
PLAINTIFF'S
EXHIBIT
AL-389

RE: ROCKDALE WORKS INDUSTRIAL HYGIENE MANUAL 1977

This volume is the Industrial Hygiene Survey of Rockdale Works. Included in this manual is a review of all materials used in this Plant as well as a process review, both generally and by department. This manual is designed for ease of revision in that additions or deletions to either process or materials can be readily made. Therefore, any revision of process or the introduction or deletion of materials should be communicated to the Medical Department immediately in order that appropriate action can be taken to maintain currency of this manual.

Every attempt has been made to coordinate this material with all responsible department personnel. If you find errors of omission or commission, please inform me as rapidly as you can so that corrections may be inserted. It is recommended that this work be utilized as a reference manual, that the materials included here be used as a source of discussion at departmental safety or management meetings, and that indoctrination in the use of real or potentially dangerous materials be made a part of the training of the new employee.

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ERG:lr



INGOT DEPARTMENT - ROCKDALE WORKS

Abrasives

These are used for cleaning Properzi wheel, and eye protection should be used. Masks should be used if extensive carborundum grinding is done because of the possibility of silicosis; however, the amount done is limited and should present no particular problem.

Adhesives

Royal Industrial Cement is used as a gasket adhesive. Adequate ventilation and personal hygiene minimize hazards.

Aerosol

WD 40 is used as a lubricant, and Krylon Paint as a paint form. They are stored in self-contained cans. The substances are flammable and dangerous if the cans are punctured or stored near heat.

Asbestos

Asbestos is used in spout gaskets at the Properzi. They are pre-formed gaskets, transported in packets. A hazardous situation occurs if fine particles become airborne and are breathed into the lungs. Therefore, extreme care is taken to avoid rubbing and fraying of fibers, and old gaskets should be disposed of in special containers.

Bactericide

Tris-Nitro is a bactericide used as a Properzi roll emulsion additive. It is handled in plastic buckets. In the quantities used, Tris-Nitro presents no personal hygiene problems.

Beryllium

Alloys of Be in combination with Al are light and remarkably resistant to stress and strain. Beryllium ingot is stored in small pieces in closed drums. It is a highly toxic bivalent metallic element which constitutes a serious hazard if its fumes are breathed into the lungs. Any skim produced is discarded immediately. Adequate ventilation is essential, and toxic fume and dust respirators and safety goggles are worn where dust is present.

Castor Oil

Castor oil is used as a mold lubricant for the DC casting units. There is no particular hazard associated here with the exception of certain allergic reactions of certain persons upon contact with the skin. Prolonged contact should be avoided and personal hygiene exercised.

Chlorine

Liquid chlorine is received in one (1)-ton cylinders and stored in Building 34-B, which is adjacent to the west side of the Ingot Department. Also in Building 34-B are two liquid chlorine evaporators, pressure reducing valves, and the beginning of the piping system to conduct the chlorine to the holding furnaces in Building 34. At the furnaces, flexible hoses connect the pipe to the graphite fluxing tubes used to introduce the gas into the molten aluminum.

The chlorine system, in an emergency, can be turned off at several of the control panels in Building 34 (Ingot Department) or at the entrance of Building 34-B. An alarm bell in the system indicates when the evaporator temperature exceeds 180 degrees F. or the chlorine supply cylinders are empty.

Building 34-B has a roof vent fan and an emergency stack vent fan which will remove the heavy chlorine gas from floor level and exhaust is well above ground level. Generally there is no chlorine liberated in the building; small residual amounts may be lost from the pipes when a cylinder is changed or work on the piping is being performed. Absorption type gas masks are available at the entrance to Building 34-B as well as near the furnaces in Building 34.

In Building 34 a little chlorine may escape at floor level during the fluxing of a furnace. Some may escape from the top of furnace along with various reaction products, such as aluminum chloride and hydrogen chloride. Roof fans help remove any escaped gas from the building, and the furnace stacks exhaust the excess chlorine and the reaction products outside the building.

Some chlorine may escape at floor level at times when fluxing is done in either an R-249, A-528, R-622, or A-181. The molten metal is fluxed in a box as it comes from the furnace. This unit is covered by an exhaust hood. The amounts of chlorine involved are quite small and dissipate quickly. The absorption type gas masks should be worn as necessary.

Chromium

Chromium is a hard metal used in alloy to impart stainless properties and smooth surfaces. It is hazardous only if volatilized or vaporized, and therefore poses no particular hazard as used.

Copper

Copper is used in Properzi copper molds. Copper dust when present as fine particles may be classed as a source of metal poisoning. However, the fine particles resulting from grinding are minimal, and approved dust masks are used.

Corrosion Preventive Additive

Cuprogard is used as a Properzi roll emulsion additive. It is an oxidation retardant for copper and brass piping and valves. Contact with skin is limited, and only small quantities are used; therefore, no serious hazard exists.

Fumes from Furnace Skim

Furnace skim consisting mostly of oxides of aluminum, but also containing some metallic aluminum, nitrides and carbides of aluminum, aluminum chloride, magnesium chloride, hydrogen chloride, is raked from the surface of the molten aluminum in the holding furnaces into skim boats. These boats are then transported to the skim room and allowed to cool. When hot, the skim gives off dense, white fumes which are very irritating to the respiratory system. The skim room has an exhaust fan for removal of these fumes. When cool, the skim is transferred from the skim room to rail cars for shipment. The cool skim emits no fumes.

Fumes from Gas Fired Holding Furnaces and Gas Burners

Fumes generated by the stirring, skimming, alloying, and fluxing of metal in the holding furnaces plus the products of combustion of the gas burners heating the furnace are normally retained inside the furnace and exhausted out the stack. The furnaces are normally operated under a slight positive pressure so that the operator may come in contact with these fumes. Some fume emission may occur around the doors and the top of the furnace during fluxing operations.

Gas burners are used to heat potroom crucibles and pouring troughs; roof rans provide draft to exhaust fumes to atmosphere.

The fumes which escape from the furnaces and unhooded gas burners generally cause no problem at floor level, but approved respirators should be worn as necessary when working at higher elevations in the building. Adequate ventilation should be maintained by roof ventilator fans.

Hydrochloric Acid

HCl is used in de-ionization of Properzi mill roll lubricant water and cleaning Properzi mold wheel. The corrosive liquid should be handled cautiously, and rubber gloves and eye protection should be used. Adequate ventilation should be provided.

Insulating Materials

Kaowool is used as insulation of pipes and filter boxes and is ocmposed of abrasive, skin-irritating fibers. Protective gloves, personal hygiene following exposure, and respirators and masks used as necessary minimize hazards.

Kerosene

Kerosene is used for water-molten aluminum explosion retardation. It is flammable and an irritant if inhaled; avoid excessive or prolonged skin exposure.

Magnesium

Magnesium for certain alloys is received in notched ingot of various sizes. When it is added to molten aluminum, a special tool is used to submerge the magnesium to prevent it from air burning.

The general toxicity of magnesium is considered to be low, but several hazards are encountered. If it is ignited, it burns with such violence that it may explode, and it can cause severe burns to the skin. Metallic magnesium particles imbedded in a wound in the skin can cause gas gangrene and freshly formed magnesium oxide can cause metal fume fever.

Manganese

Manganese adds hardness and ductility to alloys and is hazardous only if ingested or inhaled in volatilized form. As used, there is no particular problem.

Marinite

Marinite is used as insulating material. Its dust can irritate the lungs, causing possible asbestosis or lung cancer. Care is taken in handling, and scrap and dust are disposed of via special containers. Dust masks are also used if dusting occurs. See "Asbestos."

Mercury

A small amount of mercury is used in various manometers and would constitute a hazard only when an accident coused spillage or breakage of a manometer tube.

Oxygen

Oxygen is used as a furnace combustion additive and lancing furnace tap holes. It is hazardous because of its violent reaction when used in connection with combustibles and extreme caution is used.

Paints and Enamels

Various kinds of paints and enamels are used for identification purposes. Personal cleanliness will minimize the risk of skin irritation. Work area should be ventilated, and cans should be stored below 140 degrees F. In ordinary use, however, hazards are very minimal.

Red Mud

This is a by-product of bauxite processing, which is used to coat aluminum molds. Care in handling minimizes dusting. Exact composition is unknown; however, personal hygiene should be exercised after using this material and masks worn if dusting becomes severe.

Refrex-Kleen Flux

This material is a powder used in the holding furnaces to aid in skimming dross. The exact composition is unknown, but is is believed to contain fluoride, and thus is a potential hazard. This material is aspirated into the furnace, and dense fumes are created in the furnace during this operation. But in general, most of the fumes are exhausted outside the building through the furnace stack. Careful regulation and maintenance of furnace dampers and drafts should prevent most, if not all, of these fumes from entering the building atmosphere. Reasonable care in handling the flux should be practiced. Prompt removal of skim from the furnace area and wearing of approved respirators minimize risks.

Silicon

Silicon is used for alloy purposes. It is a hard, lustrous, crystalline solid of gravel-size particles which, as used here, constitutes no serious health hazard.

Sodium Hydroxide

Sodium hydroxide is used in the process of de-ionizing water. The sodium hydroxide is brought to Building 92B in 400-pound drums and then used in 40-pound quantities. Rubber gloves and face shields are required when mixing the sodium hydroxide with water. A small vent fan draws the fumes out of the building when the solution is mixed.

Titanium-Boron Alloy

Titanium and boron are used in alloying aluminum. There should be no significant hazard as used here.

Zinc

Zinc itself presents no hazard, but during alloying fumes may be evolved which could cause metal fume fever. The possibility of this happening is slight, with typical exposures of short duration. The furnace is equipped with an exhaust system, thus exhausting the bulk of the fumes outside the building.

ELECTRICAL DEPARTMENT - ROCKDALE WORKS

Abrasives

Abrasives, used in various forms, are generally of the inert or non-siliceous type. Thus the dust produced by the abrasive is not as dangerous as that produced by the material which is being ground, sanded, or buffed. Operations using abrasives are usually conducted where exhause systems are present or in open, well-ventilated areas. However, when working on materials which produce a dangerous dust, such as copper, respirators are used.

Acetylene

Steel cylinders of acetylene are ordered from the storeroom as needed. It is used with oxygen mainly for burning. As this gas burns, some carbon monoxide is produced but not in sufficient quantities to be toxic even though the exposure is for relatively long periods. Care is taken not to damage the cylinders or in any way cause a leak of the gas which is an asphyxiant in the unburned state.

Adhesives

These are received from the storeroom and stored in small amounts in office cabinets. They are used for various bonding purposes. Properties vary, but the solvents are hazardous only in that they may be flammable liquids.

Aerosol

WD-40 is used as a lubricant, and Krylon paint is used in paint form. They are stored in self-contained cans. The substances are flammable and dangerous if the cans are punctured or stored near heat.

Alcohol, Denatured

Denatured alcohol is stored in metal cans and as needed used as a cleaning agent and for crane cylinder repairs. The odor varies depending upon additive material and is poisonous when taken internally.

Asbestos Gasket Cloth

This material is stored in crates, pre-cut, and used in transformer gaskets. It is not hazardous unless the dust particles become airborne (as a result of grinding, etc.).

Askarels

This is a trade name for a series of chlorinated aromatic derivatives, such as pentachlorodiphenyl, polychlorinated biphenyls, and trichlorobenzene. They are nonflammable and are used for transformer, reactor, and capacitor insulation where ordinary insulating oil would present a fire hazard. They are enclosed in completely sealed units which are not physically handled, and disposal is by contractor service.

The substances are stored in drums and are pumped into the units if necessary. This very rare and would occur only if a reactor fails and a new one needs filling.

Since the use of these liquids is limited, the hazard is minimal. However, the liquids are highly toxic and special handling precautions are used to prevent all possible exposure.

Battery Acid

This substance is a mixture of sulfuric acid and distilled water which is used as the electrolyte in lead storage batteries. The chemical laboratory makes up a mixture of acid and water which has a specific gravity of 1.4. When a battery needs electrolyte, enough acid and water are added to provide the fully charged battery with an electrolyte of specific gravity 1.260. While the batteries are charging, hydrogen is leberated from the cells. If this gas is released rapidly enough, an acid mist may form in the vicinity of the batteries. To prevent the accumulation of the hydrogen and acid mist, the area used for charging batteries is open and well ventilated.

Brake Fluid

This is a standard hydraulic brake fluid. The Electrical Department's use of this liquid is confined mainly to the braking systems of the overhead cranes.

Copper and Copper Dust

This is not a significant hazard unless finely divided as the result of sanding or grinding.

Dye

Spotcheck Developer, Penetrant, and Cleaner are used for coloring and detecting metal cracks. The substances are flammable, but present no significant hazard as used in well-ventilated areas.

Epoxy Cements

These are generally used for temporary repairs, but because of their great strength they have also found uses of a permenent nature. Several different cements have been used, but should not be allowed to ocme in contact with the skin as they may cause dermatitis and in certain individuals an allergic reaction.

Hydrochloric Acid

Small amounts of this acid are used occasionally to clean metal surfaces prior to soldering. It is generally used in a well-ventilated area, and precautions are taken to protect the eyes and skin from this corrosive material.

Insulation, Electrical

Various types or brands of this material have been used, but at the present time a General Electric product called Gyptol is being used. This product is combustible and harmful if taken internally. Prolonged contact with skin could cause dermatitis, and it should be used with adequate ventilation to prevent possible damage to respiratory tract.

Lead

Lead is used most commonly as a joint material, but is is also used in the form of pipes and occasionally as a seal or gasket. It is also present in certain alloys, such as Babbitt and solder. The greatest hazard associated with lead is present when it is used as a joint material. Since it must be melted before use, there is danger of inhaling lead fumes from the molten metal. However, unless the melting of lead is done in a confined area, the concentration of lead in the air is probably below the maximum allowable level.

Lubricants

Crater Compound No. 3 is a heavy black oil of unknown composition or origin which is used to coat large open gears. Since it has a grease-like consistency, it must be heated to a more fluid state before application to the gears. As with other greases, repeated contact with the skin may cause dermatitis.

Penetrating Oil

Liquid Wrench is a liquid penetrant used to free parts frozen by rust, corrosion, scale, paint, varnish, carbon, or gum. It is labeled as being a

flammable blend of aromatic solvents. The label further states that prolonged or repeated breathing of the vapor and contact with the skin should be avoided, and that it is harmful if ingested. This material is generally used in well-ventilated areas, but at times it may be used in areas where poor ventilation may cause a hazardous condition.

Potassium Hydroxide

This material is used as the electrolyte in the nickel-cadmium batteries used for emergency lighting. It is stored in polyethylene bottles and used as needed. This material is dangerous to the eyes and skin. Inhalation of dusts or mists can cause injury to the respiratory system, and ingestion results in severe injury to the gastrointestinal tract. Chemical safety goggles, a full face shield, rubber gloves, and aprons should be worn when handling this material, Any area of the body which comes in contact with this material should be washed immediately with large amounts of water.

Sealing Compound

These compounds include C-H Chico, Johns Manville Duxseal, and Gould 76003. These materials are used for various sealing purposes; for example, Chico is used to seal explosion-proof circuits from non-explosion-proof areas. None but the Duxseal is actually handled by hand; however, use in infrequent and contact with the skin is limited as much as possible, thereby minimizing the hazard. Some individuals sensitive to this material may develop dermatitis. The affected area should be cleaned thoroughly after contact.

Silicone Grease

This grease is a polymer consisting of chains of alternate silicon and oxygen atoms linked to organic groups and to similar chains. It is used in the meter shop for lubricating meters and clocks which are exposed to fairly high temperatures. It is also used because it does not tend to build up on moving parts like petroleum based greases. Like other lubricants, it may cause dermatitis if repeatedly allowed to come in contact with the skin.

Silver Brazing Alloys

These alloys are occasionally used for such things as rebuilding switch contacts. The danger in these alloys is the cadmium they contain - 16% to 24%.

Since only relatively small amounts of these alloys are used and generally in open, well-ventilated areas, it is doubtful that anyone would be exposed to a concentration in excess of the permitted concentration.

Sodium Carbonate

This is a finely divided powder, alkaline in nature, which is used as electrolyte material. Care in handling minimizes dusting, which can irritate eyes and mucous membranes. Personal contact is kept to a minimum.

Solder

This is an alloy of relatively low melting point which is used for joining other metals. The term applies particularly to tin lead alloys, but other metals, such as silver, copper, zinc, and cadmium, may be included in varying amounts. A piece of solder may contain from one to five cores containing resin which acts as an antioxidant. Since only small amounts are used and generally in open and well-ventilated areas, it is doubtful that solder presents much of a hazard.

Soldering Flux

Small quantities are used in this department as an adhesive. If the flux contains an acid, spattering may cause burns. There is no serious hazard if used properly.

Solvents

Contact Re-Nu is an aerosol often marketed under the trade name "Freon." It is used as a cleaner and degreaser in the meter shop. The fluorocarbon products marketed under the trademark "Freon" are low in toxicity, nonflammable, nonexplosive, and noncorrosive, but in the presence of open flame or objects operating at high temperature they will decompose to form toxic or irritant products.

1,2 Dichloroethane is received in one quart glass bottles and is primarily used as a degreasing agent. Rags wet with this liquid are used to wipe grease from the interior walls of the mercury arc rectifier tubes. Occasionally small metal parts are allowed to soak in a pan of the solvent and then wiped clean with rags. It is used to clean electrical joints of old Alcoa Joint Compound No. 2 before the joint is made. Work with this solvent usually takes place in a well-ventilated area, but the fumes of vapors are toxic if inhaled in sufficient

quantity. The liquid is dangerous to the eyes and will cause dermatitis if allowed to repeatedly contact the skin. This is a flammable liquid, but it burns with difficulty.

Naphtha is used in the meter shop for cleaning and degreasing purposes. Since only small quantities are used at any one time, this material probably represents only a slight hazard.

Oakite is a trade name for several kinds of cleaners used to steam clean machine parts. Both acid and alkaline cleaners are sold as Oakite compounds, and all may cause irritation upon contact with skin membranes.

Varsol is a light petroleum distillate used as a solvent for oil and grease. It is usually used in open and well-ventilated areas. The usual practice is to soak the parts to be cleaned in a bucket or can containing the solvent. After a period of soaking, the parts are wiped dry with rags of blown dry with the aid of compressed air. Occasionally the Varsol will be aspirated into a stream of compressed air, and the resulting spray used to clean large pieces of equipment. This liquid may cause damage to the eyes, and prolonged contact with the skin may cause dermatitis. Inhalation of large amounts of the solvent vapors may cause adverse reactions, particularly in sensitive individuals. It has a relatively low flash point and thus also presents the problem of being a fire hazard.

Transformer Oil

Large amounts of this oil are used by this department. Pumps are used to add oil to a unit; therefore, skin contact is very limited. No serious health hazard exists as used and handled.

White Lead

This material is used for identification purposes and is stored in cans. It is usually in powder form, soluble in acids and insoluble in water. It is poisonous when inhaled into the body, causing a reaction in the upper respiratory tract. Extreme care should be taken in handling to prevent dusting, as well as personal cleanliness after using the lead base paint.

YARD SERVICE DEPARTMENT - ROCKDALE WORKS

Abrasives

Sand and Black Beauty grit are used for impact abrasive cleaning and sand blasting. Inhalation of fine particulate could be injurious. Fresh air hood should be worn during sand blast cleaning.

Adhesives

Silastic RTV is used for miscellaneous caulking purposes. The solvent may evaporate, thus displacing air in confined spaces. It should be stored in metal cans.

Aluminum Fluoride

Yard Service cleans out wet Potroom scrubbers and spillage from the Carbon Plant A-446 units, and hauls it to the approved dump area via load lugger bucket. AlF dusts readily and can be irritating to membranes and skin. Approved dust respirators should be worn and personal hygiene exercised.

Bath

Yard Service personnel clean Potroom equipment and dig metal furnace linings. Prolonged inhalation will irritate and damage the respiratory tract; therefore, dust masks should be worn.

Brick

Yard Service personnel transport brick between points of use via truck. Demolition is also performed, with the exception of Carbon Plant furnaces, by Yard Service personnel. The only hazard encountered would consist of the dust resulting from demolition. Approved dust masks should be used as necessary.

Butts

Yard Service personnel occasionally transport "burn offs" from stockpiles outside of potrooms to an approved dump area. These carbon anode remnants contain finely divided carbon, fluoride compounds, and alumina, which can be irritating to nose and throat. Personal hygiene should be exercised and approved dust masks used as necessary.

Cement

Waterplug is a quick-setting cement used for sealing cracks in water containers. The solvent vaporizes and can be irritating to skin upon contact. Rubber gloves should be worn to avoid skin contact, and skin should be washed thoroughly for 15 minutes or more if contacted. Inhalation of fumes should be avoided and ventilation adequate.

Cement - Portland

This masonry cement is used throughout the plant for making concrete. Dermatitis is the hazard usually encountered, thus necessitating personal hygiene. In dry form, it can cause respiratory irritation if inhaled in sufficient quqntities. As used here, however, this hazard is slight.

Chlorine

Yard Service personnel transport chlorine in one-ton cylinders from IGC. The gas is extremely poisonous, an irritant of the upper respiratory tract. Cylinders should be handled with extreme caution, and checks on valves and hoses should be frequent. Gas masks should be accessible for emergency use.

Coke

Yard Service personnel transport residual coke to a dump area via load lugger truck. Approved dust respirators should be worn during exposure to considerable dusting.

Creosote

On occasion, personnel of the Yard Serivce department handle creosoted wood. It can act as a skin irritant and result in serious dermatitis if exposure is prolonged. Skin contact should be avoided and protective clothing worn.

Dug Potlining

Handling and method of control are the same as for Scrap Iron.

Epoxy

Various brands are used to fill cracks in streets and passageways. Although not a serious industrial hazard, prolonged exposure or contact can cause irritation to eyes or skin.

Fertilizer

Various brands are used to enrich the soil for growth of shrubs, grass, etc. The materials can be irritating to skin membranes if dusting occurs, and approved masks should be used if necessary as well as personal hygiene exercised.

Floor Patching Resin Hardener

Floor patching materials can be irritating to skin and m-cous membranes with prolonged contact. Personal hygiene should be exercised.

Furnace Slag

Slag is hauled from electromelt furnaces via trucks by Yard Service personnel. There may be a slight dusting problem as it is disposed of in the dump area; therefore, approved dust masks should be worn when necessary.

Herbicides

Various brands of weed killers are used in a liquid form. Hazards include irritation to skin and membranes and probable toxic reactions if ingested. Eye protection and adequate clothing should be worn at all times and personal hygiene exercised.

Insecticides

Various types of insect killers are used in liquid and dust form. These materials are poisonous to humans as well as to insects. Personal hygiene, washing clothing after use, and wearing approved dust masks (for dust) and respirators (for fine mists) are protection against the hazard.

Insulation

Yard Service personnel tear out old hot equipment insulation and transport it to a dump area. Most insulating material consists of various silicates. Some old installations may still contain asbestos. A respirator and good ventilation protect against the possibility of silicosis when dusting is severe.

Insulating Materials

Materials used in insulating furnaces, pipes, pots, etc. are of various compositions, including asbestos and glass and wool fibers. Internal tissue irritation can result from exposure to dusting of these materials, and approved dust masks or respirators should be worn as necessary. Transportation should be in approved containers to appropriate dump areas.

Lime

Yard Service cleans up and disposes of lime from lime storage equipment. Skin and respiratory tract irritations from the powder can be minimized by personal hygiene, wearing of gloves, and wearing of approved dust masks.

Mercury

The Yard Service Department disposes of scrap equipment contaminated with mercury. Mercury poisoning can be brought about by the inhalation of the vapors. Scrap contaminated with mercury is placed in tightly closed containers, and the Yard Service superintendent is called for special pickup and disposal to a Class I dump area.

Mortar

Various brands are used for patching, concrete, and other masonry repair. There are no hazards as ordinarily used. Lime may cause irritations leading to dermatitis, and inhalation of dust, especially those containing lime, may cause respiratory tract irritations. Personal hygiene is the best control, as well as the use of approved respirators during prolonged exposure to the dry dust.

Pitch

The Yard Service Department cleans up pitch from areas and transports it to the disposal area via lugger buckets. This black solid with the "tar" odor contains phenolic compounds which may cause burns through contact with skin and eyes and cause skin to be particularly sensitive to sun and wind. Protective skin creams used prior to exposure, plus washing of the skin thoroughly, minimize hazards.

Potlining Scrap

Scrap metal, including used dust collector bags, are transported to a dump area by Yard Service personnel via flatbed truck or lead lugger truck. The danger here is from any pitch contained in the scrap. However, the workers' exposure to pitch is usually not prolonged. See "Pitch" above.

Premixed Grout

Embeco 153 and 713 are used as grouting, contained in sacks, and transported via truck by Yard Service personnel. It dusts readily when dry, and continued inhalation of fine aprticles may cause respiratory tract damage. Approved dust masks should be worn.

Raw Sewer Sludge

The hazards involved here are bacteriological and disease-related. Boots and gloves should be worn, with thorough washing of body and clothes after exposure.

Scrap Boxes and Bags

These materials are disposed of by Yard Service personnel via load lugger buckets and flat bed trucks. The only hazard involved would be from residual dusts from such items as coral plastic containers, etc. Care in handling and personal hygiene should be exercised.

Scrap Drums

These are handled in the same manner as above.

Scrap Iron

Scrap iron is hauled from point of generation to scrap metal yard by Yard Service via flat bed and standard dump truck. Scrap may be contaminated with used bath materials, pot linings, etc., which could result in dermatitis and skin burns. Prompt, thorough washing of exposed skin areas, wearing of dust masks if dusting is unavoidable, and wearing gloves will minimize the hazard.

Sewer Gas

Sewer gas enters sewer lines as a waste product or is formed in the sewers. The hazards in sewers and manholes are those associated with the hazards due to flammable gases, a diminution of oxygen with possible asphyxiation if such an atmosphere is entered, and to poisonous gases. Continuous ventilation by blower ventilators of the lift stations and processing plant is recommended. Analysis of gas samples should be made for the presence of oxygen and combustible gases. If needed, forced fresh air ventilation shall be provided.

Solvent

Oakite is used for cleaning machine parts. It is a trade name for several kinds of cleaners, both acid and alkaline. All should be treated as hazardous. Contact may cause irritation of skin membranes, and personal hygiene, wearing protective clothing, as well as careful handling to avoid splashing should be exercised.

Tar

Asphalt, or "tar," is mixed and used to patch floors and roads. Fumes given off will contain phenolic compounds, toluene and benzene. Adequate ventilation and avoidance of skin contact is recommended.

Water Soluble Oil

This material is disposed of to dump site or onto roadways (to settle oil). Wearing of proper protective clothing--rubber boots, gloves, etc. should minimize danger of skin irritation.

Wood and Blacktop Sealer

Squeege-Cote is flammable and resistant to oils, gasoline, and solvents. It is a skin and eye irritant, and protective clothing and equipment should be worn to avoid exposure.

ATOMIZER - ROCKDALE WORKS

Abrasives

These are used for sharpening tools, and eye protection should be used. Masks should also be used if extensive carborundum grinding is done because of the possibility of silicosis; however, the amount done is limited and should present no particular problem.

