be exceeded even instantaneously.

NOTE: IF ANY OF THE ABOVE TLVs (Threshold Limit Values) IS EXCEEDED, A POTENTIAL HAZARD FROM THAT SUBSTANCE IS PRESUMED TO EXIST.

Effects of Overexposure - description of an individual's appearance and the most common sensations that will result from exposure to the chemical. This is to aid you in recognizing a potential hazardous situation for yourself or a co-worker.

Emergency and First-Aid Procedures - deals only with problems of inhalation, ingestion, or from skin or eye contact. These are emergency procedures only. Further treatment by qualified medical personnel may be required.

SECTION V

Reactivity Data - Stability - indicates whether or not a chemical is stable or unstable under reasonably foreseeable conditions of storage, use or misuse.

Incompatibility - lists any common materials and/or contaminants which should be avoided. This is to warn you against mixing incompatible materials and includes prohibition against using dirty or contaminated containers.

Hazardous Decomposition Products - any hazardous materials that would result in dangerous amounts from burning, oxidizing or heating should be listed. Please note some relatively benign products give off dangerous by-products when burned or heated to the decomposition point.

Hazardous Polymerization - a chemical in which molecules of a material unite to form a larger, different material accompanied by the release of large amounts of energy, creating a hazardous situation.

SECTION VI

Spill and Leak Procedures - Steps to be taken in case material is released or spilled.

Applicable precautions will be indicated - avoid breathing vapors, avoid contact, remove sources of ignition, use of special equipment in clean-up, etc.

Waste Disposal Method - Indicates proper disposal methods. These recommendations must be followed.

SECTION VII

Special Protection Information - includes apparel and site/facility related information.

Respiratory Protection - Indicates the proper type of respiratory protection needed when the material is used in the manner intended.
Ventilation -

Local Exhaust - a system with high velocity and low volume.

Mechanical - normal ventilation used to distribute heated or cooled air in a plant.

Protective Gloves / Eye Protection / Other Equipment - indicates type of eye protection, hand protection and/or body protection necessary.

SECTION VIII

Special Precautions - Precautions to be taken in handling and storing indicates any precautions to be taken in situations other than those covered in preceding sections. The importance of the Special Protection and Special Precautions section of each MSDS cannot be overstated. These areas indicate what, if any, special protective equipment is required to use the material / chemical in the manner it was designed.

II. LABELS

Material received at Cardinal Surveys Company will be properly labeled. If labels are not provided, we will contact the supplier to get the specific labels. These labels should provide the following:

! Identity of the chemical products or substances in the container.
! Hazard warnings.
! Name and address of the manufacturer or other responsible party.

Labels must not be removed and will be replaced if illegible. All containers of chemical products including laboratory bottles, solvent cans and dispensers must be labeled. For smaller containers (less than one gallon), labels must be consistent with the standards that are specified above. Only those chemicals that can be classified as "immediate use", which means the hazardous chemicals under control of and used only by the person who transfers it from the labeled container and only within the work shift in which it is transferred, are exempted from the labeling procedure described above.

! In storage areas where similar chemical products are stored, we are to post signs or placards to identify the material and transmit the required information in lieu of individual container labels.

! If any materials are to be transferred from a storage tank or container through a pipeline, labels with the required information will be affixed to the line at the discharge point (valve).

! In those cans where a chemical product other than that specified on the container label is placed in the container, we must relabel the container to accurately reflect the hazards of the chemical product that has been substituted. Failure to do so could result in serious physical harm for you or one of your co-workers.

Attached are two examples of common hazardous material labels. The HMIS® (Hazardous Materials Identification System) was developed by the National Paint and Coatings Association. The example, located at the end of this section, shows the basic scheme of this labeling system. Note, a substance is rated from 4 to 0 in terms of health, flammability and reactivity, with 4 denoting the most dangerous. A letter code is also provided in the "Personal Protection" box to inform you of the proper safety equipment to wear. Keys for the letter codes are given under the personal protection index.

The National Fire Protection Association (NFPA) also authorizes a labeling system. An example of an NFPA label is located at the end of this section. As shown, health codes are found in the blue diamond, with 4 again denoting the most dangerous (deadly!) and 0 denoting normal material. Two other diamonds give information about the reactivity and fire hazards. The lower white diamond tells fire prevention specialist (and you) the general nature of the material, and indicates the proper fire fighting material to use.

III. SPILLS and ACCIDENTAL RELEASE of MATERIAL

Each MSDS, as discussed earlier, has a section indicating proper procedure and protective equipment required when a spill occurs. In every instance, whether the material is solid, liquid or gas, your supervisor should immediately be notified. The spill should be contained with the minimum number of people required to bring it under control as quickly as possible. In every case, procedure should follow that outlined in the MSDS. As is always the policy of the company, you are not to jeopardize your heath and safety or the health and safety of others for the sole purpose of saving property or preserving customer relations.

SUMMARY

Due to both current and proposed federal regulations, Cardinal Surveys Company finds it necessary to impose a policy of strict compliance when a MSDS calls for protective equipment and/or method of use. Each employee is required to read each MSDS covering any materials he or she comes in contact with and comply with any and all safety procedure or special precaution equipment requirements stated in reference to the material / chemical involved.

These federal regulations are designed for your safety and Cardinal Surveys Company as your employer, is required to enforce them. Failure to comply may result in disciplinary action up to and including discharge.