Adhesives

These materials, such as Swifts' Glue, are used for weak bonding of palletized bags. Adequate ventilation and personal hygiene minimize hazards.

Aerosol

WD 40 is used as a lubricant and enamel paint is used in paint form. They are stored in self-contained cans. The substances are flammable and dangerous if the cans are punctured or stored near heat.

Aluminum, Molten

Molten aluminum is used in the Atomizer for aluminum powder and aluminum granules. The extreme heat of the molten metal is very injurious upon contact with tissue, thus necessitating careful handling. Contact with wet, cold tools could result in explosions; therefore, only dry, hot tools should be allowed to come in contact with the metal.

Aluminum Powder

Various grade numbers of aluminum powder are produced in the Atomizer for customer sales. It is flammable with dust clouds of a highly explosive nature, producing rapid evolution of intense heat. The powder is handled with extreme care and stored and handled under inert atmosphere. Dust clouds and ignition sources should be avoided, and heat protective clothing should be worn.

Beryllium/Copper Alloy

Hand tools made of this alloy are used in the Atomizer because of its low sparking characteristics from impact or abrasion. It is hazardous only if very fine BE-Cu particles become airborne and are inhaled. As used, however, the hazards are slight.

Calcium Carbonate

This substance is used for metal trough surface protection. Excessive dust in the air could cause lung irritation; however, as used the possibilities of hazard are slight.

Cement, Rubber

Dow-Corning RTV Silicone Rubber Cement is used as a miscellaneous sealant and is handled in cartridges. Exposure is limited and constitutes only a slight hazard.

Compressed Air

Compressed air is used in pneumatic tools, piped from compressors to point of use. The major hazard is from penetration of skin by air bubbles, resulting in circulatory system damage. Molten metal and compressed air at nozzles could cause burns. High pressure air contact with body tissue should be avoided.

Copper, Scrap

Scrap copper is used in aluminum-copper alloy powder. As used, the hazards are slight. It becomes a problem only if vaporized, resulting in copper intoxication.

Furnace Gases

These are formed as a by-product in combustion of natural gas. Adequate ventilation and regulation of dampers and drafts minimize risks.

Gas, Natural

Natural gas is used as a furnace combustion fuel. It is flammable and an asphyxiant in confined spaces. Adequate ventilation is provided.

Hydrogen Gas

Hydrogen gas is a reaction product from storage battery chargers. It can also be a by-product of aluminum powder wet by water. It is explosive but not toxic unless it is found in large enough quantities to exclude oxygen. Under usual circumstances, however, there is slight hazard.

Paints and Enamels

Various kinds of paints and enamels are used in the Atomizer as protective coatings and container identification. Personal cleanliness will minimize the risk of skin irritation and possible subsequent dermatitis. Work area should be ventilated anc cans should be stored below 140 degrees F. In ordinary use, however, these are not serious health hazards.

MECHANICAL MAINTENANCE DEPARTMENT - ROCKDALE WORKS

Abrasives

The Mechanical Department uses abrasives throughout the Plant. At some time they have used practically every abrasive material available and in practically every fabricated shape or form, including abrasive sawing. Most work using abrasives is conducted in large, well-ventilated areas or in areas where exhaust hoods are available. However, occasionally some work must be done in a confined area. When this happens workers are provided with approved respirators, or the ventilation in the area is improved.

Acetylene

This is a colorless, highly flammable and explosive gas used as a fuel in conjunction with oxygen for welding and cutting of metals. It is received in steel cylinders under pressure and dissolved in acetone. Since acetylene has one of the widest explosive ranges known, the cylinders should be stored upright in a cool, well-ventilated area and checked periodically for leaks. Acetylene is an asphyxiant, but it may contain as impurities such toxic gases as arsine, phosphine, carbon monoxide, and hydrogen sulfide. For this reason welders using acetylene in restricted areas should be provided with adequate ventilation

Aerosol

Various aerosols are used as lubricants and paint forms. They are stored in self-contained cans and carried to work site. The substances are flammable and dangerous if the cans are punctured or stored near heat. They should be used in well ventilated areas.

Alcohol, Denatured

This substance is used as antifreeze for water in propane gas storage tanks and as a solvent in the Auto Shop. It is poiwonous when taken internally and warning labels should signify such. Personal hygiene and proper ventilation minimize irritation of mucous membranes.

Ammonium Hydroxide

This solution is used in the Ozalid machine in the production of blueprints. "Leak-tec" is used in the detection of chlorine leaks. As used, the danger is slight; however, the liquid will cause burns to the eyes, and goggles should be worn when handling the solution.

Babbitt Metal

Babbitt metal is a group of soft alloys used for bearings, etc. Mechanical Maintenance makes up poured cable ties with a mixture of Babbitt and lead metals. They may be used as cast or machined. The two main types are lead base and tin base Babbitt, but other types are as follows: lead silver base Babbitt, cadmium base Babbitt, arsenical Babbitt, and white metal bearing alloys. They all contain metals such as lead, antimony, cadmium, and arsenic which when heated may give off fumes which are either toxic or may cause metal fume fever. Any dust created during gfinding or machining of these alloys also presents a hazard.

Brazing Alloys

These are nonferrous alloys used for welding above 800. However, several of the silver brazing alloys are used at temperatures as low as 600. These alloys are composed of such metals as copper, zinc, tin, antimony, lead, silver, cadmium, phosphorus, nickel, and manganese. Many of these metals when heated to working temperatures will give off fumes which are either toxic or may cause metal fume fever. Under normal conditions the concentrations of these fumes probably never reach dangerous levels. However, if brazing operations are conducted in confined areas, it would be quite possible to reach or exceed safe levels for these fumes.

Carbon and Carbon Dust

This material is used as electrodes in the Shop for cutting purposes. As used, the hazard is slight.

Carbon Dioxide and Carbon Monoxide

Carbon dioxide is formed during the complete combustion of any carbonaceous material, and carbon monoxide is formed furing the incomplete combustion of any carbonaceous material. Both are colorless, essentially odorless, and both are likely to be found to some extent any place where such fuels as natural gas, oil, or coal are being burned to provide heat.

Carbon dioxide is heavier than air and tends to settle in low places such as tunnels, pits, or manholes. If the concentration is high enough, it may cause asphyxiation and death. Lesser concentrations may cause a form of intoxication with symptoms such as excitement, headache, drowsiness, and dizziness.

Carbon monoxide is highly poisonous. Exposure to as little as 200 ppm may cause a headache. Greater exposures may cause nausea, dizziness, and finally collapse and possibly death.

For these two gases to present much of a hazard, it would be necessary for exhaust and ventilation systems to fail and burner systems to be out of adjustment.

Coral Plastic

This material is used by brickmasons in lining the Lectromelt furnaces and lids. Brick has been discontinued for this job. Coral Plastic has a longer life, thus reducing costs and labor. Eye and skin irritation can be hazards associated with this material; however, brickmasons and helpers are required to wear plastic goggles, which are vented, and appropriate gloves when working with this material.

Chlorine

Liquid chlorine is received in 150-pound steel cylinders. It is used to chlorinate the potable water and the effluent of the sewage disposal plant. Exposure to the gas would be limited to mechanical failure of some part of the chlorinator, maintenance of the chlorinator, and when changing cylinders.

The Mechanical Department is also responsible for changing the one-ton cylinders of chlorine used in the Ingot Department and also for the maintenance of the piping system associated with the use of this chlorine.

Coal

Bituminous coal is used as a fuel in the blacksmith shop forges. Exhaust hoods and proper ventilation remove such products of combustion as CO_2, CO, and SO_2.

Copper and Copper Dust

In the fabrication of new anode bars, collector straps, and busses, a certain amount of machining, grinding, and welding must be done. The machining work creates very little copper dust, but the grinding and welding produce both copper dust and fumes. Most of the grinding or sanding is done before welding with only a small amount done later. The welding is done with copper rod and using an inert gas shielded welding process. Welding and most grinding or sanding is done with exhaust hoods.

Diesel

Diesel is used in the Paint Shop occasionally as a surface cleaner of equipment. It is also mixed with light oil to lubricate carbon conveyor rollers. The substance is flammable and can be irritating to tissues. Caution in handling should be exercised.

Epoxy

Epoxy is occasionally used in the department as a miscellaneous cement. As used, there is no particular hazard.

Ether

Ether (Serc) is used in the Auto Shop for quick start on vehicles. Adequate ventilation and sparing use minimize the hazard of O_2 displacement.

Fiberglass

Fiberglass cloth and sheet are used for heat insulation by the carpenters. Skin irritation can be minimized by personal hygiene.

Freon

Freon is used in air conditioning cooling system maintenance. Goggles are required when handling freon, and approved respirators should be worn.

Hydraulic Fluid

Fyrquel 220 R & D is used as a hydraulic press fluid. It is a fireproof liquid, containing tri-aryl phosphate, and emits toxic vapors if heated to boiling point. It is a skin irritant and harmful if swallowed or allowed to come into contact with eyes. Normal hygiene practices should be observed after handling.

Insulation

Fiberglass, Kaowool, and a small amount of old asbestos heat insulation are used in hot equipment insulation, thermal insulation on regenerators (R-446), and carbon plant mixers. If deteriorating, dusting can be an irritant and respirators should be worn. Old asbestos should be handled carefully without creating a dust cloud, with disposal to an approved dump area.

Kerosene

See Diesel.

Lead

Lead is used most commonly as a joint material. It is present in certain alloys such as Babbitt and solder. The greatest hazard associated with lead is present when it is used as a joint material. Since it must be melted before use, there is danger of inhaling lead fumes from the molten metal.

Lime

Lime is received in hopper bottom railroad cars and transferred to a storage tank at the Lime Treatment Plant. From storage it is conveyed to a lime slaker, and then in the form of a slurry it is added to the incoming water from the pot-room gas scrubbers. The lime causes the fluorides in the scrubber water to precipitate, and after a short settling period which removes the bulk of the precipitated material, the water is pumped back into the system. Use of dust masks or approved respirator and goggles is recommended when working in high concentrations of lime dust.

Metalizing Metal

This metal in the form of wire is passed through a gun where burning gases melt it, and then with compressed air the molten metal is atomized and sprayed onto a surface. Various metals such as stainless steels, brass, and aluminum may be used. This process is rarely used at the present time, but when it is used, the work is done in open well-ventilated areas.

Mortar

Mortar is used by the brickmasons, and there are no hazards as ordinarily used. Lime may cause skin irritations, but personal hygiene is the best control.

Natural Gas

Natural gas is used in various areas of the Plant. Mechanical Department workmen may be exposed to this gas while working on or near pipes carrying the gas and equipment where gas is burned to provide heat. Natural gas is highly flammable and explosive, is an asphyxiant, and while burning, if burners are not adjusted properly, may release such toxic products as carbon monoxide.

Piping and equipment using gas should be periodically checked for leaks and burners also checked for proper adjustment. Air packs are provided and are available if necessary.

Paints, Enamels, Thinners, and Removers

These materials are used throughout the Plant for protective coatings and for decorative purposes. Some men work in the Paint Ship while others work on jobs around the Plant.

The paints are usually prepared in the Paint Shop. The paint is mixed,

and vehicle, dryer, thinner, etc. are added as required. These materials are volatile. If the fumes are allowed to accumulate in confined areas, they are a serious source of hazard. Adequate ventilation controls this danger in the shop. A large percentage of the painting is performed on exterior surfaces where the hazard resulting from fumes is slight.

Occasionally on an interior job, the painters are in a position where the fog from the spray guns collects on exposed skin surfaces and the area becomes contaminated with the fog and fumes. In such areas, respirators are worn for protection.

Penetrating Oil

Various brands, including So'k and Liquid Wrench are used throughout the Mechanical Department to loosen rusted or corroded parts. As used, and with personal hygiene, there should be no serious danger.

Plaster

Plaster is used for occasional wall patching by carpenters. Dry plaster from the bag may dust during handling, and the principal constituent, lime, acts as a skin irritant. There should be no hazards associated with mixed plaster ready for use.

Sand

Sand is used as a grouting base by brickmasons. Continued inhalation of fine particles may be hazardous; however, as used, there should be no problem.

Sewer Gas

Employees of this department are assigned the job of cleaning and unplugging sewers and manholes throughout the Plant. In many cases, the sewer or manhole can be cleaned from the top using long-handled shovels and equipment. Sometimes it is necessary to enter the hole to unplug the drain. These men may come in contact with various gases originating in the plant processes as well as sewer gas.

Before entering, the manhole should be ventilated and the ventilation should be continued while the men are working in the hole. This is especially important in the sections of the Plant where fluoride fumes are prevalent.

Compressed air can be used to vent a hole in many cases; but when air is not available, a manhole ventilator should be used. All safety regulations should be carefully observed for the protection of the worker.

Sodium Hydroxide

Caustic Soda, or "lye," is used in cleaning air compressor valves, in washbasin drain pipes, and heat exchanger tubes. It can cause severe burns to skin and eyes, and rubber gloves, apron, face shield, or goggles should be worn.

Solder and Flux

Various types of solder and flux are used by welders. No special control required.

Solvents

Naphtha is used as a cleaner for spray hoses, etc. at the Paint Shop. Inhalation of the fumes causes headaches and nausea, and skin contact causes cracking and scaling. Rubber gloves, eye protection, and adequate ventilation are provided.

Trichloroethylene is a low boiling point solvent used in the vapor degreasing unit. In this unit the solvent is heated until it vaporizes. The vapor is allowed to rise in a tank until it encounters several rows of ooling coils where it condenses. The liquid solvent returns to the bottom of the tank, and the process is repeated again. Metallic parts needing degreasing are suspended in the vapor area and washed clean by the condensing vapors. Unusually dirty parts are sprayed with the liquid solvent while suspended in the vapor area. The degreaser is located in a room where air currents are not likely to draw vapors from the unit, and it is located under a hood which tends to remove most of the vapor which escapes the unit. When not in use, the unit is kept covered. Plastic gloves and safety glasses are used when removing material.

Steam Boiler Treatment Additive

Nalpac is used as a steam boiler tube surface scale preventative. It is a rust and corrosion inhibitor which can cause skin and tissue irritation and eye injury if allowed to come in contact. Care in handling should be exercised to avoid splashing and goggles or face shield should be worn when transferring from 55-gallon drums.

Steam Cleaning Fluid Additive

"APL Jenny No. 60" is an all-purpose liquid cleaning compound added to fluid used for steam cleaning. It is a strong, biodegradable oil and grease solvent which is safe on aluminum and magnesium. Contact with skin or eyes could result in severe irritation. Care in handling and personal hygiene should be exercised.

Tar

Tar is used occasionally in sealing small roof leaks. Since most of the work is done outside, there should be no particular hazard.

Turpentine

See Paints.

Welding Fluxes, Fumes, Rods

Several different kinds of fluxes are used in the Plant. The specific flux used on any job is determined by the metal being joined and the welding or brazing alloy being used.

The flux serves two purposes. It first aids in the free flowing of the welding or brazing alloy. Its second purpose is to help clean the area being joined and to prevent the formation of oxides during the joining process.

The fluxes may be either acid or alkaline in nature and can cause burns if allowed to remain in contact with the skin. Other fluxes when heated may liberate toxic fumes or gases. The fluxes probably do not constitute a great hazard unless they are used in a confined area with poor ventilation.

Many different types of welding rods are used. They are received in different sizes, coated with different fluxes, and composed of different metals or combinations of metals. While being used, these rods will liberate metal fumes and fumes or gases from the constituents of the flux coating the rod. The greatest hazard exists when these rods are used in confined areas or areas with poor ventilation.

Welding fumes are toxic. There should be adequate ventilation, and approved respirators should be used.

White Lead

A mixture of basic lead carbonate and oil is used as a pipe joint compound and occasionally as a lubricant in machining operations. It may also be present as a pigment in some white paints. Since only small amounts of this material are used, it probably does not represent a serious hazard.

CARBON RODDING - ROCKDALE WORKS

Abrasives

Carborundum abrasive discs are used for occasional, limited-time cleaning of copper anode bars when shot balst cleaning equipment is down. The danger here is inhalation of the fine copper dust produced which could cause metallic poisoning. Ventilation should be provided and approved dust masks worn during the operations, which are limited.

Asbestos

This material is used in heat-protective gloves. The hazard involved here involves the dust particles inside the glove which remain attached to shirt sleeves after removal of gloves. Scrap gloves should be disposed of via approved scrap containers and care taken not to inhale any particles (wiping face with sleeve, glove, etc.)

Bath

Small quantities of bath may adhere to the cast iron or stubs as they are returned from the potrooms in trailers. Any loose bath in the trailers is shoveled into a storage bin. Dusting of the bath may occur whenever handled. Fluoride compounds comprise the majority of this dust which may lead to skin eruptions and nose and throat irritations. The quantity of bath handled is very small so the health hazard should not be serious.

Copper Dust

This dust is generated during the cleaning of the copper anode bars. In this operation small steel shot are used to blast clean the contact surfaces of the bars. The resulting dust, composed mainly of metallic copper and copper compounds and a small amount of bath and alumina, is contained within the wheelabrator and pulled into a dust collector where it settles. The dust is dumped each morning into a load lugger bucket which, at regular intervals, is taken to the dump and emptied. The dust collector is emptied as early as possible in the morning in order to minimize the exposure of day shift personnel to this dust, which can irritate skin and membranes and cause metallic poisoning.

Diesel

Diesel is diluted with light oil for roll conveyor roller lubricant. It is flammable, and volatilized can be an asphyxiant and explosive in excessive concentrations. Adequate ventilation, care in handling, and personal hygiene should be exercised.

Ferrosilicon

An alloy of iron and silicon is used to add silicon to steel and iron. The silicon content may vary from 14% to 90%. Ferrosilicon with a silicon content of 45% to 70% will evolve poisonous gases when moisture is present.

Fuel Gas, Bottled

MAPP gas is used as a fuel for metal cutting torches and is enclosed in steel cylinders. It is flammable, explosive, and an asphyxiant in vapor phase in the air. Care in handling and storage are imperative.

Furnace Gases

The Lectromelt furnaces produce very few fumes or gases, and those fumes or gases which are produced are pulled into dust collectors and vented outside the building. The greatest danger is from fluorides. Bath and other fluoride materials are added to the furnaces each time they are charged with scrap castings. The furnace exhaust system kept in proper operation minimizes any danger.

Furnace Slag

Slag is the fused product which separates in metal smelting and floats on the top of the metal. Metallic fumes are evolved when molten and metallic dusts when handled cold. It is raked out of iron-melting furnaces to a slag pan, dumped into lugger boxes, and hauled to an approved dump. Care in handling is exercised and dust masks are worn if necessary.

Mortar

Various types of mortar are used to repair spouts on molten castiron crucibles. There are no hazards as ordinarily used. Skin irritations may erupt from the lime and inhalation of the lime-containing dust could cause respiratory tract irritations; however, personal hygiene and respirators are the best control.

Nitrogen

Nitrogen is used as a reserve supply of pressurined gas for operation of restubbing press and on fork trucks to keep line pressurized if a hydraulic brake leak occurs. There are no significant hazards as used if care in handling the pressurized steel cylinders is exercised.

Welding Rods and Wire

Coated rods release iron oxide and fumes which may be harmful only in confined quarters with no ventilation. Protective goggles and clothing should be worn and fans used to assist ventilation.

POTROOMS - ROCKDALE WORKS

Alumina

Alumina (aluminum oxide) is the raw material from which metallic aluminum is produced. It is a white, granular solid which is received in closed hopper bottom railway cars. It is unlaoded onto belt conveyors which carry it to large storage tanks. A portable hopper is filled from the storage tanks and used to fill the individual pot hoppers. Each time a pot is worked alumina is added to the molten bath. Most of the alumina is added by the automatic feeder.

Alumina is quite dusty when it is handled. This dust may have an added hazard in that it may contain fluorides recycled by the A-398 process. Dust type respirators are used to minimize the hazard of inhalation of the dust.

Aluminum Fluoride

Aluminum fluoride is delivered to the potrooms in portable hoppers and added to pot ore bins utilizing a granemetric feeder. In the electrolytic process, HF and $NaAlF_4$ are volatilized. Thus, aluminum fluroide has to be replenished by regularly scheduled additions. As one of the primary components of cryolite or bath, aluminum fluoride is used to maintain the ratio of sodium fluoride to aluminum fluoride to a target less than 1.50. It is worked into the pot through the automatic feeder.

Aluminum fluoride dusts readily and can cause internal poisoning. Also, it is found irritating, in both the smoke and dust states, to the eyes, nose and throat. However, exposure in the potrooms is limited. The use of respirators is recommended in abnormal exposure. Shielding of pots would adequately take care of smoke removal.

Bath

Bath is the electrolyte material used in the electrolytic reduction process. Ther term bath is used to identify cryolite after the cryolite has been melted up in the reduction process. Bath is used and handled in both the liquid and solid state. An approximate bath composition is: 8% CaF_2, 5% Al_2O_3, 9-10% excess AlF_3, and the balance cryolite (Na_3AlF_6).

Bath is handled in liquid form (melting point about 930-970 degrees C) by siphoning from the pot into a crucible. This bath may either be allowed to solidify or transferred to another pot in the liquid state. In the liquid state

it is hazardous because of the burns it may cause if allowed to come into contact with the skin and the volatile fluorides which it emits. Prolonged or continuous exposure to this smoke could be serious in that the smoke would be irritating to the mucous membranes.

Solid bath is handled by practically all transportation and handling methods and in varying degrees of exposure. When bath is handled, practically all other electrolyte materials will be present in one form or another. In the solid state the greatest hazard is the inhalation of the fluoride bearing dust created during handling or crushing operation. However, in its many forms and methods of use in the potrooms, it cannot be considered a serious health hazard.

Cryolite

Cryolite is drawn to the potrooms from storage tanks in buggies and generally dumped on the floor in front of the pot or pots in which it is to be used. From the floor the cryolite is shoveled onto the pot or pots as needed.

Cryolite is the main constituent of bath and acts as a solvent for alumina in the electrolytic reduction process in which aluminum oxide is reduced to metallic aluminum.

Cryolite is not used in any regular or scheduled manner in the potrooms. Exposure is therefore limited. Pot tenders shovel the various kinds of cryolite onto the pots at infrequent intervals as needed.. Cryolite dusts readily and can cause internal poisoning, but normal exposure in the potrooms is so limited that there are no hazards involved. Gases as the result of melting cryolite irritate the respiratory tract to a limited extent. The use of respirators is recommended in heavy exposure to cryolite dust and adequate ventilation is necessary to avoid gas concentrations.

Fluorspar

Fluorspar (calcium fluoride) is a naturally occuring material which is added occasionally to the electrolytic cells to impart or maintain certain desired properties in the molten bath. It is delevered to the potrooms in buggies and is generally dumped on the floor in front of the pot or pots in which it is to be used. It is added to the cells by shovel as needed. It does not dust readily, and any dust produced is more of a nuisance than a hazard. The dust could, however, be toxic if ingested.

Pot Gases

These gases are emitted by the electrolytic cells during the reduction of aluminum oxide to metallic aluminum. They are visible as a white smoke or fume and are composed of carbon dioxide, carbon monoxide, various gaseous fluorides, and varying amounts of finely divided solids. The major portion of this gas is drawn through an electrostatic precipitator and scrubber system before entering the stmosphere. Dry scrubbing (A-398) is used in lines 5, 7, and 8 in lieu of precipitators and wet scrubbers. However, each time a cover is removed to do some work on the cell, some of this gas excapes into the surrounding area. This gas usually rises rapidly to the roof ventilators and exposures to it are of short duration.

Potroom Particulate

This finely divided solid is removed from the pot gases by a combination of multiclones and electrostatic precipitators. It is transferred from the collecting hoppers to a storage tank in the ore unloading area by means of either trailer mounted buckets or conveyor system. From storage it is blended with alumina by adding it to the belt conveyor carrying the alumina to storage tanks. This blended alumina is used only in lines not using A-398 system. Composition is roughly 2/3 alumina, 1/4 bath compound, 9 per cent carbon dust. Exposures are usually of a short duration, since this gas usually rises rather rapidly to the roof ventilators. However, prolonged inhalation of large amounts of this gas may cause nausea, a choking sensation, and irritations to the eyes, skin, and respiratory passages.

Sodium Carbonate

This material is used to raise the ratio of sodium fluoride to aluminum fluoride in the molten bath of th4 electrolytic cells or in combination with aluminum fluorice to synthesize electrolyte. Dust from this material, due to its alkaline nature, is very irritating to the eyes, respiratory passages, and skin. However, under normal conditions workers are seldom exposed to dust from this material unless a bag is dropped or in some way broken. At the present time bulk sodium carbonate is being regularly used. It is dispensed in the same manner as AlF_3.

Regenerated Alumina from A-446

Gray dusty granular material, produced at the carbon baking facilities

and blended with alumina similarly to potroom particulate. Partially coked alumina, basically is just a nuisance dust. Eye protection should be worn, as well as a respirator when dusting is severe.

POTLINING DEPARTMENT - ROCKDALE WORKS

Acetylene

Steel cylinders of acetylene are ordered from the storeroom as needed. Acetylene is used with oxygen mainly for burning. As this gas burns, some carbon monoxide is produced but not in sufficient quantities to be toxic, even though the exposure is for relatively long periods. Care is taken not to damage the cylinders or in any way cause a leak of the gas, which is an asphyxiant in the unburned state.

Alcoa Joint Compound No. 2

This material is painted on all contacts where aluminum is to be used to make electrical contact to minimize the formation of oxide on the contact surfaces. Although prolonged contact with the skin will cause severe irritation, the exposure time for this department is so short as to minimize the dangers.

Alumina

Alumina is used as insulation for pots, and it is carried from the potrooms in ore buckets. Alumina is quite dusty, but in itself is considered more of a nuisance than a hazard. Respirators are used if dusting is heavy, and care is taken to minimize the dusting in handling.

Aluminum Fluoride

This material is sometimes used as pot shell insulating material. It is carried by boxes to the potshell, and specified amounts are shoveled into the pots. This material dusts readily and can cause internal poisoning. It is found irritating in both the dust and smoke state to the eyes, nose, and throat. Dust exposure, when shoveling this material, is not severe as a rule. However, dust respirators are provided and should be used if abnormal dusting conditions exist.

Asbestos

This material is found in the linings of some old pots as insulating material. When these linings are removed, the insulating materials are dumped in Building 27. If dusting occurs with improper ventilation, inhalation of airborne asbestos fibers could result in asbestosis, a serious lung disease. However, lining material is

wet thoroughly prior to dumping to prevent airborne fibers. Asbestos is then bagged separately and hauled to the approved disposal site. As added precaution, respirators approved for use in asbestos dust should be worn at all times by people in the area of Building 27 and by the equipment operators.

Asbestos Millboard

This material is of needle-type, heat-resistant fibers and is used as a shim under pot shells. Possibility of asbestosis hazard exists when dusting occurs upon removal of sheetboard from boxes and when removed from potshell. Respirators approved for use in asbestos dust should be worn at all times.

Bath

The main constituent of bath is cryolite. It also contains varying amounts of alumina, aluminum fluoride, and calcium fluoride. If a pot is to have a lining patched, the pot is cut out and allowed to cool. The bath is broken up with pneumatic hammers, shoveled into buckets, and hauled to the bath crusher. These operations cause varying amounts of fluoride-bearing dust to enter the surrounding atmosphere, which can be irritating to the throat and skin. Care is taken to keep the dust down as much as possible.

If the pot is to be relined, the pot is cut out, allowed to cool somewhat, and then is well soaked with water. The bath is then handled in exactly the same manner as already described, but without the dust problem.

Butts

Butts are reclaimed used electrodes. They are removed from burned out pots by drane, allowed to cool, and bath is scraped from their surfaces. They are transported by crane to the West passageway and are broken by sledge or shoveled into butt boxes which are transported to the Carbon Plant. Approved dust masks are worn as necessary, and dust is collected at its source to minimize hazards of nose and throat irritation and dermatitis.

Cement, Refractory

This material is used in bonding and air sealing blocks together in the potlining of a cell. Those received in dry forms are potential health hazards because of the danger of silicosis, though remote. Most materials are used wet, thus minimizing the possibilities of hazard. Careful handling of the dry material prevents excessive dusting, and respirators should be worn if dusting does occur.

Coal

Large amounts of anthracite coal are used as a component of potlining mix. Transferring the coal from the mixers to the mix buckets and subsequently filling the weighing box causes little or no dust, and therefore is not a problem.

Concrete (Grout)

Concrete (Grout) is used to level pot stall floors. It comes pre-mixed in concrete trucks to the location as needed and worked by trowel, etc. Continued contact could result in irritated exposed skin membranes. Care in handling fresh concrete and thorough scrubbing of hands should reduce skin irritation. When exposed to dust from broken up material, respirators should be worn.

Copper and Copper Dust

During the cleaning of copper bus, there is a chance of exposure to copper dust and to copper compounds which have formed on the surface of the bus. The copper is sometimes cleaned by grit blasting and by using an abrasive disk. When an abrasive disk is used, it is usually operated in an open and well ventilated area.

Dug Potlining

When a pot is to be relined, it is cut out, cooled, soaked with water, and the bath removed. The cathode or lining is then broken up with the aid of a pot digging machine and pneumatic hammer. The cathode materials, including the carbonaceous material, refractory brick and cement, insulation, etc. are then loaded by hand and shoveled into buckets. Asbestos is bagged and disposed of separately. The cathode materials are then dumped in the west end of Building 127 during the night shifts so that personnel who work in that area are exposed as little as possible to the irritating dust and fumrs. The material is then loaded into railroad cars for shipment to a plant for recovery of the fluorides. During the handling of this material, any dust formed may cause irritation of the skin, eyes, and respiratory system because of its alkaline reaction with moisture as well as its fluoride content. The scrap lining material also liberates acetylene and ammonia when it is wet.

Oxygen

Oxygen is used in bottles when using burning bar rig to burn off collector bars and cutting pot pads, bolts, etc. in pot disassembly. As used, not hazardous.

50 Degree Pitch

This soft pitch is received in tank cars at the Potlining Department. The tank cars are heated with steam until the pitch is liquid, and then it is pumped through steam-heated pipes to a heated storage tank. From storage, the pitch is conveyed through pipes to the weigh scales and mixers. Direct contact with the liquid pitch is rare. The fumes liberated by the liquid pitch may cause skin and eye irritation, but exposure to these fumes is very limited and constitutes only a slight hazard.

Pot Insulation

Superex is an asbestos-free material used for insulation in pot cathodes. It comes in 12 X 36 - inch sheets of different thicknesses, usually 1", 2", 3", and 4". It dusts slightly when broken up but is usually used in entire sheets and does not constitute a serious hazard.

Potlining Mix

This material is a mixture of 50 degree pitch, methyl naphthalene, and anthracite coal. It is mixed in a steam heated mixer and then dumped into a container for transportation to the pot being relined. When the mixture first comes from the mixer and until it cools somewhat, it emits pitch fumes which may cause eye and skin irritation. Protection should include thorough hygiene of exposed areas following exposure to these fumes.

Solvents

Methyl naphthalene is used as a solvent to dilute 50 degree pitch to make room temperature seam mix. Fumes liberated may cause skin and eye irritation, but exposure is limited and constitutes only a slight hazard.

Trichloroethane (TCE) is used to clean oil and grease from metal conductor joints. The materials are carried to the job in cans refilled from larger drums, and rags and brushes, saturated with the solvent, are used to wipe the metal surfaces. Gloves are worn during this operation. Exposure of the skin, especially the hands, to excessive amounts of the solvent could cause a respiratory irritation. Under normal circumstances, exposure to the liquid solvent or its vapors would be of short duration, and rubber gloves are used to further minimize the hazard.

CONTROL DEPARTMENT - ROCKDALE WORKS

Alumina

Alumina, the ore of aluminum, is unloaded from railroad cars onto a conveyor and into storage by personnel of the Utility Department, as supervised by the Control Department. Alumina is quite dusty, but in itself is considered more of a nuisance than a hazard. Respirators are used if dusting is heavy, and care is taken to minimize the dust in handling.

Aluminum Fluoride

The Control Department supervises the unloading and transportation of aluminum fluoride, one of the primary components of bath. The Utility Department unloads the material from railroad cars onto a conveyor into storage until distributed to the potrooms via dump buckets. This material dusts readily and can cause internal poisoning. It is irritating in the dust state to the eyes, nose, and throat. Dust exposure is not severe as a rule; however, respirators are provided and should be used if abnormal dusting conditions exist.

Cryolite

This material is the main constituent of bath. Handling, hazards, and method of control are the same as for aluminum fluoride.

Fluorspar

Fluorspar is a constituent of bath. Handling, hazards, and method of control are the same as for aluminum fluoride.

Sodium Carbonate

Sodium carbonate (soda ash) is added to pots to maintain proper bath ratio. It is unloaded from railroad cars in 100-pound bags and in bulk by the Utility Department. It is transported by conveyor belt to storage until needed in the potrooms, when it is distributed to pots via dump buckets. The Control Department supervises the unloading and transportation of sodium carbonate (performed by the Utility Department).

This compound is alkaline and is irritating to mucous membranes as well as being an internal poison. Dusting is not severe as a rule; however, hygiene measures prevent personal contact and dust respirators are provided if dusty conditions exist.

UTILITY DEPARTMENT - ROCKDALE WORKS

Acetylene

Steel cylinders of acetylene are ordered from the storeroom as needed. It is used with oxygen mainly for burning. As this gas burns, some carbon monoxide is produced but not in sufficient quantities to be toxic even though the exposure is for relatively long periods. Care is taken not to damage the cylinders or in any way cause a leak of the gas which is an asphyxiant in the unburned state.

Adhesives

These materials are used for bonding purposes in the sludge recovery plant to patch filter cloth. These solvents may be flammable, but as used do not constitute a health hazard.

Alumina

Alumina, the ore of aluminum, is unloaded from railroad cars onto a conveyor and into storage by personnel of the Utility Department. Alumina is quite dusty, but in itself is considered more of a nuisance than a hazard. Respirators are used if dusting is heavy, and care is taken to minimize the dust in handling.

Aluminum Fluoride

Aluminum fluoride, one of the primary components of bath, is unloaded from railroad cars onto a conveyor and into storage by the Utility Department. This material dusts readily and can cause internal poisoning. It is irritating in the dust state to the eyes, nose, and throat. Dust exposure is not severe as a rule; however, respirators are provided and should be used if abnormal dusting conditions exist.

Bath

The main constituent of bath is cryolite. It also contains varying amounts of alumina, aluminum fluoride, and calcium fluoride. If a pot is to have a lining patched, the pot is cut out and allowed to cool. The bath is broken up with pneumatic hammers by the Potlining Department, shoveled into buckets and hauled to the bath crusher by the Utility Department. These operations cause varying amounts of fluoride-bearing dust to enter the surrounding atmosphere,

which can be irritating to the throat and skin. Care is taken to keep the dust down as much as possible.

If the pot is to be relined, the pot is cut out, allowed to cool somewhat, and then is well soaked with water. The bath is then handled in exactly the same manner as already described, but without the dust problem.

Calcium Fluoride (Sludge)

Sludge is pumped from settling basins to filtering-drying plant and loaded via elevator into bulk rail cars. The material is dusty and emits some fumes during processing and drying. These conditions may cause skin and respiratory irritation as well as excessive absorption of fluorides into the body. Adequate ventilation should minimize the hazard of the dusting. As necessary, a 3M8705 respiratory dust mask and adequate gas mask should be used. Personal hygiene should be exercised as well as avoidance of dust on food and drinking liquids.

Cryolite

Cryolite, the main constituent of bath, is unloaded from railroad cars onto a conveyor and into storage by the Utility Department. Handling, hazards, and method of control are the same as for aluminum fluoride.

Fluorspar

Fluorspar, a constituent of bath, is unloaded from railroad car in crates, boxes, and sacks by the Utility Department. Handling, hazards, and method of control are the same as for aluminum fluoride.

Oxygen

Oxygen is used in bottles as a fuel for cutting metal pads. As used, it is not hazardous.

Lubricants

Various lubricants are used as vehicle lubrication, hydraulic fluid, machine lubrication, etc. There is a possibility of dermatitis; however, personal hygiene and adequate ventilation minimizes hazards.

Penetrating Oil

This material is used to loosen rusted parts. The possibility of dermatitis is present, but as used there should be no serious danger.

Sodium Carbonate

Sodium Carbonate (soda ash) is added to pots to maintain proper bath ratio. It is unloaded from railroad cars in 100-pound bags and in bulk by the Utility Department. It is transported by conveyor belt to storage until needed in the potrooms, when it is distributed to pots via dump buckets. This compound is alkaline and is irritating to mucous membranes as well as being an internal poison. Dusting is not severe as a rule; however, hygiene measures prevent personal contact and dust respirators are provided if dusty conditions exist.

Sodium Hydroxide

This material is received and used from drums to clean pipefittings used on pot (molten metal) siphons. It is mixed with water to required strength. Sodium hydroxide will cause burns to skin membranes and conjunctivitis of the eyes. Careful handling of the material, as well as protection in the form of gloves is provided to minimize the hazard.

ENVIRONMENTAL CONTROL - ROCKDALE WORKS

A-398 Bags

Pot dust collector bags are changed periodically by Environmental Control Bag Changer crews and used bags are removed to Class A dump area. Dust from the used bags can create a problem if excessive amounts are inhaled. Care in handling plus wearing approved dust masks and/or respirators minimize hazard.

Caulking

Dow-Corning RTV silicone is used from caulking cartridges to seal miscellaneous dust collector connections, doors, etc. It is usually used in a well-ventilated area, so danger from fumes is minimal.

Dust: Pot Dust

Dust from pots is drawn via duct and fume collection system into A-398 dust collector units. Collected dust is fed into a storage tank, blended with fresh alumina, and transported by dump boxes into pot alumina feeders. Approved dust masks and/or respirators should be worn. Care in handling should minimize formations of dust clouds.

Dust: Potlining Mill Dust

Anthracite coal is ground, sized, and mixed with binder as pot cathode relining material. Two dust collectors provide anthracite dust control on grinding, elevating, storing, and mixing facilities. The Bag Changer crew disposes of collected dust and occasionally changes the dust collector bags. Hydrocarbon solvent vapors could cause skin and membrane irritation, and personal hygiene and dust masks are recommended. However, closed container transportation does minimize hazard.

Dust: A-446 Regenerator Dust

A vent system on the A-446 regenerator units collects dust and pipes the collected dust back to the regenerator units. The bags are changed periodically by the Bag Changers crew. Hazards and method of control are the same as for Pot Dust.

Green Dye

This is a commercial fluorescent green concentrate used in manometers to check dust collection system operating air pressures. No significant hazard as used here.

Lubricants

Varsol, Aerosol WD 40, and Never Seez Compound are used as cleaning and lubricating agents on dust collection system nuts, bolts, doors, moving parts, etc. Exposure of the skin to excessive amounts of the lubricants can cause skin irritation, and inhalation of excessive amounts of the vapors could cause a respiratory irritation. However, under normal circumstances exposures are of short duration, and rubber gloves are used.

Red Oil

Red oil is a commercial light manometer oil used in manometers in setting and checking dust collection system fluid pressures. As used, there is no significant hazard.

Used A-446 Alumina

Alumina is piped from a potroom storage tank to the A-446 units for use as a fluid bed medium to collect carbon plant furnace gas and entrained coke particles. After processing through the A-446 regenerators, it is piped back to a potroom area storage tank. From the storage tank it is blended on the alumina rail car unloading belt into fresh incoming alumina. Unless leaks to the atmosphere develop, there should be no significant hazard. If the air is contaminated, appropriate masks and/or respirators should be worn.

JANITORIAL DEPARTMENT - ROCKDALE WORKS

Bowl Cleaner

Sani Flush is used to clean toilet bowls. It contains about 80 per cent sodium bisulphate as the active ingredient. A water solution is strongly acid and in contact with the hands may cause irritation. As used, there should be little or no danger of serious burns to skin membranes.

Disinfectants

Powder Pine is used to clean, disinfect, and deodorize toilet areas. It contains coconut oil soap, pine oil, an antiseptic, and isopropyl alcohol as the active ingredients and is effective in killing the Salmonella bacteria on environmental surfaces. Repeated contact with skin could result in irritation. As used, there should be little or no danger of serious burns to skin membranes.

Insecticides

Black Flag aerosol is used to control the insect nuisance. Spraying is usually performed when there are few workers around. The only ones exposed to the vapors would be the janitors doing the work. Caution is exercised to make sure that the men will not be exposed for long periods of time in confined quarters while spraying.

Soaps and Cleaners

Various cleaning products are used in cleaning floors, windows, hands, and environmental surfaces. They may be in the form of a powder, solid, or liquid, and contain various cleaning agents, oils, glycerin, potassium soaps, ammonia, abrasives, etc. As used, the hazard is slight. If prolonged contact is necessary during cleaning operations, protection is provided in the form of rubber gloves.

Velvoleum Cleaner and Protector

These products are used to clean and treat Velvoleum desk tops. They are stored in closed metal cans away from heat due to their highly flammable nature and their pungent vapors. These concentrated heavy duty cleaners can be fatal if swallowed and can irritate skin and mucous membranes. Protection in the form of rubber gloves is provided, and they should be used in adequately ventilated areas.

SHIPPING DEPARTMENT - ROCKDALE WORKS

Abrasives

Sand is used as a non-slip agent for trackmobile wheels. The only hazard involved would be the inhalation of the loose sand which could be injurious to operators. As used, however, the risk is slight.

Beryllium

Beryllium is used as an alloying constituent of aluminum. Dust from the metal or its compounds when breathed into the lungs creates conditions similar to chemical pneumonitis.

Where materials containing beryllium or its salts are processed in such a way that beryllium may be present as dust in the atmosphere, adequate ventilation is essential. Toxic fume and dust respirators should be worn where dust is prevalent.

Ether

This material is used in vehicle operation for quick start on vehicles. It is a light volatile flammable liquid and should be used with adequate ventilation and away from the presence of heat.

Inks

Marsh stencil ink is used for recording and identification purposes. Petrolium naphtha is a constituent, and it should be used with adequate ventilation and prolonged breathing of fumes avoided.

ANODE DEPARTMENT - ROCKDALE WORKS

Abrasives

The various forms of abrasives are used for grinding, cleaning, and polishing, and are generally of the inert or nonsiliceous type. Thus the dust produced by the abrasive is not as dangerous as that produced by the material which is being ground, sanded, or buffed. Operations using abrasives are usually conducted where exhaust systems are present or in open, well-ventilated areas. When working on materials which produce a dangerous dust, such as copper, respirators are used.

Aerosol

Various aerosols are used as lubricants and paint forms. They are stored in self-contained cans and carried to work site. The substances are flammable and dangerous if the cans are punctured or stored near heat.

Brick

Fire brick is used in the construction and maintenance of the baking furnaces. Dutting is done with a power saw which has a dust disposal system so that there is very little danger of anyone inhaling brick dust.

Butts

Butts or "burn offs" are solid chunks of anode that have been removed from operating pots. These are delivered from the Potrooms to the Carbon Plant. Most of the butts are in pieces at least 8" X 8" although there is some dust present. The butts are dumped or shoveled directly into a floor hopper feeding a conveyor. During the dumping and rehandling there is dusting. Butts contain fluorides, and when the dust is inhaled, there can be some irritation of the nose and throat. Two men handle these butts, and they normally step out of the way as the truck dumps the butts, thus limiting their exposure. During crushing and grinding, dust is collected at its source.

Cement, Refractory - See Refractory Cement

Coke

Coke is one of the principal materials used in making carbon electrodes and as such is handled throughout the entire Carbon Plant. Therefore, any of the people employed may, at one time or another, be exposed to coke dust in the atmosphere. Different kinds of coke are used, but all are quite similar as far as health hazards are concerned. Coke dust-laden air, when inhaled, may contribute

to respiratory trouble.

In the Carbon Plant, coke is received in covered hopper or open-top cars. Most of the handling of coke from car to storage and throughout the remainder of the Carbon Plant is done in closed conveyors to which suitable dust collecting systems are attached. However, some dusty conditions exist occasionally on the furnaces where dust collection is next to impossible. The exposure is rather limited by the recent use of fluid coke. Respirators are available and recommended when conditions are very dusty.

Dust from Baked Carbon Scrap

Baked scrap consists of baked anodes which were scrapped before reaching the potrooms. This material is crushed in the same hammermill as the butts and causes just about as much dust. This dust usually contains fluorides, since most anodes contain a certain percentage of butts.

Dust from Carbon Butts

Carbon butts (reclaimed anodes) are loaded into boxes by potroom crews. Bath materials adhere to these butts, and the amount depends upon the quality of the cleaning job in the potrooms. The butts are dumped into a hopper which feeds a conveyor which transports them to the hammermill where they are crushed before going to storage tanks. A dust collector carries off fine particles generated by crushing.

Dust from Green Carbon Scrap

Green carbon scrap consists of anodes which are scrapped after leaving the press and before reaching the baking furnaces. This material is crushed in the same hammermill as the butts and baked scrap, but it produces less dust. This dust also contains fluorides from its butt content and can cause skin and eye irritation due to the pitch it contains.

Fumes from Melted 110 Degree Pitch

Carbon mixing operations require that coke aggregate and 110 degree pitch be heated in a steam-heated mixer to about 30 - 40 degrees above the softening point of the pitch. At this temperature the more volatile constituents of the pitch are vaporized and enter the atmosphere from openings in the mixers and from the conveyor belt which transports the mix to the press room. A fume-removal system removes most of the fumes from the mixer area.

Furfural Alcohol

This substance is used as a vehicle and binder in carbon cements and is stored in metal drums and cans. Volatile fumes can cause irritation to eyes, nose, skin, and mucous membranes. It should be handled with extreme care, used in well-ventilated areas, and skin contact should be avoided. Eye protection should also be used.

Mortar

Several different bonding mortars are used in repairing, building, maintaining and operating carbon baking furnaces. In handling dry mortar materials, the health hazard danger is from the inhalation of dust. One man does the mixing of mortar and his contact with the dust is limited. A number of the materials are received ready mixed in wet form and consequently are not subject to dusting.

Natural Gas

Natural gas is used as fuel for the baking furnaces. The gas is supplied to the burners at less than 20 osi by pipes and hoses. Due to frequent repositioning of the burner units, there are some natural failures of hoses, pipes and fittings. However, the gas contains an additive which makes odor detection of a leak possible. In addition, the area into which gas could leak is quite large and well ventilated so that only a serious rupture or breakage of lines could cause a hazardous condition. The greatest hazard of natural gas in this operation is of a fire or explosive nature.

When using the standby system supply (a mixture of propane and air), care must be exercised to prevent this mixture from settling into the pits. If the waste gas fans should cut off, the supply of natural gas would be cut off immediately by an automatic latch valve.

Oils, Production Lubrication

This oil is usually ML 680 or any other clean, lightweight oil and is used to spray the mosepiece of the carbon anode press. During this operation small droplets of oil are introduced into the atmosphere of the press room. However, this constitutes only a very minor hazard since the amount is small and the press room is well ventilated.

110 Degree Pitch

110 degree pitch is received in railway hopper bottom cars. It is unloaded into a track hopper at Bldg. 52A and transported by conveyor into Bldg. 52 for

storage. The pitch is received in flake form and contains a certain amount of residual moisture which greatly reduces the amount of dust created during unloading. Occasionally the pitch sticks in a car and, if the use of a car shake-out does not dislodge it, a worker must enter the car and force the pitch through the hoppers. This action presents the greatest possible exposure to pitch dust.

Exposure of the skin to pitch dust may result in a serious pitch burn. The dust causes the skin to become sensitive to light and wind and, if rubbed by clothing, may be accompanied by blistering and peeling of the skin. Pitch burns generally cause more discomfort during the hot weather months. The dust also causes eye irritation. Protective creams and ointments for skin protection are only partially effective.

Refractory Cement

Cements, such as Harwaco Bond, Super 3000, and Penseal are used for minor patching of refractory walls. It is usually received already mixed with water and could cause skin irritation when handled in this form. As used, however, hazards should be slight.

Ring Furnace Exhaust Gases

These gases are formed during the combustion in the ring furnace flues. The major constituents of this gas are nitrogen, carbon dioxide, and oxygen. However, it contains a small amount of carbon monoxide, some sulfur compounds, and tar and pitch vapors which have diffused through the flue walls from the baking pits. These gases are normally contained in the flues and ducts leading to the exhause stack, but during firing changes, breakdowns, or maintenance some of these gases may escape into the furnace area. This constitutes only a very slight hazard, because the buildings are large and well ventilated.

The exhaust gases are cleaned by processing through an Alcoa 446 unit. A small part of the hydrocarbons are exhausted through a short stack.

ROCKDALE WORKS

INDUSTRIAL HYGIENE SURVEY

MATERIALS LIST

A-398 Bags
Abrasives
Acetylene
Adhesives
Aerosol
Alcoa Joint Compound No. 2
Alcohol
Alumina
Alumina Balls
Alumina, Tabular
Aluminum Fluoride
Aluminum, Molten
Aluminum Powder
Ammonium Hydroxide
Antifreeze
Argon
Asbestos
Asbestos Gasket, Cloth
Asbestos Millboard
Askarels

Babbitt
Bactericide
Bath
Battery Acid
Beryllium
Beryllium/Copper
Boron Alloy
Boron Nitride
Bowl Cleaner
Brake Fluid
Brass
Brazing Alloys
Brick
Butts

Calcium Carbonate
Calcium Chloride
Calcium Fluoride
Carbon
Carbon Dioxide
Carbon Monoxide
Castiron
Castor Oil
Caulking Compound
Cement
Cement, Portlant
Cement, Refractory
Cement, RTV
Chlorine
Chromium
Coal
Coke
Compressed Air
Concrete
Copper, Copper Dust
Copper, Scrap
Coral Plastic
Corrosion Preventive Additive
Creosote
Cryolite

Disinfectants
Dug Potlining
Dust - Baked Carbon Scrap
Dust - Carbon Butts
Dust from Potrooms
Dust - Green Carbon Scrap
Dust - Pot
Dust - Potlining Mill
Dust - Regenerator (446)
Dye

Epoxy Cements
Ether

Fabric
Ferromanganese
Ferrophosphorus
Ferrosilicon
Fertilizer
Fiberglass
Floor Patching Resin Hardener
Floor Sweeping Compound
Fluorescent Tubes
Fluorspar
Freon
Fuel Gas, Bottled

Fumes from Furnace Skim
Fumes from Holding Furnaces
Fumes from Melted Pitch
Furfural Alcohol
Furnace Gases
Furnace Slag

Glazing Compound
Graphite
Green Dye

Herbicides
Hydraulic Fluid
Hydrochloric Acid
Hydrogen Gas

Inert Gas
Inks
Insecticides
Insulating Materials
Insulation, Block
Insulation, Electrical
- Bakelite
- Duxseal
- Glyptol
- Micarta

Joint Sealer, Concrete

Laundry Additive
Lead
Lime
Lubricants

Magnesium
Manganese
Mercury
Metalizing Metal
Molasses
Mortar
Motor Vehicle Gases

Natural Gas
Nitrogen

Oil Absorbant
Oxygen

Paints and Enamels
Paint Removers
Paint Thinners
Penetrating Oil
Pipe Joint Compound
Pitch
Pitch, 50 degree
Pitch, 110 degree
Plaster
Plasterboard
Potassium Hydroxide
Pot Gases
Pot Insulation
Potlining Mix
Potlining Scrap
Potroom Particulate
Premixed Grout

Raw Sewer Sludge
Reclaimed Aluminum Insulation
Red Mud
Red Oil
Refrex-Kleen Flux
Regenerated Alumina (446)
Ring Furnace Exhaust Gases

Sand
Scrap Boxes and Bags
Scrap Drums
Scrap Iron
Sealing Compound
Sewer Gas
Shellac - Varnish
Silicon
Silicone Grease
Silver Brazing Alloys
Soaps and Cleaners
Sodium Carbonate
Sodium Chloride
Sodium Hydroxide
Solder
Soldering Flux
Solvent:
- Contact Re-Nu
- 1,2 Dichloroethane
- Methyl naphthalene
- Naphtha
- Oakite
- Trichloroethane
- Trichloroethylene
- Varsol

Steam Boiler Treatment Additive
Steam Cleaning Fluid Additive
Steel Stubs

Tar
Titanium/Boron Alloy
Turpentine

Used A-446 Alumina

Velvoleum Cleaner, Protector
Vermiculite
Vira Fluxes

Water Softener Resin
Water Soluble Oil
Welding and Brazing Fluxes
Welding Fumes
Welding Rods and Wire
White Lead
Whiting
Wood and Blacktop Sealer

Zinc

MATERIAL	A-398 DUST COLLECTOR BAGS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Environmental Control
OPERATIONAL USES	Collection of pot dust in pot gas filtering system
TRANSPORTATION AND HANDLING	Manual installation and removal; disposal of used bags to Class A dump area
PROPERTIES	Bag material: polyester felt
POSSIBILITY OF HAZARD	None, except dust from used bags
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Excessive breathing of dust from used bags can cause lung irritation and absorption of fluorides.
RECOMMENDED METHOD OF CONTROL	Handle used bags with care; avoid dusting; wear approved dust masks and/or respirators.

MATERIAL	ABRASIVES
TRADE OR OTHER NAME	Anthracite fines, Carborundum, Emery, Sand, Black Beauty Grit, Glass Beads, Steel Shot
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Anode, Shipping, Atomizer, Ingot, Yard Service, Mechanical, Rodding
OPERATIONAL USES	Grinding, cleaning, polishing, and cutting putposes. Cleaning bus joints, resistance material in Electrical Department; non-slip agent for trackmobiles; sharpening tools; impact abrasive claeaning, sand blasting
TRANSPORTATION AND HANDLING	Obtained from Building 127 (screened fines), open buckets to pot location. Stored at storeroom and transported by truck or hand.
PROPERTIES	Abrasive materials are usually bonded together if in wheel or disc form or bonded on paper or cloth. Steel shot or sand are blasted against surfaces for cleaning purposes.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	The abrasive itself is dangerous only if it is of a silicious material such as sand. The other materials are considered inert, but in certain individuals they may cause irritation of the lungs and nasal passages and lower resistance to inflammatory disease. The greatest danger lies in the fine metal dust produced during operations using these materials. The metal dust, particularly from certain metals, such as copper or lead, may cause metal fume fever.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation at grinding level. Compulsory wearing of safety glasses. Approved respirator in poorly ventilated areas where grinding cannot be performed in controlled environment and when working on materials which produce a dangerous dust.

MATERIAL	ACETYLENE
TRADE OR OTHER NAME	C_2H_2, Prestolite, Ethine
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining, Utility, Electrical, Mechanical
OPERATIONAL USES	Fuel for welding operations and soldering torch. Used in flame cutting and burning of pot pads and collector bars. Ignites O_2 - Fe reaction.
TRANSPORTATION AND HANDLING	Steel cylinders to Plant and to location of work
PROPERTIES	Colorless gas, garlic-like odor. Relative density to air: 0.9. Boiling point: -127 F. Minimum explosive limit in air is 2.5% by volume. Usually compressed into steel cylinders as a solution in acetone.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Carbon monoxide
EXPLANATION OF HAZARD	Acetylene gas acts as an asphyxiant and anesthetic. This material, when mixed with air, has a wide explosive range. The gas which is dissolved in acetone is compressed in steel cylinders. Should a cylinder be defective, the acetone vapors would be liberated as well as the acetylene. The toxic limits generally set up for acetylene are: 90,000 ppm, 1/2 to 1 hour exposure, Bearable 250,000 ppm, 1/2 to 1 hour exposure, Dangerous 450,000 ppm, 1/2 to 1 hour exposure, Fatal Carbon monoxide, a decomposition product, is a toxic gas.
RECOMMENDED METHOD OF CONTROL	Care in handling of cylinders to prevent damage. Store in approved racks. Periodic checks of valves and hoses to prevent leakage. Proper ventilation to remove reaction product.

MATERIAL	ADHESIVES
TRADE OR OTHER NAME	Miracle Type M, DuPont Plastic, Wood-Lac Glue, Best-test Paper Cement, 3-M General Purpose and Rubber to Metal, National Starch Load Lock, Silastic RTV, Royal Industrial, Elmer's, Goodyear, Swift's, Loctite 404, Permater, Tech 2-Way, Weldwood Glue, RTV Silicone Rubber
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Yard Service, Ingot, Shipping, Utility, Atomizer, Electrical
OPERATIONAL USES	Used for various bonding and miscellaneous caulking purposes. Used as gasket adhesive by Ingot, to patch filter cloth in sludge recovery plant, and for weak bonding of palletized bags in Atomizer.
TRANSPORTATION AND HANDLING	Received from storeroom and carried or trucked to using sites.
PROPERTIES	Sticky substances which cause materials to adhere. May be flammable.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Solvents may be flammable liquids. Solvent can evaporate and displace air in confined spaces. Excessive exposure to evaporating vehicle can result in possible lung irritation. Possible skin irritant if exposure prolonged.
RECOMMENDED METHOD OF CONTROL	Solvents in metal cans and stored in fireproof bins. No smoking when handling. Adequate ventilation and personal hygjene.

MATERIAL	AEROSOL
TRADE OR OTHER NAME	WD-40, Krylon Paint, HLP Aluminum Lubricant, Leak-Tec, Serc
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Mechanical, Atomizer, Shipping, Anode, Ingot
OPERATIONAL USES	Used as both a lubricant and paint form.
TRANSPORTATION AND HANDLING	Stored within department in self-contained cans. Trucked or carried to work site. Cans are metal spray cans.
PROPERTIES	Water-clear liquid that decomposes at 150 C. Petroleum distillates.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	High pressure can build up in aerosol cans when heated. Dangerous to puncture cans. Some aerosols are flammable.
RECOMMENDED METHOD OF CONTROL	Avoid heat when storing. Do not puncture cans. Assume all materials flammable unless known not to be. Do not discard into trash that will be burned.

MATERIAL	ALCOA JOINT COMPOUNT NO. 2
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining, Electrical
OPERATIONAL USES	Used on electrical connections where aluminum is to be used to provide good contact and prevent formation of oxide films on contact surfaces.
TRANSPORTATION AND HANDLING	Received in tubes or metal pails. Rubbed on contact surfaces before connection is tightened. May be rubbed into surface with abrasive paper to remove an existant oxide film.
PROPERTIES	A dark colored viscous grease which has had hydrogen fluoride bubbled through it. At room temperature, a semisolid. Insoluble in water; soluble in mineral spirits.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Hydrogen fluoride
EXPLANATION OF HAZARD	If contact with the skin is frequent or prolonged, it may cause a skin irritation. If a quantity of this material was heated in a confined area, the resultant fumes could cause a respiratory irritation.
RECOMMENDED METHOD OF CONTROL	Prevent, as much as possible, contact with the skin. Wash thoroughly skin areas which have come in contact with this material. If material must be heated, do so only in areas of adequate ventilation.

MATERIAL	ALCOHOL, DENATURED
TRADE OR OTHER NAME	Ethyl alcohol with additive
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Mechanical
OPERATIONAL USES	Used for crane cylinder repairs; cleaning agent and solvent; used as antifreeze for water in propane gas storage tanks.
TRANSPORTATION AND HANDLING	Stored in metal cans. Transported by vehicle or hand.
PROPERTIES	Ethyl alcohol denatured with chemicals such as benzene, gasoline, aldehydes, commercially pure wood alcohol, petroleum naphtha, sulphuric acid, etc. Liquid is unfit for beverage use and odor varies depending upon additive material. It is often poisonous when denatured.
POSSIBILITY OF HAZARD	Yes
\ZARDOUS REACTION rRODUCTS	None
EXPLANATION OF HAZARD	Liquid is irritant to mucous membranes of skin, nose, throat, and eyes. In addition, the product of the reaction of the denaturant is a poison of a non-potable material.
RECOMMENDED METHOD OF CONTROL	Personal hygiene; proper ventilation; warning labels of its poisonous nature when taken internally.

MATERIAL	ALUMINA
TRADE OR OTHER NAME	Al_2O_3, Refined bauxite, Ore
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms, Potlining, Utility, Control
OPERATIONAL USES	Added to the electrolytic cells and reduced to metallic aluminum; also used as insulation for pots.
TRANSPORTATION AND HANDLING	Received at the Plant in closed hopper bottom cars. Unloaded onto belt conveyors and transported to storage tanks. A portable hopper is filled from the tanks and used to fill the individual pot bins. Transported from potrooms in ore buckets.
PROPERTIES	A white, granular solid of which about 30% is finer than 200 mesh. Chemically inert, the refined product of bauxite ore. Specific gravity 3.6 to 3.95. Melting point 2020 C. Insoluble in water. Impurities: SiO_2, Fe_2O_3, Na_2O, CaO, B_2O_3. The alumina contains fluorides recycled by the A-398 fume recovery system.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	The oxygen liberated in the electrolytic process combines with the carbon anodes to produce carbon monoxide and carbon dioxide. Also, hydrolysis produces some hydrogen fluoride.
EXPLANATION OF HAZARD	The volume of carbon dioxide and carbon monoxide produced in the pots is quickly diluted with air so that there is little danger from these gases. Since alumina is quite dusty, there is the danger of inhaling or ingesting this dust which contains fluorides.
RECOMMENDED METHOD OF CONTROL	Approved dust masks should be worn if dusting is heavy. Care in handling should be exercised to minimize dusting.

MATERIAL	ALUMINA BALLS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Molten metal filter medium
TRANSPORTATION AND HANDLING	Boxes, bags
PROPERTIES	Inert material
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	ALUMINA, TABULAR
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Molten metal filter medium
TRANSPORTATION AND HANDLING	Various handling methods - boxes, bags
PROPERTIES	3-6 mesh alumina particles. Inert material.
POSSIBILITY OF HAZARD	None
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	ALUMINUM FLUORIDE
TRADE OR OTHER NAME	AlF_3
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms, Potlining, Utility, Yard Service, Control
OPERATIONAL USES	Added to the electrolytic cells to maintain the ratio of sodium fluoride to aluminum fluoride in the bath of operating pots. Also used as a pot shell insulating material.
TRANSPORTATION AND HANDLING	Received at the Plant in closed hopper bottom cars. Unloaded onto a belt conveyor and transported to storage tanks. Drawn from tanks into boxes and added to ore bins in the potrooms by crane. Also carried by boxes to potshells and specified amounts shoveled into pots.
PROPERTIES	A white granular solid, insoluble in water.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Dust and fumes containing fluorides
EXPLANATION OF HAZARD	Aluminum fluoride dusts readily in handling. Since it may contain some free hydrofluoric acid, the dust can be very irritating to the eyes, skin, and respiratory passages. Atmolite ($NaF:AlF_3$, $NaAlF_2$) is continually volatilized from the molten bath. Exposure to these fumes is usually of a short duration. The greater part of these fluoride gases and fumes are exhausted from the pots by the pot gas scrubber system. Aluminum fluoride is also a poison if ingested.
RECOMMENDED METHOD OF CONTROL	Careful handling of solid to minimize dusting. Use of an approved dust respirator if exposed to high concentrations of aluminum fluoride dust. Provide ventilation to areas where fluoride fumes or gases may collect. Personal hygiene--keep skin and clothing well washed.

MATERIAL	ALUMINUM, MOLTEN
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	Used for aluminum powder and aluminum granules
TRANSPORTATION AND HANDLING	Open crucible and gas-fired holding furnace
PROPERTIES	Heated until molten
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Burns from heat of molten metal. Extreme heat very injurious upon contact with tissue. Explosions can result from contact with wet (cold) surfaces and tools.
RECOMMENDED METHOD OF CONTROL	Careful handling; dry, hot tools. Prevent contact with wet surfaces.

MATERIAL	ALUMINUM POWDER
TRADE OR OTHER NAME	Various grade numbers
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	Produced for customer sales
TRANSPORTATION AND HANDLING	Airslides, storage tanks, drums, flexible rubber bags, paper bags, bulk rail cars
PROPERTIES	Flammable; dust clouds explosive
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Hydrogen, carbon dioxide
EXPLANATION OF HAZARD	Rapid evolution of intense heat
RECOMMENDED METHOD OF CONTROL	Handle with care. Store and handle under inert atmosphere. Avoid dust clouds; avoid ignition sources. Wear heat-protective clothing.

MATERIAL	AMMONIUM HYDROXIDE
TRADE OR OTHER NAME	NH_4OH; ammonia solution; aqua ammonia; Leak-Tec
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Ingot
OPERATIONAL USES	In the Ozalid machine in the production of blueprints and in the detection of chlorine leaks in Ingot.
TRANSPORTATION AND HANDLING	Received in 5-gallon cans for the Ozalid machine. Small volumes are obtained from Stores for the detection of chlorine leaks.
PROPERTIES	A colorless liquid with the strong characteristic odor of ammonia. Concentration of ammonia approximately 30%
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	As used the danger is probably slight. However, the liquid will cause burns to the skin and particularly to the eyes. The vapor is very irritating and may cause burns to the eyes and respiratory system.
RECOMMENDED METHOD OF CONTROL	Make sure exhaust hood on Ozalid machine is functioning at all times. Check ammonia system on machine for proper operation and leaks. Wear glasses or goggles when handling ammonium hydroxide. Provide adequate ventilation.

MATERIAL	ANTIFREEZE
TRADE OR OTHER NAME	Prestone, Ethylene Glycol
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Mechanical
OPERATIONAL USES	Rectifier air wash; propane storage tank vaporizer unit; vehicle radiators
TRANSPORTATION AND HANDLING	Transported by truck. Stored in original shipping container
PROPERTIES	Ethylene-glycol, 95% by weight; water, 3% by weight. Specific gravity 1.116 at 60 F. Soluble in water, dyed.
POSSIBILITY OF HAZARD	None as used
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None as used
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	ARGON
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Rodding, Mechanical, Ingot
OPERATIONAL USES	Used as arc shield on automatic stub welder. Used to clean and dry chlorine pipelines. Inert gas sweep to remove absorbed hydrogen.
TRANSPORTATION AND HANDLING	Steel cylinders; storage tank, piped to filters.
PROPERTIES	Argon is a colorless inert gas which does not combine chemically with any element. It liquifies at -185.8 C. Slightly soluble in water.
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	ASBESTOS
TRADE OR OTHER NAME	Johns Manville, Marinite
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining, Yard Service
OPERATIONAL USES	Used for insulation in pot cathodes
TRANSPORTATION AND HANDLING	Insulation material transported in approved containers to approved dump area.
PROPERTIES	A material consisting of various silicates such as magnesium, iron, and calcium, usually in a silky, strong, fibrous state. Found in native state.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Asbestos is found in the linings of some old pots as insulation material. When these linings are removed, the insulating materials are dumped in Building 27. Dust from this operation must be assumed to contain asbestos fibers. If dusting occurs or fine particles become airborne, asbestosis, a serious lung disease, is a hazard if inhaled into the lungs.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation. Lining material should be wet thoroughly prior to dumping to prevent airborne fibers. Respirators approved for use in asbestos dust should be worn at all times by people in the area of Building 27 and by the equipment operators. Material should be hauled to the Class I disposal site while still wet in order to minimize exposure to asbestos dust.

MATERIAL	ASBESTOS
TRADE OR OTHER NAME	Johns Manville, Marinite
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining, Yard Service
OPERATIONAL USES	Used for insulation in pot cathodes
TRANSPORTATION AND HANDLING	Insulation material transported in approved containers to approved dump area.
PROPERTIES	A material consisting of various silicates such as magnesium, iron, and calcium, usually in a silky, strong, fibrous state. Found in native state.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Asbestos is found in the linings of some old pots as insulation material. When these linings are removed, the insulating materials are dumped in Building 27. Dust from this operation must be assumed to contain asbestos fibers. If dusting occurs or fine particles become airborne, asbestosis, a serious lung disease, is a hazard if inhaled into the lungs.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation. Lining material should be wet thoroughly prior to dumping to prevent airborne fibers. Respirators approved for use in asbestos dust should be worn at all times by people in the area of Building 27 and by the equipment operators. Material should be hauled to the Class I disposal site while still wet in order to minimize exposure to asbestos dust.

MATERIAL	ASBESTOS GASKET, CLOTH
TRADE OR OTHER NAME	Garlock, Longhorn Safti-Seal
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Ingot, Mechanical
OPERATIONAL USES	Transformer gasket material, spout gaskets, and other gasket applications; covering on boards used by Pot Plugger Repair Crew.
TRANSPORTATION AND HANDLING	Truck; rolled and pre-cut sheets. Stored in wooden crates. Received and handled as pre-formed gaskets in packets. Disposal via special container.
PROPERTIES	Heat and pressure resistant
POSSIBILITY OF HAZARD	Little or none
HAZARDOUS REACTION PRODUCTS	Possible small amounts of asbestos fibers if sheet or gasket completely deteriorated in use.
EXPLANATION OF HAZARD	Little or no hazard--fibers are sandwiched into plastic sheets. Pre-formed gaskets are a hazard only if fibers become frayed or are rubbed off and become airborne. Cloth-covered board exposure to Repair Crew is very limited.
RECOMMENDED METHOD OF CONTROL	Handle used gaskets with care; avoid crumbling and dusting. Dispose of used gaskets and cloth via approved special container to approved disposal area. Container should be properly marked and have a tightly fitting lid or cover.

MATERIAL	ASBESTOS MILLBOARD
TRADE OR OTHER NAME	Johns Manville
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining
OPERATIONAL USES	Shim under pot shells
TRANSPORTATION AND HANDLING	Sheetboard in boxes
PROPERTIES	Needle-type fibers; heat resistant
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Dusting can occur upon removal of sheetboard from boxes and when removed from potshell. Asbestosis is a serious hazard if inhaled into the lungs.
RECOMMENDED METHOD OF CONTROL	Care in handling to prevent dusting. Use of approved respirators at all times.

MATERIAL	ASKARELS
TRADE OR OTHER NAME	PCB (Polychlorinated biphenyls)
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	A nonflammable liquid used for the cooling and electrical insulation of transformers, reactors, and capacitors.
TRANSPORTATION AND HANDLING	Received and stored in 30 gallon drums. Filtered and pumped into units as necessary. Not physically handled. Disposal by contractor service.
PROPERTIES	This is a trade name for a series of chlorinated aromatic derivatives, such as pentachlorodiphenyl, trichlorobenzene, and polychlorinated biphenyls. Specific gravity approximately 1.5. Colorless.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used here
EXPLANATION OF HAZARD	Of the polychlorinated biphenyls, those with greater that tetrachloro substitutions produce special toxicity problems. Exposure to even small amounts results in dermatitis, and they are extremely toxic in small doses.
RECOMMENDED METHOD OF CONTROL	Special handling precautions should be used to prevent all possible exposure.

MATERIAL	BABBITT METAL
TRADE OR OTHER NAME	Bearing metal
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	As a bearing metal (minimal usage on elevator bearings); mix with lead to pour clamp on jib crane cables. Bearings on potroom siphon wagons (purchased)
TRANSPORTATION AND HANDLING	Received in the form of small ingot
PROPERTIES	The two main types are lead base and tin base. In addition to these two metals, antimony, cadmium, and arsenic may also be found. All these metals tend to give off fumes when heated. Lead Base: 70-90% lead, 9-20% antimony, 0.5-9% tin Tin Base: 80-93% tin, 3-10% copper, 5-10% antimony
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Metal fumes
EXPLANATION OF HAZARD	During the melting of Babbitt, several of the metals may gove off fumes which may cause metal fume fever or metal poisoning. If, after casting, the bearing is machined, ground, or polished, the fine metal dust produced, if inhaled or ingested, may also cause metal poisoning. Antimony dust especially will cause acute stomach and intestinal disturbances.
RECOMMENDED METHOD OF CONTROL	Melt the Babbitt alloys in well-ventilated areas. Use an exhaust hood if available. In machining or grinding Babbitt bearings, use an exhaust hood and a respirator.

MATERIAL	BACTERICIDE
TRADE OR OTHER NAME	Tris-Nitro (Stock No. 051-975-0125)
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	To reduce bacterial growth in water-oil hot lubricating emulsion
TRANSPORTATION AND HANDLING	55-gallon plastic-lined drum, buckets
PROPERTIES	Inhibits growth of bacteria
POSSIBILITY OF HAZARD	EPA registration No. 271-26AA
HAZARDOUS REACTION PRODUCTS	None known
EXPLANATION OF HAZARD	Contains tris (hydroxymethyl) nitromethane (50%) and H_2O. Harmful if swallowed.
RECOMMENDED METHOD OF CONTROL	Open both plugs to empty drum (plastic-lined drum). Avoid ingestion and excessive skin contact, especially cuts and scratches. Wash thoroughly. If swallowed, obtain medical attention immediately.

MATERIAL	BATH
TRADE OR OTHER NAME	Electrolyte
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms, Potlining, Utility, Yard Service, Rodding
OPERATIONAL USES	Molten electrolyte for aluminum reduction cell
TRANSPORTATION AND HANDLING	Found in either liquid or solid form. In potrooms it is necessary for alumina dissolution, and solids are stored in Courtyard 19 and transported by payloader. Found as scrap material on stubs returned from potrooms to rodding; in pots taken to potlining for relining. Bath is broken up with pneumatic hammers, shoveled into buckets, hauled to bath crusher.
PROPERTIES	A solid composed mainly of cryolite but also containing varying amounts of alumina, aluminum fluoride, and calcium fluoride. Melting point approaches 1000 C. HF and SiF_4 are formed during reduction process.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Fluoride-bearing dust during the handling of the solid material and gaseous fluorides from an operating pot.
EXPLANATION OF HAZARD	Exposure to both solid and gaseous fluorides may cause irritation of the eyes, skin, and respiratory passages. Prolonged exposure to high concentrations may cause more serious damage. Toxic if ingested in sufficient quantities.
RECOMMENDED METHOD OF CONTROL	Collection of solid and gaseous fluorides at their source. Avoid ingestion--prevent exposure of food to dust. Wash hands prior to eating. Use approved respirators if exposed to high concentrations.

MATERIAL	BATTERY ACID
TRADE OR OTHER NAME	Sulfuric acid
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Used as the electrolyte in storage batteries.
TRANSPORTATION AND HANDLING	Chemical Laboratory makes up an acid of sp. gr. 1.400 and places it in approximately 5-pint glass bottles. When a battery needs electrolyte, this acid and water are added to give the charged battery an electrolyte of sp. gr. 1.260.
PROPERTIES	A clear, odorless, water-white solution of sulfuric acid and distilled water. Corrosive liquid. Specific gravity varies.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Hydrogen
EXPLANATION OF HAZARD	Sulfuric acid is a very corrosive liquid. Even the dilute solutions used in batteries can cause burns to the skin and eyes. During the charging of batteries, hydrogen is released. Not only is the hydrogen dangerous - forming an explosive mixture in confined areas - but if the release of hydrogen is rapid enough, it may carry along small droplets of acid in the form of a mist. This mist is very irritating to the skin, eyes, and respiratory passages.
RECOMMENDED METHOD OF CONTROL	Wear chemical goggles, rubber apron, and rubber gloves when handling the acid. Charge batteries in a well-ventilated area to prevent accumulation of acid mists and hydrogen.

MATERIAL	BERYLLIUM AND ITS COMPOUNDS
TRADE OR OTHER NAME	Be, Glucinium
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot, Shipping
OPERATIONAL USES	An alloying constituent of aluminum, a beryllium phosphor coating in fluorescent light tubes.
TRANSPORTATION AND HANDLING	Transferred to remelting rooms as 4-6% Be-Al ingot from melting rooms, and in skim as by-product. Stored in small pieces in closed drums.
PROPERTIES	Grayish-white, hard, light metal, very difficult to prepare in pure form. 99.96% pure metal. Specific gravity - 1.816. Melting point - 1284 C. Soluble in dilute acids and alkalies. Metal is easily oxidizable and the oxide is the protective type. The salts of beryllium have a sweetish taste.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	May form or be present as beryllium aluminum silicate, beryllium oxide, fluoride, or other salts.
EXPLANATION OF HAZARD	Dust from the metal or its compounds when breathed into the lungs creates conditions similar to chemical pneumonitis. This may be acute or chronic. Chronic cases have developed after periods up to five years after exposure. It is thought that beryllium dust in the lungs may be absorbed into the bone structure. During the breaking of discarded fluorescent light tubes which contain beryllium-phosphor coating, the powder may be inhaled, but, more serious, the powder from a fragment of the shattered glass piercing the skin is readily absorbed by the blood stream and will prevent healing of the wound. In processing skim from Be-Al alloy, the fumes may be high in beryllium dust. In grinding rich Be alloy, the dust constitutes a serious hazard. In all cases the danger is grave since not more than 2 micrograms of Be per cubic meter of air is known to be safe.
RECOMMENDED METHOD OF CONTROL	Where materials containing Be or its salts are processed in such a way that Be may be present as dust in the atmosphere, adequate ventilation is essential. Any skim produced should be segregated and discarded to reclamation. Approved fume and dust respirators should be worn any time there is a possibility of producing a dust or fume containing beryllium. Fluorescent bulbs should be broken under water or under a hood, or otherwise discarded without dusting.

MATERIAL	BERYLLIUM/COPPER
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	"Spark-resistant" hand tools
TRANSPORTATION AND HANDLING	Manual
PROPERTIES	Low sparking characteristics from impact or abrasion
POSSIBILITY OF HAZARD	Small
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Possibility of berylliosis from inhalation of fine airborne Be-Cu particles.
RECOMMENDED METHOD OF CONTROL	Avoid generation of very fine particles from the tools in question.

MATERIAL	BORON (3%) MASTER ALLOY (BORON-ALUMINUM)
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Alloying aluminum
TRANSPORTATION AND HANDLING	Small 20-pound waffle slabs
PROPERTIES	Used for hardening of Al alloy
POSSIBILITY OF HAZARD	None as used here
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	BORON NITRIDE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	Powder-producing equipment
TRANSPORTATION AND HANDLING	Boxes
PROPERTIES	Heat-resistant
POSSIBILITY OF HAZARD	None
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	BOWL CLEANER
TRADE OR OTHER NAME	Sani-Flush
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout the plant by janitors
OPERATIONAL USES	Cleaning toilet bowls
TRANSPORTATION AND HANDLING	Metal cans to department, small amounts poured into bowls.
PROPERTIES	Bowl cleaners contain approximately 80% solid sodium bisulphate as the active ingredient. They form strong acid solutions in water.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Harmful fumes may result if used with chlorine-type bleaches.
EXPLANATION OF HAZARD	The solution being strongly acid may be irritating to skin membranes upon prolonged contact and damaging to eyes. Harmful if swallowed.
RECOMMENDED METHOD OF CONTROL	Contact of the strong solution with eyes, skin, or clothing should be avoided. Rubber gloves should be worn. Should not be used with chlorine-type bleaches. Container should be kept tightly capped and destroyed when empty. Do not take internally. Antidote: External--flood the surface with water, using soap freely. Then cover with moist magnesia or baking soda. If splashed in eyes, wash thoroughly with water. Call physician. Internal--Give milk of magnesia, chalk, or whiting suspended in much water, milk, or egg white. Call physician.

MATERIAL	BRAKE FLUID
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Used in the hydraulic brake systems of overhead cranes
TRANSPORTATION AND HANDLING	Received in various size cans, from 1-quart to 5-gallon
PROPERTIES	A light oil plus organic additives which add certain desired qualities. The oil base may be mineral oil, castor oil, or of a synthetic nature.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	This material may cause dermatitis or allergic reactions in sensitive individuals. The cause may be the base oil, the additives, or a combination of both.
RECOMMENDED METHOD OF CONTROL	Prevent this material from contacting the skin. If the material does contact the skin, wash the area thoroughly as soon as possible.

MATERIAL	BRASS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Machine parts, hinges, handles; cast brass fittings, valves, etc.
TRANSPORTATION AND HANDLING	Bars, rod, and sheet
PROPERTIES	A copper-zinc alloy of varying composition. It usually contains some lead or tin or both and small percentages of other metals.
POSSIBILITY OF HAZARD	None
AZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	None as used. (Should it be necessary to melt brass, the fumes would constitute a health hazard causing metal fume fever, for instance)
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	BRAZING ALLOYS
TRADE OR OTHER NAME	Easy-Flo, Sil-Fos
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Repairing of metal parts
TRANSPORTATION AND HANDLING	Received in the form of rod, bar, and wire and carried to job
PROPERTIES	A series of alloys which generally melt above 800 C. May be alloys of any of the following metals: copper, zinc, tin, antimony, lead, silver, cadmium, phosphorus, nickel, and manganese. Alloys generally designed to have good flow characteristics between rather narrow temperature limits.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Metal fumes
EXPLANATION OF HAZARD	Many of the metals listed above when heated will give off fumes. These fumes may cause metal fume fever or metal poisoning if inhaled or ingested.
RECOMMENDED METHOD OF CONTROL	Use these brazing alloys only in well-ventilated areas; use forced ventilation if used in confined spaces.

MATERIAL	BRICK
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service, Anode
OPERATIONAL USES	Lining and repairing of furnaces
TRANSPORTATION AND HANDLING	Railroad cars to plant; truck to work area. Demolition by Yard Service personnel.(except carbon plant furnaces).
PROPERTIES	The properties and composition of bricks vary considerably. Refractory bricks must withstand high temperatures, and of the many types, alumina, silica and chrome are the most common. Building bricks are of common clay composition and must weather well.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	The only hazard encountered would consist of the dust resulting from demolition. This dust would contain silica, but it is doubtful if the particle size would be fine enough to cause silicosis or fibrosis of the lungs. Should a job require considerable cutting or grinding of the brick, to be on the safe side, the fine dust should be removed to prevent inhalation.
RECOMMENDED METHOD OF CONTROL	On continued or major cutting or grinding operations, a local exhaust system should be used. Use approved dust mask as necessary during demolition.

MATERIAL	BUTTS
TRADE OR OTHER NAME	Burn-offs
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode, Potlining, Yard Service
OPERATIONAL USES	Butts are reclaimed used electrodes. They are ground, mixed, and incorporated into the new electrodes produced.
TRANSPORTATION AND HANDLING	Butts are removed from burned out pots by crane, allowed to cool, and bath is scraped from their surfaces. They are transported by crane to the West passageway and are broken by sledge or shoveled into butt boxes, which are transported to the Carbon Plant.
PROPERTIES	The solid pieces are the remnants of carbon anodes after use in pots with bath and alumina adhering. Dust contains fihely divided carbon, fluoride compounds, and alumina.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Dust and fumes from bath materials and alumina
EXPLANATION OF HAZARD	During the dumping and handling, there is dusting. Butts contain fluorides and when the dust is inhaled, there can be some irritation of the nose and throat. Chronic skin irritations may result in dermatitis. When the butts are taken to the Carbon Plant for grinding and crushing, dust is collected at its source, minimizing the hazard.
RECOMMENDED METHOD OF CONTROL	Dust should be collected at the source. Wear approved dust masks as necessary and avoid exposure to food. Exercise personal hygiene.

MATERIAL	CALCIUM CARBONATE
TRADE OR OTHER NAME	Atomite powder, whiting
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	Metal trough surface protection
TRANSPORTATION AND HANDLING	Boxes
PROPERTIES	Slight solubility in water; powder or granules. No odor. Boiling point 600 C. Sp. Gr. 2.6-2.8
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Decomposes at 600 C, liberating CO_2
EXPLANATION OF HAZARD	Excessive dust in air could cause lung irritation. Prolonged exposure may lead to pulmonary involvement.
RECOMMENDED METHOD OF CONTROL	Avoid creating dust clouds by careful handling. Adequate ventilation. Approved dust masks in dusty environments. Flush eyes with water; wash from skin with water. Goggles should be worn as eye protection.

MATERIAL	CALCIUM CHLORIDE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Melting snow
TRANSPORTATION AND HANDLING	Bags
PROPERTIES	White deliquescent crystals, granules, lumps, or flakes. Sp. Gr. 2.152 - 1.654. Soluble in water and alcohol.
POSSIBILITY OF HAZARD	None as used.
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	CALCIUM FLUORIDE
TRADE OR OTHER NAME	Sludge, Potroom wet pot gas collection system
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Utility (Sludge Recovery Plant)
OPERATIONAL USES	None (Material being prepared for loading and shipment in bulk rail cars)
TRANSPORTATION AND HANDLING	Pumped from settling basins to filtering-drying plant. Loaded via elevator into bulk rail cars.
PROPERTIES	Caustic; dusty; some fumes during processing and drying. May have a minor proportion of calcium carbonate in the material.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Skin and respiratory irritation; excessive absorption of fluorides into body.
RECOMMENDED METHOD OF CONTROL	Control dusting; adequate ventilation; use of AM8705 respiratory dust mask and adequate gas mask as necessary; personal hygiene (wash promptly and thoroughly). Avoid dust on food and drinking liquids.

MATERIAL	CARBON
TRADE OR OTHER NAME	Anodes, Electrodes, Graphite, Baked Carbons, C
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Anode, Rodding, Potrooms
OPERATIONAL USES	Electrodes in the Shop for cutting purposes; anodes for electrolytic decomposition of alumina in cryolite
TRANSPORTATION AND HANDLING	Transported by trailer and crane
PROPERTIES	A non-metallic chiefly tetravalent element found native or as a constituent of coal, petroleum, and asphalt, of limestone and other carbonates and of organic compounds or obtained artificially in varying degrees of purity. Carbon anodes are hard solid forms of carbon made from ground coke plus a pitch binder, usually containing carbon butts which in turn contain fluorides from reduction process. Impurities: SiO_2, Fe_2O_3, S. Ash.
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	The carbon electrodes used in the potrooms and handled in other departments are solid, and when properly made do not dust appreciably in handling or during the process. In the production of electrodes, the carbons are baked at high temperatures.
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	CARBON DIOXIDE
TRADE OR OTHER NAME	CO_2
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Practically all departments have CO_2 fire extinguishers. Otherwise they are found to some extent in any area where combustion of a fuel is in progress.
OPERATIONAL USES	CO_2-in fire extinguishers and as a by-product of complete combustion
TRANSPORTATION AND HANDLING	CO_2 fire extinguishers are refilled from large cylinders. Otherwise this gas is dependent upon air currents and ventilation for movement.
PROPERTIES	Colorless, odorless, non-combustible, and heavier than air. May cause asphyxiation
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Since carbon dioxide is heavier than air, it tends to settle in low places such as tunnels, pits or manholes. In high concentrations it may cause asphyxia simply by providing an atmosphere which contains insufficient oxygen to support life. At lower concentrations it may cause a form of intoxication with such symptoms as excitement, headache, drowsiness, and dizziness.
RECOMMENDED METHOD OF CONTROL	Proper ventilation of work areas and proper adjustment or control of all fuel burners (gas engines, etc.) to insure complete combustion. Provision of oxygen breathing apparatus if work must be done in areas having high concentrations of these gases.

MATERIAL	CARBON MONOXIDE
TRADE OR OTHER NAME	CO
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout the Plant, wherever incomplete combustion of an organic material occurs, motor vehicle exhausts and exhausts wherever oil and gasoline engines are found.
OPERATIONAL USES	A by-product of incomplete combustion
TRANSPORTATION AND HANDLING	Airborne
PROPERTIES	Colorless, odorless gas. Combustible. Boiling Point - 314 F. Lighter than air. Relative Density to air - 0.967. Explosive limits - 12.5 to 74%.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Carbon monoxide is encountered when incomplete combustion of carbon compounds or carbonaceous materials occurs. The gas, when inhaled into the body over a period of time, produces poisoning, manifesting itself by headache, mental confusion, nausea, and collapse. The gas acts as a chemical asphyxiant because it replaces oxygen in the blood's hemoglobin. The hemoglobin of the blood has an affinity for CO approximately 300 times greater than for oxygen. Consequently, the concentration of the carbon monoxide and the exposure time are important factors. Toxic limits are usually set at 100 ppm for a work period. 1500-2000 ppm for as little as one hour is considered very dangerous. In garages or buildings where trucks or tractors or other internal combustion engines are operated, the concentration of this gas may be much higher than the recommended safe 100 ppm. when motors are first started, but within a very few minutes this concentration should be down to safe limits, provided there is adequate ventilation and a large volume of air for dilution.
RECOMMENDED METHOD OF CONTROL	In all locations the exhaust fumes should be diluted with uncontaminated air. Careful carburetor adjustment makes for more complete combustion and decreases hazard from automotive engines. Adequate ventilation is necessary in the potrooms, etc., to insure proper dilution of the gas and other fumes and maintain safe concentration limits. Oxygen breathing apparatus should be worn when working in confined areas where there may be high concentrations of the gas.

MATERIAL	CAST IRON
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Rodding
OPERATIONAL USES	Used to bond collector bars to bottom blocks
TRANSPORTATION AND HANDLING	From rodding by fork truck. Poured between blocks and collector bars.
PROPERTIES	Metallic
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

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MATERIAL	CASTOR OIL
TRADE OR OTHER NAME	Ricinus oil
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Used as a mold lubricant for the DC casting units.
TRANSPORTATION AND HANDLING	Received in 55-gallon drums
PROPERTIES	A colorless to pale yellow viscous liquid with a characteristic odor.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Certain persons may have allergic reactions to this oil. Otherwise prolonged contact with the skin may cause dermatitis.
RECOMMENDED METHOD OF CONTROL	Prevent contact of this material with the skin as much as possible. Thoroughly wash areas of skin which have been in contact with the oil.

MATERIAL	CAULKING COMPOUNDS
TRADE OR OTHER NAME	Dow Corning Silicone RTV
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Environmental Control
OPERATIONAL USES	Used as a sealing compound
TRANSPORTATION AND HANDLING	Stored in cans, tubes, caulking gun or cartridges, and transported by vehicle or manually.
PROPERTIES	A non-hardening, putty-like compound; inert.
POSSIBILITY OF HAZARD	Small
HAZARDOUS REACTION PRODUCTS	Gaseous acetic acid
EXPLANATION OF HAZARD	Can cause lung irritation if used in confined, non-ventilated spaces.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation

MATERIAL	CEMENT
TRADE OR OTHER NAME	Waterplug
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Sealing cracks in water containers
TRANSPORTATION AND HANDLING	Quart metal can
PROPERTIES	Quick-setting cement
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	Solvent vaporizes - can displace air in confined spaces; skin irritant
RECOMMENDED METHOD OF CONTROL	Wear rubber gloves, avoid contact with skin. Wash skin thoroughly for up to 15 minutes or more if contacted; avoid inhalation of vapors - adequate ventilation.

MATERIAL	CEMENT, PORTLAND
TRADE OR OTHER NAME	Alamo Masonry Cement
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Used for making concrete throughout the plant.
TRANSPORTATION AND HANDLING	Transported and handled in paper bags.
PROPERTIES	Mixture of calcium silicate and calcium aluminate with excess of lime. Very finely divided material. 21-23% Silica 2.49-3.54% Ferric Oxide 5.68-8.12% Alumina 60.25-64.12% Calcium Oxide .88-2.78% Magnesia
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Can cause respiratory irritations. In contact with water will form a caustic which will act as skin irritant. In dry form, it is conducive to eye irritation. Dermatitis is the hazard usually encountered.
RECOMMENDED METHOD OF CONTROL	Personal hygiene. Avoid prolonged exposure.

MATERIAL	CEMENT, REFRACTORY; BONDING MORTAR
TRADE OR OTHER NAME	C-38 cement, Harwaco Bond, Penseal, Lightweight Castable, JM 375, Harbide Mortar, Firebond, Lumnite
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining, Anode, Mechanical
OPERATIONAL USES	Used to bond crucibles, boiler linings, etc. Casting insulating sleeves and air sealing around collector bars in reduction cells. Used to bond side lining blocks together and used as a dam when pouring molten castiron into bar.
TRANSPORTATION AND HANDLING	Bags, paper containers, or drums. To pots on pallets.
PROPERTIES	Bonding mortars and refractory cements must withstand high temperatures. There are several kinds of material used as the basic ingredient of this type of cement. Alumina is one of the most common; others are silicates, magnesite, and chrome ore.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	Bonding mortar and refractory cement sufficiently ground to a fine powder will present certain hazards. Because of the high percentages of silicates present, those received in dry form must be classed as potential health hazards. The danger of silicosis of fibrosis of the lungs is remote. However, lowering of resistance to infection may result from inhalation of large quantities of the dust. Most materials are received already mixed with water. The wet form can cause skin irritation with prolonged exposure.
RECOMMENDED METHOD OF CONTROL	Careful handling of the dry material to prevent excessive dusting. Wearing of approved respirators if dusting does occur.

Inert Gas

A mixture of CO_2 and nitrogen is used as a fire suppressing atmosphere in powder conveyors, screens, tanks, and containers. It can induce asphyxia by excluding oxygen. There should be adequate ventilation and/or fresh air supply when working inside ducts and tanks.

Inks

Marsh K-1 is used for product identification on bags, drums, etc. Petroleum naphtha is a constituent and should be used with adequate ventilation.

Insulating Materials

Johns Manville Hi Temp Block Insulation and Kaowool are used as heat insulation on furnace metal troughs. Frayed fibers can cause skin irritation; however, personal hygiene, protective clothing and gloves, plus care in handling minimizes risks.

Lubricating Oil

Anderol 500 is used as air compressor lubrication, and as used should pose no significant hazard other than skin irritation after prolonged contact.

Marinite *

Marinite is used in prefabricated metal trough dams. Sawing or machining material can produce dust which can irritate lungs; therefore, wearing dust masks plus dust collecting equipment and vacuum sweepers minimize the hazard. Disposal of dust and scrap via special container is to approved scrap area.

Mercury

Mercury is used in instrumentation, and because of the vapors normally given off, a serious hazard exists whenever it is used or handled. All mercury should be kept in closed containers to prevent the escape of vapors, and exhaust systems should be used where necessary. Spilled mercury should be picked up at once and disposed of to an approved scrap area. Gloves must be worn when handling.

Oxygen

Steel cylinders of oxygen are used as fuel for cutting aluminum metal spills and lancing furnace tap holes. As used, it is not toxic.

* See materials sheet on ASBESTOS

MATERIAL	CEMENT, RTV SILICONE RUBBER
TRADE OR OTHER NAME	Dow-Corning RTV Silicone
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	Miscellaneous sealant
TRANSPORTATION AND HANDLING	Cartridges
PROPERTIES	Flexible
POSSIBILITY OF HAZARD	Relatively none
HAZARDOUS REACTION PRODUCTS	Acetic acid
EXPLANATION OF HAZARD	Lung irritant if exposure prolonged
RECOMMENDED METHOD OF CONTROL	Adequate ventilation

MATERIAL	CHLORINE
TRADE OR OTHER NAME	Cl_2
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot, Mechanical
OPERATIONAL USES	Fluxing molten aluminum to improve quality. Chlorination of potable water and effluent of sewage disposal plant.
TRANSPORTATION AND HANDLING	Piped to furnaces. Chlorine for the potable water and sewage disposal effluent is received in 150-pound steel cylinders.
PROPERTIES	Greenish-yellow gas or liquid. Density (gas) 2.49. Has pungent characteristic odor. Boiling point of liquid at 760 mm = -35.5 C. Dry chlorine is non-corrosive to most metals at room temperature. At elevated temperatures, or in presence of small amounts of moisture, it reacts readily with many metals. With aluminum forms aluminum chloride.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Nascent oxygen, HCl
EXPLANATION OF HAZARD	Chlorine is a poisonous gas. In either gaseous or liquid form it is very dangerous to the eyes and skin. The injurious effect of chlorine is due to its potent oxidative effect because it liberates nascent oxygen from the water present. Nascent oxygen is an active protoplasmic poison. In addition, there are also those effects that result from the formation of HCl in situ. Chlorine gas is a respiratory irritant. A concentration of 15 ppm will cause throat irritation and 30 ppm will cause coughing. The least detectable odor is a concentration of 3.5 ppm. Exposure to concentrations of 50 ppm or higher is dangerous and may be fatal if exposure is prolonged. A concentration of 1000 ppm is invariably and rapidly fatal. 1 (One) ppm has been the recommended threshold limit value for chlorine.
RECOMMENDED METHOD OF CONTROL	Proper equipment and safeguards for handling. Careful regulation of exhaust on furnaces. System should be inspected frequently for detection of leaks and corrosion. Gas masks and Scott air-packs should be provided in an easily accessible location for use in an emergency.

MATERIAL	CHROMIUM
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot, Shipping
OPERATIONAL USES	Various aluminum alloys
TRANSPORTATION AND HANDLING	Bricquetted, in bags; small ingot (25-30 pound size)
PROPERTIES	Hard, heavy, grayish metal used in alloy to impart stainless properties and smooth surfaces.
POSSIBILITY OF HAZARD	None in ingot form.
AZARDOUS REACTION PRODUCTS	Cr_2O_5 if volatized state is oxidized
EXPLANATION OF HAZARD	Not a hazard unless volatized or vaporized, at which time it is a carcinogen with prolonged exposure.
RECOMMENDED METHOD OF CONTROL	Monitoring; discontinue use of exhaust control if becomes an apparent hazard.

MATERIAL	COAL
TRADE OR OTHER NAME	Bituminous, Anthracite
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Potlining
OPERATIONAL USES	As a fuel in forge in blacksmith shop; potlining ingredient
TRANSPORTATION AND HANDLING	Railroad cars to a storage area--Building 127 and near forge.
PROPERTIES	A black organic material, usually having a brilliant luster and conchoidal fracture. Composed chiefly of carbon with minor impurities such as sulfur, iron, and calcium. Volatile material depends upon degree of calcination. Moisture content may vary from 2-10%.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	CO, CO_2, and SO_2
EXPLANATION OF HAZARD	During unloading, there is dusting. If the exhaust hood on the forge is not operating correctly or the fire is not getting sufficient air, the gases listed above could enter the atmosphere around the forge. While the concentrations involved would probably not be fatal, they might, under certain ventilation conditions, cause some of the minor symptoms of CO and SO_2 poisoning. With excessive exposure to coal dust, there is a lowering of resistance to respiratory disease.
RECOMMENDED METHOD OF CONTROL	Enclosed crusher and conveyor equipment. Proper ventilation of work area. Periodic checks to make sure exhaust hood of forge operating.

MATERIAL	COKE
TRADE OR OTHER NAME	Petroleum coke, pitch
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode, Yard Service
OPERATIONAL USES	One of the principal materials used in making carbon electrodes.
TRANSPORTATION AND HANDLING	Received in covered hopper or open-top railcars. Transported from car to storage and throughout remainder of carbon plant via closed conveyors to which suitable dust collecting systems are attached. Residual coke hauled to dimp area via load lugger truck.
PROPERTIES	Formed as residue from distillation of coal, pitch, petroleum, or other carbonaceous materials. Usually cellular in structure.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Carbon monoxide
EXPLANATION OF HAZARD	Hazards due to reaction products--formation of CO being the primary one. During handling, some dusting is likely. Prolonged exposure to fine dust may be contributory to the weakening of resistance to lung disorders.
RECOMMENDED METHOD OF CONTROL	Provide adequate ventilation and sufficient dust collecting devices during handling. Approved dust respirators to employees exposed to considerable dusting.

MATERIAL	COMPRESSED AIR
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer, throughout the Plant
OPERATIONAL USES	Atomizing aluminum powder; pneumatic tools throughout the plant
TRANSPORTATION AND HANDLING	Piped from compressors to point of use
PROPERTIES	Up to 200 psi
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Penetration of skin by air bubbles; consequent circulatory system damage. Possible burns from molten metal and compressed air at nozzles.
RECOMMENDED METHOD OF CONTROL	Prevent and control leaks. Avoid high-pressure air contact with body tissue.

MATERIAL	CONCRETE
TRADE OR OTHER NAME	Grout
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining
OPERATIONAL USES	Used to level pot stall floors.
TRANSPORTATION AND HANDLING	Trucked to location as needed. May be worked by trowel, etc.
PROPERTIES	Concrete is formed by mixing cement, sand, stone or gravel, and water in proper proportions. After setting, concrete becomes a hard stonelike material.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used.
EXPLANATION OF HAZARD	The lime in the wet concrete may irritate the exposed skin membranes after continued contact. When necessary to break up old concrete, the resulting dust may be irritating to the nose and throat passages. This dust, if inhaled for sufficient periods, may cause silicosis.
RECOMMENDED METHOD OF CONTROL	Care in handling the fresh concrete. Thorough scrubbing of the hands should reduce skin irritation. When exposed to dust from broken up material, respirators should be provided.

MATERIAL	COPPER AND COPPER DUST
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining, Electrical, Ingot, Mechanical, Rodding
OPERATIONAL USES	Used as a conductor of electricity. Copper dust arises during the cleaning or grinding of copper bus. Dust generated during the cleaning of anode bars. Copper tubing, fabrication and repair of anode bars, collector straps, buses; welding anode rods; used in Properzi molds.
TRANSPORTATION AND HANDLING	By practically all transportation and handling methods. Copper dust in Rodding area is collected in dust collector and periodically hauled to the dump via lugger bucket.
PROPERTIES	A heavy, flexible, ductile reddish colored, hard metal; a good conductor of electricity. Practically all of its compounds are poisonous. Spec. Gr. 8.96. Melt pt. 1083 C. Boil pt. 2310 C. Soluble in hot H_2SO_4, hot concentrated and diluted HNO_3. Insoluble in water and alcohol.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Dust caused by cleaning or grinding copper. Fumes. Finely divided metallic copper and possibly some of the copper compounds formed on the surface of the anode bars.
EXPLANATION OF HAZARD	Inhalation of finely divided copper causes a condition similar to metal fume fever. During cleaning or grinding operations on copper bus, inhalation or ingestion of the surface corrosion compounds may cause metal poisoning. A metallic taste is usually noticed first, then discomfort in the throat. Continued exposure causes severe headache, cramps, muscle pain, and general exhaustion.
RECOMMENDED METHOD OF CONTROL	Provide exhaust ventilation and adequate dust collection system. Use of respirators where copper dust or dust of copper compounds may be in atmosphere. A thorough personal cleanup after being exposed to copper or its compounds.

MATERIAL	COPPER, SCRAP
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer, Shipping
OPERATIONAL USES	Aluminum-copper alloy powder (50/50) Cut wire and assorted scrap--anode bars, etc.
TRANSPORTATION AND HANDLING	Boxes
PROPERTIES	Typical heavy metal - See Copper and Copper Dust
POSSIBILITY OF HAZARD	See Copper
HAZARDOUS REACTION PRODUCTS	See Copper
EXPLANATION OF HAZARD	See Copper
RECOMMENDED METHOD OF CONTROL	See Copper

MATERIAL	CORAL PLASTIC
TRADE OR OTHER NAME	Refractory Cement - High Temperature
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical (Rodding furnaces)
OPERATIONAL USES	Lectromelt metal furnace lining; occasional aluminum holding furnace lining patching
TRANSPORTATION AND HANDLING	Boxes by vehicle
PROPERTIES	85% alumina phosphate bonded plastic refractory
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Possibility of emitting phosphoric acid fumes when heated, which are moderately toxic with prolonged exposure.
EXPLANATION OF HAZARD	The material when used in the Mechanical Maintenance Department is not heated and therefore not a hazard with regard to fumes emitted. However, it can be an eye and skin irritant.
RECOMMENDED METHOD OF CONTROL	Avoid contact with skin, eyes, or open cuts, and avoid prolonged inhalation of dust. Remove from skin promptly by washing. Flush eyes with water and get medical attention.

MATERIAL	CORROSION PREVENTIVE ADDITIVE
TRADE OR OTHER NAME	Cuprogard
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Properzi roll emulsion additive. Very small amounts used--4 gallons every 2 months.
TRANSPORTATION AND HANDLING	Gallon containers
PROPERTIES	Oxidation retardant for copper and brass piping and valves.
POSSIBILITY OF HAZARD	Small
HAZARDOUS REACTION PRODUCTS	None known
EXPLANATION OF HAZARD	Prolonged contact with sensitive skin would result in an allergic reaction.
RECOMMENDED METHOD OF CONTROL	Personal hygiene; gloves to minimize skin contact.

MATERIAL	CREOSOTE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Wood preservative
TRANSPORTATION AND HANDLING	Manually, by hand (creosoted wood)
PROPERTIES	Dark liquid, characteristic odor. Derived from the distillation of coal-tar. May be a mixture of two or more coal-tar fractions, containing phenols and their ethers. Liquid is poisonous.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Both creosote and its vapors may act as skin irritants and serious cases of dermatitis may result from prolonged exposure. Creosote contains phenolic compounds and naphthalene, both of which act as poisons if breathed into the human system.
RECOMMENDED METHOD OF CONTROL	Avoid skin contact. Protective clothing; gloves. Protective creams should be available. Adequate ventilation.

MATERIAL	CRYOLITE
TRADE OR OTHER NAME	Sodium aluminum fluoride, Na_3AlF_6, Synthetic cryolite
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms, Utility, Control
OPERATIONAL USES	Solvent for alumina in the electrolytic cells
TRANSPORTATION AND HANDLING	Received at Plant in closed hopper bottom cars. Unloaded in Building 40 onto a belt conveyor and transported to storage tanks by Utility Dept., supervised by Control. It is drawn from storage and added to the pots by Potroom personnel.
PROPERTIES	Color varies with source. Material ranges from powder to small lumps. Chemically inert. Insoluble in water. Impurities in symthetic cryolite: NaF, Na_2CO_3. SiO_2, Al_2O_3, AlF_3, $Al_2(SO_4)_3$. HF and SiF_4 formed during reduction process.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Dusts and gases containing fluorides
EXPLANATION OF HAZARD	Cryolite in a solid form dusts readily, and this dust may cause irritation of the skin, eyes, and respiratory passages. In a molten state cryolite gives off gases which contain small amounts of fluorides. In the molten state cryolite is probably less of a hazard as exposures are shorter and most of the gases evolved are drawn into the potroom gas scrubber system. When ingested in sufficient quantities, cryolite is toxic.
RECOMMENDED METHOD OF CONTROL	Collect gases and fumes at the source. Use of a dust type respirator if work area contains large concentrations of cryolite dust. Prevent exposure of food to dust. Care in handling to minimize dusting. Personal hygiene.

MATERIAL	DUG POTLINING
TRADE OR OTHER NAME	Used potlining, scrap cathode materials
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining, Yard Service
OPERATIONAL USES	This material is removed from the pot shells, stored in Bldg. 127, and loaded into railroad cars for shipment to a plant (Point Comfort) for reclaiming of the fluoride compounds which the cathode has absorbed from the bath.
TRANSPORTATION AND HANDLING	Loaded by hand and shovel into buckets which are transported by various means to the west end of 127 and dumped. The material is then loaded onto railroad cars using a front end loader. Asbestos is bagged and disposed of separately.
PROPERTIES	A black solid composed chiefly of carbonaceous material but also containing such insulating materials as asbestos, refractory bricks and cement and alumina plus sodium and fluoride compounds absorbed from the bath and a certain amount of bath.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	The sodium and fluoride compounds which the cathode has absorbed from the bath, bath which has adhered to the cathode, and nitrides and carbides which have formed in the cathode.
EXPLANATION OF HAZARD	The sodium compounds absorbed from the bath react with moisture in an alkaline reaction and may cause irritation of the skin, eyes, and respiratory passages. Dust from this material will also contain fluorides. Moisture also reacts with the nitrides and carbides in this material to liberate ammonia and acetylene which may cause irritation of the eyes and respiratory passages. Asbestosis is a hazard if dusting of the asbestos in the older pots occurs.
RECOMMENDED METHOD OF CONTROL	Use of a respirator if the material is extremely dusty and thorough washing of exposed skin areas after contact with this material.

MATERIAL	DUST FROM BAKED CARBON SCRAP
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode
OPERATIONAL USES	Reclamation of anodes scrapped before reaching the potrooms
TRANSPORTATION AND HANDLING	Open type boxes, hoppers, pan conveyors, belt conveyors, hammermills, bucket elevators, vibrating screens, screw conveyors, and Redler conveyors.
PROPERTIES	Fine dust
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Fluorides from bath materials contained in the anodes
EXPLANATION OF HAZARD	All anodes contain a percentage of butts, and the butts contain an amount of bath or fluoride materials. When these are crushed, the area around the hammermill is filled with a dust containing some of this fluoride material.
RECOMMENDED METHOD OF CONTROL	Proper cleaning of bath from butts and use of approved respirator if dust load becomes too high.

MATERIAL	DUST FROM CARBON BUTTS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode
OPERATIONAL USES	Reclamation of anodes used in pots
TRANSPORTATION AND HANDLING	Open type boxes, hoppers, pan conveyors, belt conveyors, hammermills, bucket elevators, vibrating screens, screw conveyors, and Redler conveyors
PROPERTIES	Dust
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Fluorides from the bath materials adhering to the butts.
EXPLANATION OF HAZARD	During unloading and crushing operations the dust created contains fluorides. The amount of this fluoride material depends upon how well the bath was cleaned from the butts in the potrooms.
RECOMMENDED METHOD OF CONTROL	Clean bath from butts; use respirators when unloading butts or working in the area of the hammermill when butts are being crushed.

MATERIAL	DUST FROM GREEN CARBON "SCRAP"
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode
OPERATIONAL USES	Reclamation of anodes which are scrapped after leaving press but before reaching baking furnaces
TRANSPORTATION AND HANDLING	Open type boxes, hoppers, pan conveyors, belt conveyors, hammermills, bucket elevators, vibrating screens, screw conveyors, and Redler conveyors.
PROPERTIES	Fine dust
POSSIBILITY OF HAZARD	Yes
"AZARDOUS REACTION RODUCTS	Pitch dust and fluorides from bath materials contained in the anodes.
EXPLANATION OF HAZARD	When green scrap is being crushed, the area around the hammermill is exposed to a dust containing pitch. Anyone exposed to this dust for a length of time could develop skin and eye irritation. This dust also contains some fluorides from the butt content of the scrap anodes.
RECOMMENDED METHOD OF CONTROL	Operate dust collector and adjust flow of material to capacity of collector fan. Proper protection of skin and eyes, prompt cleanup after exposure, use of respirator if necessary, and proper cleaning of bath from butts.

MATERIAL	DUST FROM POTROOMS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Produced in potrooms, but common in areas surrounding potrooms.
OPERATIONAL USES	Reclaimed and returned to pots.
TRANSPORTATION AND HANDLING	The airborne dust settling in passageways, courtyards, etc. is swept up manually or by power sweepers and put back into operating pots via dump buckets or shoveling.
PROPERTIES	The dust contains alumina, particles of carbon and fluoride, and is usually associated with AF and CO gas. It is carried by air currents from the potrooms.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Alumina and carbon particles are considered only in the sense of nuisances. Fluorides both solid and gaseous and the carbon monoxide are health hazards. It should be noted that these gases are diluted in the potrooms after coming off from the pots and then diluted after leaving the potrooms so the health hazards are negligible over the surrounding area. The fluorides and carbon monoxide are discussed under separate sheets.
RECOMMENDED METHOD OF CONTROL	Use of approved dust masks. Collection of dust and fumes at sources. Shielding of pots.

MATERIAL	DUST, POT
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Environmental Control
OPERATIONAL USES	Material, primarily alumina, reblended with incoming alumina for reclamation into pots via alumina tank storage.
TRANSPORTATION AND HANDLING	From "vacuum box" to alumina unloading station.
PROPERTIES	Principally inert aluminum oxide with a small percentage (usually less than 5%) of entrained alumina particles.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Lung irritation and excessive fluoride particle absorption into body tissue with excessive exposure.
RECOMMENDED METHOD OF CONTROL	Handle with care, avoiding generation of dust clouds. Wear approved dust masks and/or respirators when handling.

MATERIAL	DUST, POTLINING MILL
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Environmental Control
OPERATIONAL USES	None
TRANSPORTATION AND HANDLING	Vacuum truck
PROPERTIES	Hydrocarbon solvent vapors
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Skin and tissue irritation if exposure excessive
RECOMMENDED METHOD OF CONTROL	Handle with care and avoid creating dust clouds. Handle in closed container to Class A dump area. Adequate clothing; personal hygiene. Wear approved dust masks when handling.

MATERIAL	DUST, REGENERATOR (A-446)
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Environmental Control
OPERATIONAL USES	None
TRANSPORTATION AND HANDLING	Bag-collected dust from regenerator vent system discharges via duct to regenerators.
PROPERTIES	Alumina with entrained hi-melt point hydrocarbon and pitch with some entrained petroleum coke
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Skin and tissue irritation from excessive exposure
RECOMMENDED METHOD OF CONTROL	Handle used dust collector bags with care. Avoid creating dust cloud. Personal hygiene; adequate clothing. Wear approved dust mask when handling used bags.

MATERIAL	DYE
TRADE OR OTHER NAME	Spotcheck developer, Spotcheck penetrant, Spotcheck cleaner.
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	For coloring and detecting metal cracks
TRANSPORTATION AND HANDLING	
PROPERTIES	Hydrocarbon. Flammable.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Same as any hydrocarbon. A flammable liquid and a dangerous hazard.
RECOMMENDED METHOD OF CONTROL	Keep away from any potential fire hazard. Store in cool, well-ventilated area. Personal hygiene. Use in well-ventilated area.

MATERIAL	EPOXY CEMENTS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Mechanical, Yard Service
OPERATIONAL USES	Used mainly as an adhesive to make temporary repairs to metal, glass, ceramic, and plastic materials.
TRANSPORTATION AND HANDLING	Received in small tubes, cans, or bottles. Each cement is received in two containers which must be mixed together in certain proportions before the material is ready for use.
PROPERTIES	Thermosetting resins which when mixed with the proper curing or catalytic agents form tight cross-linked polymer networks characterized by toughness, good adhesion, corrosion and chemical resistance, and good dielectric properties.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Either of the components or the mixture of the two may cause dermatitis and in certain individuals even allergic reactions. The curing or catalytic agents, such as amines and anhydrides, are probably the most dangerous components used to formulate these epoxies.
RECOMMENDED METHOD OF CONTROL	Use of gloves when handling or mixing these adhesives and a thorough cleaning of any skin area which comes in contact with the materials. They should also be used only in well-ventilated areas.

MATERIAL	ETHER
TRADE OR OTHER NAME	Ethyl ether, Serc
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Shipping
OPERATIONAL USES	Used in vehicle operation for quick start on vehicles.
TRANSPORTATION AND HANDLING	Contained in 1" capsules which are shipped and stored in metal cans.
PROPERTIES	A light, volatile, flammable liquid obtained by distillation of alcohol with sulfuric acid.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Severe explosion hazard
EXPLANATION OF HAZARD	Flammable. Severe explosion hazard. Highly dangerous in the presence of heat. Anesthetic. Can displace oxygen.
RECOMMENDED METHOD OF CONTROL	Store and keep away from open flames or heat. Provide good ventilation. Avoid inhalation. Use sparingly.

MATERIAL	FABRIC
TRADE OR OTHER NAME	Kynol
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout the Plant
OPERATIONAL USES	Insulation - gasket-type seals
TRANSPORTATION AND HANDLING	
PROPERTIES	Resistant to heat
POSSIBILITY OF HAZARD	None known at present
AZARDOUS REACTION PRODUCTS	None known at present
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	FERROMANGANESE
TRADE OR OTHER NAME	Fe:Mn (7:93%)
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Rodding
OPERATIONAL USES	Alloying constituent
TRANSPORTATION AND HANDLING	Railroad cars to plant, received in drums.
PROPERTIES	An alloy consisting principally of iron and manganese with silicon and carbon impurities. It is a dense, metallic-like substance ranging from 4" lumps to fines. It disintegrates when exposed to atmosphere for a period of time.
POSSIBILITY OF HAZARD	None as used
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	FERROSILICON
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Rodding
OPERATIONAL USES	To add silicon to cast iron
TRANSPORTATION AND HANDLING	Shoveled from storage into the iron furnace
PROPERTIES	An alloy of silicon and iron containing approximately 75% silicon. It is received in approximately 1/2-inch pieces.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Poisonous gases such as phosphine
EXPLANATION OF HAZARD	These gases are produced when ferrosilicon containing 45% to 70% silicon comes in contact with moisture. These gases are caused by impurities in the ferrosilicon. This material is stored in a dry and well-ventilated area so that there should be very little danger associated with it.
RECOMMENDED METHOD OF CONTROL	Keep storage area dry and well ventilated.

MATERIAL	FERTILIZER
TRADE OR OTHER NAME	Vigoro, 10-20-10
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Enriching soil.
TRANSPORTATION AND HANDLING	Paper bags and plastic bags to plant, by hand to job.
PROPERTIES	A 10-20-10 label refers to 10% ammonia, 20% phosphoric acid, and 10% potash. Vigoro has different percentages but contains approximately the same ingredients.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Large amounts of 10-20-10 fertilizer are used on lawns, shrubs, etc. The material is irritating to skin membranes, especially when wet. It is also irritating to the eyes, nose, and throat.
RECOMMENDED METHOD OF CONTROL	Handle carefully to reduce dusting to a minimum. Personal hygiene. Wear approved dust mask as necessary.

MATERIAL	FERROPHOSPHORUS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Rodding
OPERATIONAL USES	Alloying material in the iron melting furnace
TRANSPORTATION AND HANDLING	Shoveled manually from storage bin to iron melting furnace.
PROPERTIES	An alloy of iron and phosphorus ranging from 18-25% phosphorus.
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	FLOOR SWEEPING COMPOUND
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout the Plant
OPERATIONAL USES	Dust settling, dirt adhering, material spread on floors before sweeping.
TRANSPORTATION AND HANDLING	Fiber boxes, paper bags
PROPERTIES	Actual composition not known but thought to be a sawdust and sand with a dye added and wet with an oil.
POSSIBILITY OF HAZARD	None
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	FLUORESCENT TUBES
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout the Plant
OPERATIONAL USES	Tubes for fluorescent lighting.
TRANSPORTATION AND HANDLING	By carton to department; singly as needed.
PROPERTIES	Regular glass fluorescent tubes, the insides of which are coated with a beryllium phosphor powder.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Beryllium phosphor powder
EXPLANATION OF HAZARD	The glass tubes, themselves, pose no health hazard, but the coating of beryllium phosphor inside the tube is a serious hazard. When this powder is inhaled or if the glass tube is shattered and a gragment of the glass pierces the skin, the compound is readily absorbed by the blood stream and will prevent the healing of the wound.
RECOMMENDED METHOD OF CONTROL	The disposal of the worn-out tubes should be carefully carried out.

MATERIAL	FLUORSPAR
TRADE OR OTHER NAME	Calcium fluoride, spar, CaF_2
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms, Utility, Control
OPERATIONAL USES	Added to the electrolytic cells to give certain desirable properties to the bath.
TRANSPORTATION AND HANDLING	Received at the Plant in bulk or bags in box cars. It is unloaded by the Utility Department and conveyed to storage. From storage it is distributed to the pots, supervised by the Control Department.
PROPERTIES	A multicolored solid with a vitreous luster. Material received in the form of lumps ranging in size from 1/8 inch to one inch. Major constituent is CaF_2, with other impurities such as silica, $CaCO_3$, Fe_2O_3, Pb, Zn, Cu, Al_2O_3. Fluorspar in bath lowers melting point, increases density, decreases conductivity, decreases solubility of Al_2O_3, softens bath crust, thereby increasing workability.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Fluoride bearing dust
EXPLANATION OF HAZARD	Fluorspar is the most stable and least volatile of the fluorides so that it probably represents only a very slight hazard. The material does not dust roo readily, and any dust produced is more of a nuisance. However, this dust could be toxic if it were ingested.
RECOMMENDED METHOD OF CONTROL	Care in handling. Use of a dust-type respirator if dust concentrations are high. A thorough cleanup before eating after the handling of this material.

MATERIAL	FREON
TRADE OR OTHER NAME	CCl_2F_2, Dichloro Difluoromethane, F-12
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	An additive to air conditioning and cooling systems.
TRANSPORTATION AND HANDLING	Stored in steel cylinders
PROPERTIES	Solorless, odorless, and tasteless gas which is 4.2 times heavier than air. Non-explosive and non-flammable. Non-corrosive to metals.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Decomposed by heat, releasing carbon monoxide, chlorine, phosgene, hydrogen fluoride. These products act as irritants to skin, eyes, nose and throat, with prolonged exposure possibly causing death.
EXPLANATION OF HAZARD	Acts as an anesthetic at high concentrations. Freon sprayed into eyes instantly freezes tissue.
RECOMMENDED METHOD OF CONTROL	Proper maintenance and inspection to prevent leaks. Adequate ventilation should be provided for repair work. Little danger of poisoning in low concentrations. Goggles required when handling or working in the vicinity of freon. Do not expose to heat. Use air-pak respirator as necessary, and other approved respirators.

MATERIAL	FUEL GAS, BOTTLED
TRADE OR OTHER NAME	MAPP gas
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Rodding
OPERATIONAL USES	Used as fuel for metal cutting torches
TRANSPORTATION AND HANDLING	Steel cylinders
PROPERTIES	Combustible liquid
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	CO, CO_2, various metallic oxides from metal cutting.
EXPLANATION OF HAZARD	Asphyxiant in excessive concentration; flammable and explosive in vapor phase in air.
RECOMMENDED METHOD OF CONTROL	Store cylinders upright with caps on, in approved location; store away from ignition sources, care in handling.

MATERIAL	FUMES FROM FURNACE SKIM
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	
TRANSPORTATION AND HANDLING	Skim is raked from molten metal surface in holding furnace into skim boat. Skim boat is carried by fork truck to skim room. After cooling, skim is shoveled into boxes to await disposal.
PROPERTIES	Fumes from skim at elevated temperatures contain nitrides and carbides of aluminum, chlorine, aluminum chloride, magnesium chloride, and hydrogen chloride. Fumes are dense and white.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Nitrides, carbides, chlorides of aluminum, chlorine, magnesium chloride, and hydrogen chloride.
EXPLANATION OF HAZARD	Nitrides, carbides and chlorides of aluminum are irritating to the respiratory system.
RECOMMENDED METHOD OF CONTROL	After removal from furnace, hot skim should be placed in skim room under exhaust hood as soon as possible. Avoid breathing dust as much as possible. Use approved dust respirator when loading rail car.

MATERIAL	FUMES FROM GAS FIRED HOLDING FURNACES AND GAS BURNERS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	By-product of combustion
TRANSPORTATION AND HANDLING	Fumes are exhausted from furnaces through furnace stack. Products of combustion from gas burners used to heat potroom crucibles, molds, etc. are removed from Building 34 by means of roof vent fans.
PROPERTIES	
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Products of combustion including CO, CO_2, N_2, chlorine, aluminum and magnesium chlorides, and HCl
EXPLANATION OF HAZARD	In sufficient concentration will cause respiratory irritations and possible suffocation.
RECOMMENDED METHOD OF CONTROL	Proper operation of furnace dampers. Inspection to insure no leakage in stack or transition dust work from furnace. Operation of roof fans. Use of oxygen at times to reduce entrained carbon-hydrocarbon particles and fumes.

MATERIAL	FUMES FROM MELTED 110 PITCH
TRADE OR OTHER NAME	HSP coal tar pitch fumes
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode
OPERATIONAL USES	Hydrocarbon fumes from melted pitch
TRANSPORTATION AND HANDLING	Fume hoods, ducts, blowers, roof fans
PROPERTIES	Yellowish, smoky gas
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Fumes are created when 110 pitch is heated above the melting point.
EXPLANATION OF HAZARD	These fumes cause skin to become sensitive to wind and sun. Prolonged rubbing of skin by collars, sleeves, etc. will also result in discomfort and possible blistering. Pitch fumes in the eyes cause a stinging sensation which may last for several hours.
RECOMMENDED METHOD OF CONTROL	Wear goggles, use protective creams or ointments, do not rub exposed parts of body, clean up as soon as possible after exposure. Use approved respiratory masks.

MATERIAL	FURFURAL ALCOHOL
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode
OPERATIONAL USES	Vehicle and binder in carbon cements
TRANSPORTATION AND HANDLING	Metal drums and cans
PROPERTIES	Volatile fumes
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Irritant to eyes, nose, skin, mucous membranes
RECOMMENDED METHOD OF CONTROL	Personal hygiene. Use approved respirators.

MATERIAL	FURNACE GASES
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Rodding, Atomizer
OPERATIONAL USES	Evolved during the melting of cast iron in the Lectromelt furnaces.
TRANSPORTATION AND HANDLING	Gases are pulled by exhaust fans into dust collectors and vented outside the building. Collected dust is hauled in closed bucket to disposal area.
PROPERTIES	Composed of gases and fumes generated by the cast iron and its alloying materials plus those materials, such as bath, which accompany a furnace change of scrap castings. Volume of gases and fumes probably small.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Iron oxide fumes and possibly fluorides, CO
EXPLANATION OF HAZARD	Inhalation of iron oxide fumes may cuase respiratory irritation. Any volatilized fluorides may cause irritation of the skin, eyes, and respiratory passages.
RECOMMENDED METHOD OF CONTROL	Keep dust collector in good repair and dispose of catch to approved dump. Keep vent hoods in good shape and holes and cracks closed up.

ARD 003341

MATERIAL	FURNACE SLAG
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot, Yard Service
OPERATIONAL USES	None
TRANSPORTATION AND HANDLING	Raked out of iron-melting furnace into slag pan. Dumped into lugger boxes, hauled to approved dump.
PROPERTIES	Slag is the fused product which separates in metal smelting and floats on the top of the metal. It is the result of the combination of the flux, the metal being processed, furnace lining, and may include the oxides, sulfides, etc., derived from the metal.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Metallic fumes evolved when molten, metallic dusts when handling cold. Slight dusting may occur in disposal to dump area.
RECOMMENDED METHOD OF CONTROL	Handle with care. Wear approved dust mask if necessary.

MATERIAL	GRAPHITE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Lubrication of locks, etc; welding wire feeders; electric arc cutting; gearbox lubricant.
TRANSPORTATION AND HANDLING	Various means.
PROPERTIES	A soft, greasy feeling powder or flake material. Black to steel gray in color with a dull metallic luster. Sp. Gr. 2.09 to 2.25.
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	GREEN DYE
TRADE OR OTHER NAME	Fluorescen green concentrate
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Environmental Control
OPERATIONAL USES	Manometer water dye
TRANSPORTATION AND HANDLING	Plastic bottles
PROPERTIES	Unknown
POSSIBILITY OF HAZARD	None as used
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	HERBICIDES
TRADE OR OTHER NAME	Prometon, 2,4 Bis(Isopropylamino-6, Methoxy-S-Triazine), Sodium Metaliorate Tetrahydrate, Boron trioxide, Bromacil, Dowpon, granular ureabar, Eptam, 2,4,5T
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Weed killer
TRANSPORTATION AND HANDLING	Metal drum; sprayed onto areas for brush and weed control
PROPERTIES	Liquid, soluble in water.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Harmful if swallowed; irritating to mucous tissue; probable toxic reactions if ingested.
RECOMMENDED METHOD OF CONTROL	Avoid swallowing; avoid contact with eyes and skin; store above 32 F. Wash with soap and water to remove. Wear adequate clothing, including eye protection. Use respirator approved for dust and mist.

MATERIAL	HYDRAULIC FLUID
TRADE OR OTHER NAME	Fyrquel 220; Pydraul 10 E
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Hydraulic press fluid
TRANSPORTATION AND HANDLING	55-gallon metal drums
PROPERTIES	Fireproof liquid, contains tri-aryl phosphate
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Toxic vapor if heated to boiling point
EXPLANATION OF HAZARD	Harmful if swallowed; causes irritation to skin and eyes.
RECOMMENDED METHOD OF CONTROL	Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Use normal industrial hygiene practices. If swallowed, induce vomiting with finger down throat or by giving soapy or strong salty water to drink. Repeat until vomit is clear. Call physician. In case of contact with eyes, immediately flush eyes with plenty of water for at least 15 minutes. Call physician. If contact with skin, flush skin with plenty of water.

MATERIAL	HYDROCHLORIC ACID
TRADE OR OTHER NAME	HCl; hydrogen chloride; muriatic acid.
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Ingot, Mechanical
OPERATIONAL USES	Cleaning metal surfaces prior to soldering; cleaning scale from heat exchangers; cleaning cable ends before making splices or loops. Deionization of Properzi mill roll lubricant water and cleaning Properzi mold wheel.
TRANSPORTATION AND HANDLING	Received in storeroom in various sized plastic bottles. Bottles carried to using location.
PROPERTIES	A clear, colorless to slightly yellow, fuming liquid with a pungent and irritating odor. Poisonous. A strong, highly corrosive acid. Soluble in water, alcohol, and ether.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Hydrogen gas and hydrogen chloride gas.
EXPLANATION OF HAZARD	Hydrochloric acid will liberate hydrogen chloride when exposed to the air. This gas is very irritating to the skin, eyes, and respiratory system. When hydrochloric acid reacts with a metal, hydrogen is released. If the release of gas is rapid, small droplets of acid may be carried into the surrounding atmosphere. The hydrogen liberated, if confined to a small area, may form an explosive mixture. Corrosive liquid will produce severe burns on skin.
RECOMMENDED METHOD OF CONTROL	Use only in well ventilated areas, preferably with exhaust ventilation. Use protective devices for the eyes and exposed skin areas.

MATERIAL	HYDROGEN GAS
TRADE OR OTHER NAME	H_2
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	Reaction product from storage battery charger; can be by-product of aluminum powder wet by water.
TRANSPORTATION AND HANDLING	Airborne
PROPERTIES	Colorless, odorless gas. Highly flammable. Sp. Gr. 0.0694. Melting Point -259 C. Boiling Point -252 C. Soluble in water.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Hydrogen gas is an acute fire and explosion hazard. The explosive limits range from 4.1% to 74.2% by volume in air. It is highly flammable. Hydrogen is not toxic; however, in large enough quantities it can cause asphyxiation by excluding oxygen normally needed to sustain life. Being much lighter than air and therefore rising rapidly, it is therefore less likely to cause accidental asphyxiation than heavier gases.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation. No smoking in Battery areas. Keep powder dry.

MATERIAL	INERT GAS
TRADE OR OTHER NAME	CO_2, N_2
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	Combustion gas dried and used as inert gas atmosphere (fire suppressing atmosphere) in aluminum powder airslides, storage tanks, and packout equipment.
TRANSPORTATION AND HANDLING	Piped from generators to operating areas.
PROPERTIES	Colorless, odorless gas. Relative density of gas heavier than air. Boiling Point (sublimes) - 100 F. Specific Gravity 1.53. An atmosphere of this gas will not support combustion.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Carbon dioxide and nitrogen mixture induce asphyxia by excluding oxygen. They are heavier than air and may collect in manholes, vats, etc. Produced by the almost complete combustion of natural gas and may be found where fires are present or where explosions have occurred.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation. Dilution with uncontaminated air. Air packs and/or fresh air supply when working inside ducts and tanks.

MATERIAL	INKS
TRADE OR OTHER NAME	Marsh K-1, Foxboro, Recorder
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout Plant
OPERATIONAL USES	Product identification, recording, etc.
TRANSPORTATION AND HANDLING	
PROPERTIES	Fluid composed of pigment or dye plus liquid medium. Petroleum naphtha is a constituent (Vapor Hazard 95*, Threshold Limit 500 ppm, Boiling Point 80-130 C).
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Petroleum naphtha is a term used for a number of solvent mixtures derived from petroleum and oil. It is a vapor hazard and should be used with adequate ventilation.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation when using products with petroleum naphtha as a constituent. Prolonged breathing of vapors should be avoided.

*Ratio of equilibrium vapor concentrations at 25 C to Threshold Limit Value, computed from vapor pressure data.

MATERIAL	INSECTICIDE
TRADE OR OTHER NAME	Black Flag, Malathion, Real Kill, systemic dust such as Lystan
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout Plant by Janitors and Yard Service
OPERATIONAL USES	Killing flies and other insects
TRANSPORTATION AND HANDLING	Malathion in 1-gallon glass jugs; systemic in cardboard boxes; Black Flag in 12-ounce aerosol can. May be sprayed by hand spray guns or by compressed air guns.
PROPERTIES	Insecticides are composed of a carrier such as deodorized light petroleum oils or mineral spirits plus the killing agent pyrethrum.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	Harmful if ingested. High concentrations in closed quarters is unpleasant and irritating, possibly dangerous. The liquid upon repeated contact with skin membranes may cause skin irritation. Contents in aerosol container are under pressure and should not be used near heat or open flame. Exposure to sunlight or temperatures exceeding 120 F. may cause bursting.
RECOMMENDED METHOD OF CONTROL	Exposure to high concentrations of vapors should be avoided. Room should be vacated after spraying and aerated before re-entering. Cover or remove exposed foods. Do not store or use near heat, open flame. Do not puncture or incinerate container. Do not expose to sunlight or temperatures exceeding 120 F. Avoid freezing. Avoid contact with skin or eyes. Wear adequate clothing and goggles if necessary to keep mist from eyes. Wear approved respirator for mists and dust masks for systemic dusts. Wash hands and clothing thoroughly after using.

MATERIAL	INSULATING MATERIALS
TRADE OR OTHER NAME	Johns-Manville Hi-Temp Block Insulation, Kaowool
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer, Yard Service, Mechanical, Ingot
OPERATIONAL USES	Insulation of furnaces. Heat insulation on furnace metal troughs.
TRANSPORTATION AND HANDLING	Rolls, blocks
PROPERTIES	Ceramic fibers, high-purity silica alumina.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Frayed fibers can cause skin irritation. Internal tissue irritation and/or silicosis is a hazard with prolonged inhalation.
RECOMMENDED METHOD OF CONTROL	Personal hygiene, protective clothing such as gloves. Handle with care to avoid abrasion and prevent dusting.

MATERIAL	INSULATION, ELECTRICAL: BAKELITE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Insulation
TRANSPORTATION AND HANDLING	Solid form in sheets and blocks
PROPERTIES	Bakelite is a trademark for a plastic material. The composition varies depending upon its use. The solid type used for insulation would have no industrial hazard.
POSSIBILITY OF HAZARD	None
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	INSULATION, ELECTRICAL: DUXSEAL
TRADE OR OTHER NAME	Johns Manville Duxseal (soft plastic)
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Sealing and caulking
TRANSPORTATION AND HANDLING	Paper bags
PROPERTIES	Non-hardening, non-poisonous, non-injurious, non-irritating to the skin. Pliable, clay-like
POSSIBILITY OF HAZARD	None known
AZARDOUS REACTION PRODUCTS	None known
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	INSULATION, ELECTRICAL: GLYPTOL
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Used on motors and electrical wires, coils, and contacts for insulating and moisture-proofing purposes.
TRANSPORTATION AND HANDLING	Received in either small metal cans for brush application or aerosol cans for spray application.
PROPERTIES	A natural or synthetic resin in a solvent or oil plus certain modifiers or additives. A thin film of this material produces, on exposure to air, a transparent or translucent film which is hard and glossy and impervious to air and moisture. Tough, flexible, good dielectric strength. Percent solids - wt. avg. - 50 Solvent system - Xylene Excellent resistance to acid and oil.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION RODUCTS	Toxic fumes from high temperature oxidation and evaporation of solvent (ketone, aromatic, and aliphatic hydrocarbons). CO_2 and CO from combustion of propane/isobutane propellant in spray cans.
EXPLANATION OF HAZARD	Any of the solvents, oils, or resins or combinations of these materials may cause skin irritation for sensitive persons. Vapors from this material in a confined area may cause respiratory irritation. Combustible. Harmful if taken internally. Combustion of phthalic anhydride glycerol resin can produce toxic fumes.
RECOMMENDED METHOD OF CONTROL	Prevent, as much as possible, contact with the skin, and use only in areas with adequate ventilation. Cleanse hands thoroughly before eating. Avoid fumes if subject to combustion or very high temperatures. Do not spray near fire or open flame. Store in cool area.

MATERIAL	INSULATION, ELECTRICAL: MICARTA
TRADE OR OTHER NAME	Laminated plastic
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Mechanical
OPERATIONAL USES	Insulating material, bearings, gears; low voltage electrical insulation on pots.
TRANSPORTATION AND HANDLING	Sheets, bar, rod, blocks
PROPERTIES	A material such as fabric or paper laminated with a phenolic resin. High dielectric strength. Resistant to acids and alkalies; hard; impervious to moisture; chars at 570-600 F.
POSSIBILITY OF HAZARD	Minimal
HAZARDOUS REACTION PRODUCTS	Polymerized phenol-formaldehyde resin will evolve toxic vapors under combustion at high temperatures.
EXPLANATION OF HAZARD	Excessive inhalation of fumes could cause lung irritation
RECOMMENDED METHOD OF CONTROL	Avoid breathing dust as much as possible when sawing or sanding. Avoid inhalation of vapors if material subjected to combustion or very high temperatures.

MATERIAL	JOINT SEALER, CONCRETE
TRADE OR OTHER NAME	Randustrial Flo-Joint Kit
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Repair throughout the plant
TRANSPORTATION AND HANDLING	5-gallon metal cans
PROPERTIES	Unknown
POSSIBILITY OF HAZARD	None noted on container
HAZARDOUS REACTION PRODUCTS	None known
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	LAUNDRY ADDITIVE
TRADE OR OTHER NAME	Ethoquad
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Atomizer
OPERATIONAL USES	Anti-static additive for clothes laundering
TRANSPORTATION AND HANDLING	Drum
PROPERTIES	Probably a stearate; reduces static electricity from fabrics.
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	LEAD
TRADE OR OTHER NAME	Pb, Plumbum
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Electrical
OPERATIONAL USES	Mostly used as a joint material. Also used in fabricated forms such as pipe, seals and gaskets. Also present in certain Babbitt alloys. Mixed with Babbitt metal to pour cable ties.
TRANSPORTATION AND HANDLING	Received in form of small pig or ingot, sheet, and various fabricated forms and shapes.
PROPERTIES	A bluish-gray soft, ductile metal, low tensile strength, having a density of 11.3 and a melting point of 327 C. Insoluble in water. Soluble in dilute nitric acid.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	The use as a joint material probably presents the greatest hazard. Inhalation of the fumes liberated during the heating and melting may lead to lead poisoning. The inhalation and ingestion of dust produced during any machining or finishing of lead may also cause poisoning. In some cases lead can be absorbed through the skin. Symptoms of lead poisoning are usually slow and gradual, since lead is a cumulative poison. Recommended maximum allowable concentration is 0.2 milligrams per cubic meter of air.
RECOMMENDED METHOD OF CONTROL	Heating and melting of lead should be done in open well-ventilated areas or under an exhaust hood. If lead dust is a possibility, an approved respirator should be worn. Hands should be washed thoroughly after handling lead.

MATERIAL	LIME
TRADE OR OTHER NAME	Quicklime, calcium oxide, CaO
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Yard Service
OPERATIONAL USES	To precipitate the fluorides from potroom gas scrubber water.
TRANSPORTATION AND HANDLING	Hopper bottom railway cars to a storage tank at the Lime Treatment Plant; conveyor to lime slaker from which it is added in the form of a slurry to the incoming potroom scrubber water.
PROPERTIES	A white to yellowish solid; odorless; slightly soluble in water, uniting to form calcium hydroxide, with the evolution of heat. Specific gravity 3.4.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Calcium hydroxide
EXPLANATION OF HAZARD	Lime or calcium oxide is an irritant to the mucous membranes of the eyes and respiratory tract due to the heat evolved when it contacts moisture and the caustic reaction of the calcium hydroxide formed. In the same manner contact with moist skin may result in dermatitis. Recommended maximum allowable concentration is 5 milligrams per cubic meter of air.
RECOMMENDED METHOD OF CONTROL	Use of dust mask or respirators and goggles when working in areas with high concentrations of lime dust. Thorough washing of skin after working in area laden with lime dust. Avoid causing dust cloud.

MATERIAL	LUBRICANTS
TRADE OR OTHER NAME	See listings next 4 pages
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	
OPERATIONAL USES	
TRANSPORTATION AND HANDLING	
PROPERTIES	
POSSIBILITY OF HAZARD	
HAZARDOUS REACTION PRODUCTS	
EXPLANATION OF HAZARD	
RECOMMENDED METHOD OF CONTROL	

MATERIAL	FIBERGLASS
TRADE OR OTHER NAME	Fiberglass cloth, fiberglass sheet
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Used for heat insulation. Used with resin and activated to hatch and join fiberglass pipe.
TRANSPORTATION AND HANDLING	Sheets
PROPERTIES	Glass in a fibrous form used to make various products such as wall panels, insulating panels, etc.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Can be a skin irritant, causing dermatitis
RECOMMENDED METHOD OF CONTROL	Personal hygiene, protective clothing.

MATERIAL	FLOOR PATCHING RESIN HARDENER
TRADE OR OTHER NAME	Nordbak
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Floor patching
TRANSPORTATION AND HANDLING	Metal cans
PROPERTIES	Plastic with liquid resin hardener. Other properties unknown.
POSSIBILITY OF HAZARD	Small
HAZARDOUS REACTION PRODUCTS	Various irritating and possibly toxic fumes can result from extreme heating or combustion.
EXPLANATION OF HAZARD	Irritating to skin and mucous membranes
RECOMMENDED METHOD OF CONTROL	Avoid excessive exposure to the skin. Remove with soap and water. Protect eyes. Launder soiled clothing before wearing. Provide adequate ventilation if exposed to flame. Avoid inhaling fumes. Avoid inhaling dust if grinding or chipping.

LUBRICANTS

Trade or Other Name	Dept. Used	Operational Uses	Transportation and Handling	Properties and Description	Explanation of Hazard	Control of Hazard
SAE 20/20W motor oil	All depts using int. combust. engines	Crankcase lubrication of reciprocating gasoline and diesel engines	55 gal. drums; small cans to engines	A petroleum oil containing additives; viscosity 50-58 SSU @ 210 F; flash pt.375 F (COC); composition of additives unknown	Dermatitis	Personal hygiene
SAE 30 motor oil	Same as 20/20W	Same as 20/20W	Same as 20/20W	Viscosity 58-70 SSU @ 210 F; flash point 390 F (COC) Balance same as 20/20W	Dermatitis	Personal hygiene
SAE 40 motor oil	Same as 20/20W	Same as 20/20W	Same as 20/20W	Viscosity 70-85 SSU @ 210 F; flash pt. 395 F (COC) Balance same as 20W	Dermatitis	Personal hygiene
SAE Type A or Type F	Mechanical Atomizer	Automatic transmissions	Drums or can to job	Viscosity approx. 52.8 SSU at 210 F. A petroleum oil containing additives of unknown number & composition.	Dermatitis	Personal hygiene
SAE 90 gear oil	All depts.	Lubrication of all types of enclosed gear drives	55 gal. drums; small cans to job	Viscosity 875-1250 SSU at 100 F; flash pt. 325 F (COC). Heavy petroleum oil containing additives.	Dermatitis	Personal hygiene
SAE 140 gear oil	Same as SAE 90	Same as SAE 90	Same as SAE 90	Viscosity 2500-4000 SSU @ 100 F; flash pt. 300 F (COC) Balance same as SAE 90.	Dermatitis	Personal hygiene
Crater Comp. No. 3	Mechanical Electrical	Lubrication of open gears on overhead cranes	35 pound pails	Viscosity 2500-4000 SSU @ 210 F. A black oil of almost grease-like consistency. Usually heated to aid applic	Dermatitis	Personal hygiene
Transformer Oil	Electrical Atomizer	Cooling and insulating fluid in transformers, circuit breakers	55 gal. drums	Viscosity 55-85 SSU @ 100 F. Flash pt. 265 (COC). A light colored petroleum oil containing no oxidation inhibitors.	Dermatitis	Personal hygiene
Cutting oil	Mechanical	Coolant and lubricant in ferrous alloy cutting, threading, machining	55 gal. drums	Viscosity 125-175 SSU @ 100 F; Flash pt. 300 F. (COC). Must contain added sulfur or chlorine or both	Dermatitis	Personal hygiene

ARD 003363

LUBRICANTS

Trade or Other Name	Dept. Used	Operational Uses	Transportation and Handling	Properties and Description	Explanation of Hazard	Control of Hazard
Soluble cutting oil; Oil C	Mechanical	In water emulsion form for ferrous machining	55 gal. drums	A petroleum sulfonate type cutting oil containing a germicide. Used in the form of a water emulsion	Dermatitis	Personal hygiene
Gasoline	All depts.	Fuel for internal combustion engines	Tank truck to storage; pumped to vehicle tanks or safety cans	A mixture of volatile liquid hydrocarbons containing additives such as tetraethyl lead, antioxidants, corrosion inhibitors. Meets API stds. for reg. grade gasoline. Flammable. Moderate explosion hazard.	Dermatitis; CO & exhaust gas fume may act as anesthetic or asphyxiant. Explosive in vapor forms.	Adequate ventilation of exhaust gas & vapors; pers. hygiene. Keep away from ignition sources.
Kerosene	All depts.	As a solvent for cleaning oils and grease from machine parts; occasionally as a fuel.	Tank truck to storage; small safety can to job. Also 55-gal. drums	A pale yellow to white oily liquid distilled from petroleum; boiling range 150-325 C. Flammable.	Dermatitis; explosive & an asphyxiant; vapor may cause headache & stupor; CO present in combustion exhaust gas.	Personal hygiene; adequate ventilation of exhaust gas & vapors.
Hydraulic Fluid (Fyrquel, Pydraul)	Atomizer Rodding Ingot Mechanical	A fire-resistant hydraulic fluid	55-gal. drums	A chlorinated phosphate ester type hydraulic fluid; fire resistant; viscosity 60 SSU @ 100 F.	Harmful if swallowed; irritation to skin and eyes	Personal hygiene
Varsol	All depts.	A solvent for oils & grease; may also be used @ paint & varnish thinner	55-gal. drums	A straight petroleum aliphatic solvent; conforms to standards for Stoddard Solv. Min. flash pt. 100 F.	Dermatitis; irritation of respiratory passages	Personal hygiene; proper ventilation
Silicone Dash Pot Fluid	Mechanical Atomizer	Dash pot fluid	Pint cans to job	An organosilicon oxide polymer compounded to yield a viscous fluid; wide range of viscosities available.	Dermatitis	Personal hygiene
Flake graphite	All depts.	Dry lubrication of slow moving parts or blended with other lubricants to form high temp. lubr.	1 lb. cans	Crystalline allotropic form, soft, greasy feel, steel gray to black color with metallic sheen. Sp. Gr. 2.09 - 2.25.	None as used	None as used

ARD 003364

LUBRICANTS

Trade or Other Name	Dept. Used	Operational Uses	Transportation and Handling	Properties and Description	Explanation of Hazard	Control of Hazard
Powdered graphite	Mechanical	Same as Flake	7 oz. polyethylene bottles	Same as Flake, except in powdered form	None as used	None as used
Cellulube 550	Rodding	Fire-resistant hydraulic fluid	55-gal. drums	Non-aqueous phosphate ester type hydraulic fluid; fire-resistant; viscosity 400-625 SSU @ 100 F.	Dermatitis; lung irritation if mist inhaled	Personal hygiene; adequate ventilation; goggles, mask if spraying.
Rubrex 200	Ingot	Additive to Properzi mill lubricant	55-gal. drums	Straight mineral oil with a viscosity of 175-250 SSU @ 100 F.	Dermatitis	Personal hygiene
Prosol 48 and 66	Ingot	Same as Rubrex	Same as Rubrex	Soluble oil emulsion of unknown composition; probably a petroleum sulfonate	Dermatitis	Personal hygiene
Cuprogard 40	Ingot	Additive to Properzi roll emulsion to prevent corrosion of copper parts.	Same as Rubrex	Oxidation retardant for copper and brass	Dermatitis	Personal hygiene
Tris-Nitro	Ingot	Bactericide for Properzi mill lubricant	55-gal. drums	Trademark for tris (hydroxymethyl) nitromethane or 2-hydroxymethyl-2-nitro-1, propanediol	Dermatitis	Personal hygiene
Castor Oil	Ingot	HDC mold lubricant	55-gal. drums	Pale, yellow viscous liquid, mild odor, nauseating taste; non-drying oil	Dermatitis	Personal hygiene
Trichloroethylene	Mechanical	Degreasing of metal parts	55-gal. drums	Stable, colorless, heavy, mobile liquid with a chloroform-like odor. Boiling pt. 87 C. Non-flammable.	Dermatitis; eye damage; inhalation can cause respiratory irritation.	Personal hygiene; eye protection; Adequate ventilation
Mold grease	Ingot	Lubrication of DC molds	Drums	Exact composition unknown, but thought to be 97% No. 3 calcium base grease and 3% Dow Corning fluid # 200.	Dermatitis	Personal hygiene

ARD 003365

LUBRICANTS

Trade or Other Name	Dept. Used	Operational Uses	Transportation and Handling	Properties and Description	Explanation of Hazard	Control of Hazard
Anderol 500	Mechanical Anode	Air compressors	55-gal. drums	Synthetic oil	Dermatitis; Respiratory irritation	Personal hygiene; Adequate ventilation
Do-All HD600	Ingot	Cutting fluid for band saw used in cutting HDC ingot	55-gal. drums	Soluble oil emulsion; probably a petroleum sulfonate	Dermatitis	Personal hygiene
Cindol-3	Mechanical	Lubricant used during the machining of aluminum	16-oz. spray cans	Synthetic fluid of unknown composition and additives	Dermatitis	Personal hygiene
Never-Seez Compound	Mechanical Env. Cont.	An antiseize material for threaded joints & connectors	1-lb. cans	An aluminum colored grease-like material of unknown composition; slick feeling similar to graphite	Dermatitis	Personal hygiene
Dow-Corning Antifoam B	Ingot	To prevent the formation of foam in the Properzi mill emulsion	55-gal. drums	Fluid of unknown composition; probably a silicone	None as used	None as used
Dow-Corning # 33 Silicone	Mechanical	Lubrication of meters & clocks exposed to fairly high temperatures	8-oz. tubes	Organosilicon oxide polymer compounded to yield a grease with a NLGI # 2 consistency	Dermatitis	Personal hygiene

ARD 003366

MATERIAL	MAGNESIUM
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Alloying aluminum
TRANSPORTATION AND HANDLING	Received in various sizes of notched ingot. A special tool is used to submerge the magnesium in the molten aluminum to prevent air burning.
PROPERTIES	Density - 1.74. A silver-white, light, rigid metal, ductile and malleable. Burns with intense light and heat. When burned in air it forms MgO and Mg_3N_2.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Fire or explosion if ignited and formation of magnesium oxide fumes while burning.
EXPLANATION OF HAZARD	Magnesium is highly flammable and can cause explosions if finely divided. Particles of magnesium or its alloys embedded in a wound in the skin may cause gas gangrene. Freshly formed magnesium oxide can cause metal fume fever.
RECOMMENDED METHOD OF CONTROL	Follow standard practices when alloying molten aluminum with magnesium. Store away from sources of heat. If ignited, smother fire with calcium carbonate, dry sand, graphite, etc. Do not use foam, water, carbon tetrachloride or carbon dioxide on a magnesium fire. Promptly remove all particles of magnesium or its alloys from a wound.

MATERIAL	MANGANESE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Various alloys
TRANSPORTATION AND HANDLING	50-pound bags, briquetted shapes
PROPERTIES	Hard metal used in alloys to add hardness and ductility. Present safe atmosphere level standard 5 mg/m^3.
POSSIBILITY OF HAZARD	Small
HAZARDOUS REACTION PRODUCTS	Volatized oxides of Mn are hazardous (manganese dioxide), causing central nervous system degeneration.
EXPLANATION OF HAZARD	Hazardous only if ingested or inhaled in volatized form. No problem as used here, however.
RECOMMENDED METHOD OF CONTROL	Fume control of volatized state.

MATERIAL	MERCURY
TRADE OR OTHER NAME	Quicksilver; Hg
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Atomizer, Ingot, Yard Service, Mechanical
OPERATIONAL USES	Cathode pool in mercury arc rectifiers; a small amound may be used in small switches; manometers (Ingot) maintained by Mechanical Department.
TRANSPORTATION AND HANDLING	Bulk received in the rectifier tanks. A small amount received in 10-pound glass bottles. The handling of mercury is confined to a well-ventilated room which contains cleaning, distilling and storage facilities. Small bottles kept for use in manometers.
PROPERTIES	A silvery liquid, metallic element. Both the metal and its vapor are poisonous. Specific gravity 13.59.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used here.
EXPLANATION OF HAZARD	Mercury as a liquid exerts a vapor pressure. This vapor pressure, even at room temperature, will cause an unventilated area to have a concentration of mercury vapor up to 200 times the maximum allowable concentration. Mercury poisoning brought about by the inhalation of the vapor is accompanied by a warning effect of a brassy taste in the mouth and discomfort in the throat. Continued exposure to amounts not capable of being tasted causes severe headaches, insomnia, cramps, muscle pain, and general exhaustion. Of lesser importance, although a hazard, is the absorption of mercury through the skin membranes or by ingestion. If workers have their hands in contact with the metal, small amounts can be absorbed through the skin and cause poisoning. The standards for permissible vapor and dust concentrations in the air if tge workroom range from 0.1 to 0.25 mg. per cubic meter. The small amounts used in departments for manometers do not constitute a serious hazard unless an accident breaks a manometer and spillage is not removed promptly.
RECOMMENDED METHOD OF CONTROL	Keep mercury in closed containers. If necessary to use in the open, exhaust ventilation should be used. Any spilled mercury should be cleaned up immediately. The eating or storage of food in areas where mercury is handled should be prohibited. Personnel should change clothes and wash thoroughly after handling mercury. Place scrap contaminated with Hg in airtight containers and call the Yard Service supervisor for special pick-up and disposal in Class I dump area.

MATERIAL	METALIZING METAL
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	The repairing of metal parts
TRANSPORTATION AND HANDLING	Received in the form of coils of wire.
PROPERTIES	Various metals or alloys are used in this process, such as steel, stainless steel, brass, and aluminum.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Metal fumes
EXPLANATION OF HAZARD	In this process a wire of the desired alloy is passed through a flame where it is melted. Compressed air is then used to atomize the molten metal. The atomized spray is then directed onto the part being repaired. During this process fine particles of metal and metal fumes may enter the atmosphere in the work area. Depending on the metal being used and period of exposure, this operation could cause metal fume fever or metal poisoning.
RECOMMENDED METHOD OF CONTROL	The operation is carried out in an open well-ventilated area. Wear approved respirators as necessary.

MATERIAL	MORTAR
TRADE OR OTHER NAME	Super 3000, Harwaco Bond, Brixment, and other various brands.
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode, Carbon Rodding, Yard Service, Mechanical
OPERATIONAL USES	Repairing, building, maintaining, and operating carbon baking furnaces. Patching concrete and other necessary repair.
TRANSPORTATION AND HANDLING	Mixed by hand and power mixer. Shoveled and hauled by wheelbarrow and mud bucket.
PROPERTIES	A finely ground mixture of lime, cement or other similar materials to which sand is added to form mortars.
POSSIBILITY OF HAZARD	Small
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	No hazards as ordinarily used. Lime may cause skin irritations leading to dermatitis, and inhalation of dust, expecially those containing lime, may cause respiratory tract irritations.
RECOMMENDED METHOD OF CONTROL	Personal hygiene is the best control. Use approved respirator during prolonged exposure to dry dust.

MATERIAL	MOTOR VEHICLE GASES
TRADE OR OTHER NAME	Exhaust gases
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout the Plant wherever gasoline engines are operating.
OPERATIONAL USES	None
TRANSPORTATION AND HANDLING	Airborne
PROPERTIES	These gases contain carbon monoxide along with the combustion products of tetrethyl lead, an additive to gasoline. Carbon monoxide can comprise up to 6-7% by volume of the gases given off.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	CO
EXPLANATION OF HAZARD	The hazard of carbon monoxide is discussed under its material sheet.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation at all times.

MATERIAL	NATURAL GAS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Atomizer, Anode
OPERATIONAL USES	Used for a wide variety of heating purposes: boiler heat fuel, area heaters, hot water heaters, blacksmith forge fuel, metal holding furnaces, metal filter boxes, mold heaters. Fuel for baking furnaces in Anode Plant; furnace combustible fuel in Atomizer.
TRANSPORTATION AND HANDLING	Brought to the areas where it is used by pipeline.
PROPERTIES	A colorless gas which is a mixture of the low molecular weight paraffin series hydrocarbons methane, ethane, propane, and butane. It may also contain some nitrogen. Its odor is usually due to an odor additive. Flammable; asphyxiant in confined spaces.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	CO, CO_2. CO is the primary combustion hazard.
EXPLANATION OF HAZARD	Mechanical Maintenance Department personnel are required to work on the piping and equipment which uses the gas to produce heat. Leaks in this piping or equipment may cause fires and explosions and possibly asphyxiation. If the burners using this gas are not regulated correctly, incomplete combustion may occur, and there is the possibility of introducing carbon monoxide into the surrounding atmosphere.
RECOMMENDED METHOD OF CONTROL	Piping and equipment using gas should be periodically checked for leaks. Proper operation and adjustment of burners should also be checked. Exhaust must be adequate. Use air packs if necessary. Adequate ventilation.

MATERIAL	NITROGEN
TRADE OR OTHER NAME	N_2
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Electrical, Rodding, Atomizer
OPERATIONAL USES	Inert atmosphere inside transformers. Flame detector on boilers when using oil. Reserve supply of pressurized gas to operate upper plateau of restubbing press; on fork trucks to keep line pressurized if hydraulic leak occurs. Calibrating gas analyses instruments.
TRANSPORTATION AND HANDLING	Steel cylinders
PROPERTIES	Colorless, odorless, tasteless gas constituting approximately 4/5 of the air. Soluble in water; slightly soluble in alcohol. Sp. Gr. (gas) 0.967, (liquid) 0.804.
POSSIBILITY OF HAZARD	None as used.
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	Store cylinders fasten in vertical position.

MATERIAL	OIL ABSORBANT
TRADE OR OTHER NAME	Fullers Earth, Absorbo
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining, Rodding, Yard Service
OPERATIONAL USES	Oil absorbant on floor around machines, etc. General floor cleaning.
TRANSPORTATION AND HANDLING	Paper bags or barrels.
PROPERTIES	Fullers Earth is a hydrated silica-aluminum compound.
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	OXYGEN
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Utility, Atomizer, Ingot, Potlining
OPERATIONAL USES	Furnace combustion additive; fuel for cutting metal pads; cutting aluminum metal spills, lancing furnace tap holes, burning off collector bars and cutting pot pads, bolts, etc. in pot disassembly.
TRANSPORTATION AND HANDLING	Steel cylinders
PROPERTIES	Colorless, odorless gas; approximately 1/5 of the atmosphere. Liquifiable at 190 C. Solidifiable at 227 C. Specific gravity 1.10535. Slightly soluble in water. Compressed in steel cylinders for welding operations.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	See below
EXPLANATION OF HAZARD	Oxygen is not hazardous in itself. It will react violently with oil or greases under certain conditions and for this reason libricants of this nature should never be used on valves or any piping coming in contact with oxygen under pressure. Since it is essential to life, the chief hazard occurs when it is deficient in the atmosphere, i.e. used up in a confined space either by men breathing or by some chemical by which it is absorbed.
RECOMMENDED METHOD OF CONTROL	Caution in connection with combustibles. Proper storage of cylinders.

MATERIAL	PAINTS AND ENAMELS
TRADE OR OTHER NAME	Various trade names
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Ingot, Atomizer
OPERATIONAL USES	Protective coating and container identification
TRANSPORTATION AND HANDLING	one and five-gallon cans; aerosol cans
PROPERTIES	Paint is essentially a mixture of opaque substances (pigments of finely divided metals) with drying oils, thinners, driers and resins, and blended petroleum distillates. Enamels are much the same but with resin as the main constituent of the vehicle. Paint pigments most widely used are lead compounds, either sulphates, oxides, carbonates or chromates and titanium oxides, barium sulphates, zinc oxide, sulfates; also polyvinylacetate copolymers, alyshatic hydrocarbons, xylol; linoleic, oleic, palmitic, and stearic acid components. Linseed oil is the main vehicle but other oils such as soya bean and tung oils are sometimes used.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	The solvent or vehicle of the paint as well as the pigment may cause skin irritations that will lead to dermatitis. The vapors from the vehicle will cause irritation of the eyes, nose, and throat. Some pigments such as compounds of arsenic, tar distillates, zinc and chromium are poisons in themselves and care must be exercised when used to prevent contact with the skin. In ordinary use paints and enamels are not serious health hazards. The application of some of these paints in enclosed areas will result in minor irritations, but when the worker is removed from the area no serious effects are noted.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation of work area. Personal cleanliness should be stressed, especially after using the heavy paints. Keep materials away from sources of fire. If spraying paint, wear respirator to prevent inhalation of fine droplets of paint.

MATERIAL	PAINT REMOVER
TRADE OR OTHER NAME	Western Auto KWIK All-Purpose Paint and Varnish Remover
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Removal of paint
TRANSPORTATION AND HANDLING	Quart and gallon cans to job
PROPERTIES	Non-flammable, water soluble. Contains: methylene chloride - 75% methanol - 17% isopropyl alcohol (inhibitors, masking agents, etc.)-8%
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Contact with flame or hot surface may produce toxic gases.
EXPLANATION OF HAZARD	The manufacturer states that the material is dangerous and may be fatal or cause blindness if swallowed. Vapor harmful. Skin and eye irritant. Cannot be made non-poisonous.
RECOMMENDED METHOD OF CONTROL	Avoid breathing of vapor or contact with skin. Use only with adequate ventilation. Close container after each use. Do not use near flame or hot surface. If swallowed, induce vomiting by giving one tablespoon of salt in warm water and repeat until vomit fluid is clear. Follow with 2 teaspoons baking soda in a glass of water. Have patient lie down and keep warm. Cover eyes to exclude light. In case of contact with eyes, flush with water. Call physician immediately in either case.

MATERIAL	PENETRATING OIL
TRADE OR OTHER NAME	Liquid Wrench, WD40, Sok'd
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Mechanical, Utility
OPERATIONAL USES	Used to free electrical connectors and fittings which are frozen by rust, corrosion, scale, paint, varnish, carbon, or gum.
TRANSPORTATION AND HANDLING	Received in one-pint cans and aerosol
PROPERTIES	A light, oily, yellow colored liquid (Liquid Wrench). A blend of aromatic solvents; flammable; strong penetrating odor. Petroleum distillate with surface wetting agent.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	The label on the can states that prolonged or repeated breathing of the vapor and contact with the skin should be avoided. The material is also harmful if ingested. Since it is flammable, it is also a fire hazard. The possibility of dermatitis is present, but as used should present no serious danger. See also "Aerosol."
RECOMMENDED METHOD OF CONTROL	Use only in well-ventilated areas. Prevent, as much as possible, contact with the skin. Wash thoroughly after using this material, especially skin areas which have been in contact with the material. Do not expose to a source of fire.. See also "Aerosol."

MATERIAL	PIPE JOINT COMPOUNDS
TRADE OR OTHER NAME	Teflon tape; plastic adhesive (80P, 80C, and purple primer for PVC plastic pipe)
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Electrical
OPERATIONAL USES	Applied to pipe joints for sealing purposes.
TRANSPORTATION AND HANDLING	Carried or trucked
PROPERTIES	Quick-seal-like nickel or copper compounds
POSSIBILITY OF HAZARD	None
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	PITCH
TRADE OR OTHER NAME	Low softening point, High softening point, tar
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service (for other departments)
OPERATIONAL USES	A constituent of raw anode and potlining material
TRANSPORTATION AND HANDLING	Cleaned up by Yard Service and hauled to disposal area via lugger buckets
PROPERTIES	A black solid, semi-solid or viscous material with a "tar odor" characteristic. Contains phenolic compounds, toluene, benzene, etc.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Volatiles
EXPLANATION OF HAZARD	Phenolic compounds may cause burns through contact with skin and eyes. This is aggravated by exposure to sunlight. Volatiles from pitches burn readily. Dusts are explosive in certain concentrations.
RECOMMENDED METHOD OF CONTROL	Provide adequate ventilation when fumes are produced. Avoid skin contact. Use mechanical handling equipment. Use approved dust mask as needed; use protective skin cream (Kerodex or equivalent) prior to exposure. Wash skin thoroughly; wear adequate clothing.

MATERIAL	50 DEGREE PITCH
TRADE OR OTHER NAME	Tar, low softening point pitch
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining
OPERATIONAL USES	Binder for potlining mixes
TRANSPORTATION AND HANDLING	Received in tank cars which are steam heated to melt the pitch. Pumped through a steam heated pipe system to storage and then to mixers.
PROPERTIES	A black, viscous, bituminous substance which softens at about 50 C.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Volatile organic compounds
EXPLANATION OF HAZARD	These volatile organic compounds will either burn the skin or irritate the skin and eyes.
RECOMMENDED METHOD OF CONTROL	Use protective cream on exposed skin and some type of eye protection.

MATERIAL	110 DEGREE PITCH
TRADE OR OTHER NAME	HSP coal tar pitch
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode
OPERATIONAL USES	Binder for carbon anodes
TRANSPORTATION AND HANDLING	Open hoppers, pan conveyors, bulk floor storage, clam shell bucket, screw conveyors, bucket elevators and Redler conveyor
PROPERTIES	Black, solid flakes
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Pitch dust is created during the unloading process and any time the pitch is moved or handled.
EXPLANATION OF HAZARD	This dust causes skin to become sensitive to wind and sun. Prolonged rubbing of skin by collars, sleeves, etc. will also result in discomfort and possible blistering. Pitch dust in the eyes causes stinging sensation which may last for several hours.
RECOMMENDED METHOD OF CONTROL	Wear goggles, use protective creams or ointments, do not rub exposed parts of body, clean up soon as possible after exposure. Used approved respiratory masks.

MATERIAL	PLASTER
TRADE OR OTHER NAME	U.S. Gypsum, Unsanded Fibre
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Surface coating for walls and ceilings by carpenters.
TRANSPORTATION AND HANDLING	Received in bags
PROPERTIES	A mixture of lime, sand, and water together with a binding material such as hair. The dry plaster contains hydrated lime, the binding material and some calcium sulphate.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Dry plaster, as it comes from the bag, may dust during handling and coat the nose and throat passages. This is a nuisance more than a health hazard. The lime, a principle constituent, may act as a skin irritant and dermatitis may result. When mixed ready for application, there should be no hazard unless the hands of the worker are in contact with the mix for long periods of time. Should this occur the skin of the hands may crack.
RECOMMENDED METHOD OF CONTROL	Personal hygiene.

MATERIAL	PLASTERBOARD, TRANSITE, MASONITE, PLYWOOD
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Building material
TRANSPORTATION AND HANDLING	Sheets
PROPERTIES	A synthetic building material. May be wood fibres, gypsum, sawdust, silicates bonded together by a binder.
POSSIBILITY OF HAZARD	None
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	POT GASES
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms
OPERATIONAL USES	This gas is emitted by the molten bath of the electrolytic cells.
TRANSPORTATION AND HANDLING	The bulk of the gas is drawn through an electrostatic precipitator and scrubber system before entering the atmosphere.
PROPERTIES	These gases are visible as a white smoke or fume. They contain carbon dioxide, carbon monoxide, and various gaseous fluorides, principally HF (during anode effect only - some CF_4 is also evolved).
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Compounds of fluorine-both solid and gaseous, and CO. However, most CO evolved is normally burned to CO_2 near crust of pot and diluted by air in fume collection system.
EXPLANATION OF HAZARD	During carbon setting, tapping, or other operations which require the removal of pot covers this gas escapes into the surrounding area. Inhalation of large amounts of this gas may cause a choking sensation, nausea, and irritation of the eyes, skin, and respiratory passages. However, this gas usually rises rather rapidly to the roof ventilators and exposures to it are usually of a short duration.
RECOMMENDED METHOD OF CONTROL	Keep pots covered as much as possible and keep the area as well ventilated as possible. (Respiratory filters do not protect against pot gases).

MATERIAL	POTLINING MIX
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining Department
OPERATIONAL USES	Used to line the reduction cell. When baked, it becomes the cathode of the cell.
TRANSPORTATION AND HANDLING	It is mixed in steamheated mixers and dumped into containers which are transported to a pot being relined. The mix is placed in the insulated pot shell and tamped into place.
PROPERTIES	A mixture of 50 pitch, anthracite coal, and methyl naphthalene. When dumped from the mixer, the mix emits fumes which are composed of the lower boiling constituents of the pitch. As the mix cools, the amount of fumes decreases.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	The volatile organic compounds which are liberated when the mix is hot.
EXPLANATION OF HAZARD	These volatile compounds may cause irritation of the eyes and skin.
RECOMMENDED METHOD OF CONTROL	Use of goggles for eye protection and skin creams for exposed skin areas. A thorough washing of exposed skin areas should follow exposure to these fumes.

MATERIAL	POTLINING SCRAP
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	None
TRANSPORTATION AND HANDLING	Scrap material, including used dust collector bags, hauled to dump area on flat bed truck or load lugger truck
PROPERTIES	Potlining consists of a mix of 30% anthracite coal, 70% potlining coke with pitch as a binder.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None as scrap
EXPLANATION OF HAZARD	Pitch can cause skin burns and can cause skin to be particularly sensitive to sun and wind.
RECOMMENDED METHOD OF CONTROL	Avoid prolonged contact with dust. Wash thoroughly. Wear approved dust masks as necessary.

MATERIAL	POTROOM PARTICULATE
TRADE OR OTHER NAME	Catch
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms
OPERATIONAL USES	These solids removed from the pot gases are blended into the alumina supplied to lines not using Alcoa 398 system, with the exception of Room 6.
TRANSPORTATION AND HANDLING	Potroom particulate from Lines 1, 2, 3, 4 are hauled to the storage tank in trailer mounted buckets and dumped. P. P. catch from Line 6 is conveyed directly to storage from the catch hopper. Blending with alumina is done by adding the catch to alumina on the belt conveyor carrying it to storage.
PROPERTIES	A very fine gray to black dust. The major part of it is Al_2O_3. It also contains considerable amounts of carbon and compounds of fluorine and sulfur. The material dusts readily. Composition is roughly 2/3 alumina, 1/4 bath compounds, 9% carbon dust.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Finely divided solid compounds of fluorine
EXPLANATION OF HAZARD	Exposure to this material may cause irritation of the skin and eyes. Inhalation may cause irritation of the respiratory passages. Ingestion of the dust may cause poisoning.
RECOMMENDED METHOD OF CONTROL	Use an adequate respirator if exposed to large concentrations of this dust. A thorough personal cleanup after exposure to the material.

MATERIAL	PREMIXED GROUT
TRADE OR OTHER NAME	Embeco 153 and 713
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Used as grouting
TRANSPORTATION AND HANDLING	Contained in sacks and transported by truck
PROPERTIES	Hard crystalline substance gray in color. Dusts readily when dry.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Continued inhalation of fine particles (0.5-5.0 microns) may cause silicosis, a fibrosus of the lung tissue. Sandblasting particularly hazardous due to breaking down of particle sizes.
RECOMMENDED METHOD OF CONTROL	Provide adequate ventilation and wear approved dust mask. Sandblast in enclosure wearing protective equipment.

MATERIAL	RAW SEWER SLUDGE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	None
TRANSPORTATION AND HANDLING	Pumps and sewer pipe
PROPERTIES	Contains various bacteria
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Sewer gas and toxic bacteria
EXPLANATION OF HAZARD	Bacteriological effects on human tissue; possible disease organisms
RECOMMENDED METHOD OF CONTROL	Wear adequate clothing including boots and gloves. Wash very thoroughly after exposure.

MATERIAL	RECLAIMED ALUMINA INSULATION
TRADE OR OTHER NAME	RAI, Caked Alumina Insulation
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining
OPERATIONAL USES	Reclaimed for shipment to Point Comfort
TRANSPORTATION AND HANDLING	Reclaimed from pots by digging with pneumatic hammers, separated from potlining, and shoveled in boxes to Potlining Department. Payloaders move materials to railroad cars for shipment to Point Comfort.
PROPERTIES	RAI is alumina highly impregnated with fluorides and carbon with other impurities such as iron, silicon, and sodium carbonate. It is gray to black in color. This material absorbs moisture readily and is alkaline in nature. When wet, ammonia is given off, along with carbides and nitrides.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Ammonia, carbides, and nitrides when in contact with moisture.
EXPLANATION OF HAZARD	Because of the alkaline nature, this material will burn skin membranes, and any dust will irritate the eyes and set up inflammation in the respiratory system. The fluorides are dangerous and will conceivably cause illness if sufficient material if ingested. Refer to material sheets on Aluminum Fluoride and Sodium Fluoride for the industrial hazards. The gases, ammonia, acetylene, and nitrides may accumulate in confined areas and become a serious hazard. Refer to material sheets on these compounds.
RECOMMENDED METHOD OF CONTROL	Removal of dust and fume from the source. Care in handling the solid. Prevent moisture from coming in contact with the material.

MATERIAL	RED MUD
TRADE OR OTHER NAME	Wash for thermocouples, ladles, tools
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Used to coat aluminum molds to prevent attack by molten aluminum
TRANSPORTATION AND HANDLING	Received in drums
PROPERTIES	By-product of bauxite processing
POSSIBILITY OF HAZARD	Yes
IAZARDOUS REACTION RODUCTS	Unknown
EXPLANATION OF HAZARD	Avoid breathing dust
RECOMMENDED METHOD OF CONTROL	Handle with care to minimize dusting.

MATERIAL	POTASSIUM HYDROXIDE
TRADE OR OTHER NAME	Caustic potash; KOH
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Used as the electrolyte in the nickel-cadmium batteries used for emergency lighting
TRANSPORTATION AND HANDLING	The Chemical Laboratory prepares a solution of potassium hydroxide and distilled water with a sp. gr. of 1.220. It is stored in polyethylene bottles and used as needed.
PROPERTIES	White, deliquescent solid; absorbs water and carbon dioxide from air; soluble in water with the liberation of much heat.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	This material is dangerous to the eyes and skin in both solid and liquid form because it destroys tissues and causes severe burns. Inhalation of dusts or mists can cause injury to the entire respiratory system, and ingestion results in severe injury to the gastrointestinal tract.
RECOMMENDED METHOD OF CONTROL	Chemical safety goggles and a full face shield made of plastic should be worn when handling this material. Rubber gloves and aprons should also be worn. Any area of the body which comes in contact with this material should be washed immediately with large quantities of water.

MATERIAL	RED OIL
TRADE OR OTHER NAME	Mariam 827
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Environmental Control
OPERATIONAL USES	Manometer liquid
TRANSPORTATION AND HANDLING	Metal and plastic cans
PROPERTIES	Oily
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Skin and tissue irritation
RECOMMENDED METHOD OF CONTROL	Personal hygiene; avoid accidental ingestion or inhalation of vaporized fumes from hot surfaces.

MATERIAL	REFREX-KLEEN FLUX
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Used in the holding furnaces to aid in skimming dross
TRANSPORTATION AND HANDLING	Received in drums
PROPERTIES	Exact composition is not known. Believed to contained a fluoride.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Fluoride fumes and dust
EXPLANATION OF HAZARD	This material is aspirated into the furnace. Dense fumes are created in the furnace during this operation, but in general most of the fumes are exhausted outside the building through the furnace stack. However, some of these fumes may escape into the building around the top of the doors, and an operator standing near an open door could be exposed to some of this fluoride containing gas and dust. The skim treated with this flux will also emit fluoride fumes while it is cooling.
RECOMMENDED METHOD OF CONTROL	Careful regulation and maintenance of furnace dampers and drafts should prevent most, if not all, of these fumes from entering the fuilding atmosphere. Reasonable care in handling the flux should be practiced. Approved respirators should be worn.

MATERIAL	REGENERATED ALUMINA FROM A-446
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms, Anode
OPERATIONAL USES	Blended with alumina as is potroom particulate
TRANSPORTATION AND HANDLING	Dense phase transport system
PROPERTIES	Gray, dusty granular material
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Nuisance dust
EXPLANATION OF HAZARD	Very dusty; sonsidered more of a nuisance than a hazard; however, it can be an irritant if dust gets into the eyes.
RECOMMENDED METHOD OF CONTROL	Eye protection. Respirator when conditions indicate.

MATERIAL	RING FURNACE EXHAUST GASES
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Anode
OPERATIONAL USES	Produced by the combustion of natural gas or propane-air in enclosed firebrick flues.
TRANSPORTATION AND HANDLING	Exhaust fans pull the products of combustion through the flues to ducts which carry the gas to the Alcoa 446 treatment before exhausting it into the atmosphere.
PROPERTIES	Gas is composed mainly of carbon dioxide, oxygen, and nitrogen with a small amount of carbon monoxide and some sulfur compounds. The gas also contains tar or pitch vapors which have diffused through the flue walls during the baking process.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Carbon monoxide and tar or pitch vapors. In the cooler parts of the exhaust system, these tar or pitch vapors condense and may cause skin irritation to anyone coming in contact with this condensed material.
EXPLANATION OF HAZARD	There is probably not enough carbon monoxide in this gas to be dangerous unless a person were confined in a small area containing this gas. The condensed tar or pitch vapors constitute a hazard to anyone who must work on the ducts or exhaust fans.
RECOMMENDED METHOD OF CONTROL	Prevent the excape of these gases into work areas. Properly ventilate any work areas when these gases could accumulate. Use prescribed protective equipment when working in exhaust ducts or mains.

MATERIAL	SAND
TRADE OR OTHER NAME	SiO_2, Quartz, Silica, Gravel
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Used as grouting base
TRANSPORTATION AND HANDLING	Contained in bulk and transported by truck
PROPERTIES	Hard crystalline substance brown or white in color. Dusts readily when dry. Foundry sand contains up to 40% minus mesh natural.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Continued inhalation of fine particles (0.5-5.0 microns) may cause silicosis, a fibrosis of the lung tissue. Sandblasting particularly hazardous due to breaking down of particle sizes.
RECOMMENDED METHOD OF CONTROL	Provide adequate ventilation. Avoid handling dry when possible. Sand blast in enclosure wearing protective equipment. Use approved respirators during exposure to dust.

MATERIAL	SCRAP BOXES AND BAGS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Disposal to dump
TRANSPORTATION AND HANDLING	Load lugger buckets, flat bed trucks
PROPERTIES	Residue,i.e. dusts
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Skin irritation from residual dusts such as coral plastic containers, etc.
RECOMMENDED METHOD OF CONTROL	Handle with care and wash thoroughly.

MATERIAL	SCRAP DRUMS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	None
TRANSPORTATION AND HANDLING	Truck
PROPERTIES	Can contain residual liquids and/or dusts
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Skin irritation; dermatitis
RECOMMENDED METHOD OF CONTROL	Avoid contact with liquids and dusts; wash thoroughly. Replace caps and plugs.

MATERIAL	SCRAP IRON
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Hauled from point of generation to scrap metal yard.
TRANSPORTATION AND HANDLING	Via flat bed and standard truck from plant areas to scrapyard.
PROPERTIES	Metallic: iron, steel. Potlining scrap contaminated with used bath materials.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Fluorides and sodium hydroxide from used bath and potlinings
EXPLANATION OF HAZARD	Dermatitis and skin burns from alkali materials and sodium hydroxide formed
RECOMMENDED METHOD OF CONTROL	Handle contaminated potlining scrap with care; avoid dusting. Wear adequate clothing and gloves; wear approved dust mask if dusting is unavoidable; wash skin thoroughly and promptly. Personal hygiene. Wash clothing thoroughly.

MATERIAL	SEALING COMPOUND
TRADE OR OTHER NAME	C-H Chico
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	To seal up explosion-proof circuits from a non-explosion proof area
TRANSPORTATION AND HANDLING	Boxes, cans
PROPERTIES	Cement-like after hardening
POSSIBILITY OF HAZARD	None, with the exception of possible dermatitis upon repeated contact with extremely sensitive skin.
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	See above
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	SEWER GAS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Yard Service
OPERATIONAL USES	None
TRANSPORTATION AND HANDLING	Enters sewer lines as a waste product or is formed in the sewers. Usually present in manholes.
PROPERTIES	The most common components of sewer and sewage gases are methane, ethane, hydrogen sulfide, carbon monoxide, carbon dioxide, illuminants, gasoline vapors, nitrogen, hydrogen, and oxygen. Sewer gases have an objectionable odor. Chlorine may be present in the sewers at Ingot.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	The danger of explosion is present and subsequent additional amounts of carbon monoxide would be formed.
EXPLANATION OF HAZARD	The hazards in sewers and manholes are those associated with the hazards due to flammable gases, a diminution of oxygen with possible asphyxiation if such an atmosphere is entered and to poisonous gases. In the sewers of the Ingot section, there may be concentrations of chlorine. Near caustic dip operations, there may be fumes of caustic, or nitric acid, and of oxides of nitrogen. The presence of the objectionable odor of sewer gas will reduce the hazard, since it would cut down exposure.
RECOMMENDED METHOD OF CONTROL	Continuous ventilation of lift station and processing plant by continuous blower ventilators. Samples of the gases should be taken and analysis made for the presence of oxygen and combustible gases. The men should work in pairs. Scott airpacs and forced ventilation shall be used as needed. Wash very thoroughly after exposure to raw sewage.

MATERIAL	SHELLAC - VARNISH
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Protective Coating
TRANSPORTATION AND HANDLING	Gallon Metal Cans
PROPERTIES	Shellac is a protective material composed of a resin obtained from the secretions of an insect on trees in India, Siam, etc. This is refined and cut and thinned with alcohol. Varnish is a solution which can be applied to a surface in a thin film and produces a continuous protective coating by the evaporation of its volatile constituents, by oxidation or chemical reaction of the film-forming constituents, or by both means.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	The fumes from the alcohol are poisonous, but as used there should be no serious danger. The fumes from the volatile liquids in the varnish may be a health hazard, especially if the varnish is used in close, unventilated areas.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation in area where used.

MATERIAL	SILICON
TRADE OR OTHER NAME	Si
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Alloying constituent
TRANSPORTATION AND HANDLING	Gravel-sized particles transported in boxes
PROPERTIES	A hard, lustrous, crystalline solid of 6" lumps and down. Specific Gravity 2.00-2.49. Melting Point 1,420 C. Soluble in hydrofluoric acid and alkalies. Principal impurity is Ca.
POSSIBILITY OF HAZARD	Small
AZARDOUS REACTION PRODUCTS	Silicon tetrafluoride.
EXPLANATION OF HAZARD	Possible respiratory irritation in prolonged concentrated exposure to gas.
RECOMMENDED METHOD OF CONTROL	Adequate exhaust and ventilation.

MATERIAL	SILICONE GREASE
TRADE OR OTHER NAME	Dow 33
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Used to lubricate meters and clocks which are exposed to fairly high temperatures.
TRANSPORTATION AND HANDLING	Received in tubes
PROPERTIES	A lightweight, colorless grease
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	This material may cause dermatitis, particularly among individuals sensitive to this material, if allowed repeated or prolonged contact with the skin.
RECOMMENDED METHOD OF CONTROL	Limit, as much as possible, contact with the skin. If the material does contact the skin, thoroughly clean the affected area.

MATERIAL	SILVER BRAZING ALLOYS
TRADE OR OTHER NAME	Easy-Flo, Sil-Fos
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	The repair of broken metal parts and the rebuilding of silver contact surfaces
TRANSPORTATION AND HANDLING	Received in the form of rod, bar, or wire
PROPERTIES	Easy-Flo consists of 50% Ag, 15.5% Cu, 16.5% Zn and 18% Cd. Sil-Fos consists of 15% Ag, 80% Cu, and 5% P.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Cadmium fumes
EXPLANATION OF HAZARD	The alloy Sil-Fos probably presents no hazard unless it should be used in a very confined area. The alloy Easy-Flo used here and several others of similar composition present a definite hazard due to the cadmium metal they contain - 16% to 24%. The fumes given off when cadmium is heated are very toxic. The effects of cadmium poisoning may include lung damage and damage to the kidneys, bones, and blood.
RECOMMENDED METHOD OF CONTROL	Work with these alloys should definitely not be done in confined areas unless respiratory protection is provided. In addition general ventilation in areas where these alloys are used should be good enough to keep the concentration of cadmium fumes in the air below the permitted concentration.

MATERIAL	SOAPS AND CLEANERS
TRADE OR OTHER NAME	Floor Maintenance, Super Shine All, Windex, Formula 409, Perform, Cococon, Tide, Ez Go Hand Cleaner.
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout the plant by janitors; general use of hand soaps.
OPERATIONAL USES	Cleaning agents
TRANSPORTATION AND HANDLING	These soaps and cleaners may be in the form of a powder, solid, or liquid. They are stored in their original containers, which can be metal cans, 5-gallon buckets, glass bottles, or paper boxes.
PROPERTIES	Soaps are usually the sodium salt of oleic, stearic, or palmitic acids or of a mixture of these and in general of the fatty acid contained in natural fats and oils. Soap powder is a hydrated mixture of soap 20%, soda ash 40%, and the remainder water. Liquid hand soap used in soap dispensers contains coconut oil, domestic castile oils, and glycerin. Some soaps and cleansers, in addition to the above, contain an abrasive to assist in cleaning, as well as chlorine bleach. Other cleaners contain ammonia, alkyl alcohol ethers, or potassium soap.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Most cleaners are non-flammable or have an extremely high flash point, but can be very harmful if swallowed. Soaps containing abrasives or chlorine bleach may irritate the skin upon repeated use. Concentrated liquid cleaners may result in dermatitis upon repeated contact. Persons having sensitive skin may be bothered with skin eruption when using certain industrial cleaners. Ammonia has a sharp, pungent odor, and in some cleaners such as Windex, can irritate eye and nose membranes if not used with ventilation.
RECOMMENDED METHOD OF CONTROL	Avoid storing in open or unlabeled containers. Materials should be kept away from heat and open flame. Do not take internally. Avoid prolonged breathing of vapor and use in well-ventilated or naturally-ventilated areas. Avoid repeated contact with harsh cleaners. If prolonged contact is necessary during cleaning operations, protection the the form of rubber gloves should be provided.

MATERIAL	SODIUM CARBONATE
TRADE OR OTHER NAME	Soda ash, soda, Na_2CO_3
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potrooms
OPERATIONAL USES	Used to raise the ratio of sodium fluoride to aluminum fluoride in the bath.
TRANSPORTATION AND HANDLING	Received at the plant in paper bags or bulk. Bags are stored on pallets in Building 36. Bags are transported to pots by fork truck and placed on the crust. Bulk received by rail, unloaded to storage tank by conveyor, to pots via dump buckets.
PROPERTIES	A grayish-white powder or lumps containing up to 99% sodium carbonate. Soluble in water. Contains impurities of NaCl, sodium sulphate, calcium and magnesium carbonates, and sulfur.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used.
EXPLANATION OF HAZARD	Finely divided sodium carbonate is very irritating to the skin, eyes, and respiratory passages, because it is a highly alkaline material and burns tender tissue. Sodium carbonate is an alkali material and if taken internally would be a poison.
RECOMMENDED METHOD OF CONTROL	Careful handling of the material to prevent dusting. Use of protective equipment to reduce the exposure of skin, eyes, and respiratory passages to this material. Wash thoroughly after exposure. Use approved dust mask.

MATERIAL	SODIUM CHLORIDE
TRADE OR OTHER NAME	Salt, NaCl
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	To melt snow and ice
TRANSPORTATION AND HANDLING	Handled in bags and transported by truck
PROPERTIES	White crystals
POSSIBILITY OF HAZARD	None as used
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	SODIUM HYDROXIDE
TRADE OR OTHER NAME	Caustic soda; sodium hydrate; lye; NaOH; diamond alkali
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Utility, Ingot
OPERATIONAL USES	Raise pH of potable water; cleaning air compressor valves, washbasin drain pipes, heat exchanger tubes, and pipefittings used on pot (molten metal) siphons mixed with water in drum. 35% solution by weight for cleaning aluminum skull from equipment used in handling molten aluminum in Ingot. Deionizing process for water additions to mill lubricant.
TRANSPORTATION AND HANDLING	Drums, buckets, small cans; shoveled into caustic tank or scooped into 5-gallon buckets.
PROPERTIES	White opaque deliquescent crystal. Absorbs water and carbon dioxide from air. Sp. Gr. 2.130. Boiling point 1390 C.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Sodium hydroxide mist
EXPLANATION OF HAZARD	This alkali will cause severe burns to skin membranes and conjunctivitis of the eyes. The mist is irritating and toxic. Reaction with aluminum produces a sodium aluminate precipitate. Poisonous when taken internally. Caustic uniting with various metals will liberate hydrogen gas which may form explosive mixtures with air.
RECOMMENDED METHOD OF CONTROL	Careful handling of the liquid. Rubber gloves, aprons, and face shields or goggles should be used when handling the liquid. Mist and gases from tank should be exhausted by hooding. Immediate flushing of skin or eyes with copious quantities of water following contact with caustic solutions.

MATERIAL	SOLDER
TRADE OR OTHER NAME	Half and Half, Alcoa 807, Hi Temp Alloy Solder, Silfas, Silver, 50SN-50ZN
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Mechanical
OPERATIONAL USES	Used to make clean and permanent electrical connections and make repairs on various metal items.
TRANSPORTATION AND HANDLING	Received in spool or bar form
PROPERTIES	Generally a tin-lead alloy; type used here 60% tin and 40% lead resin core; low melting point; may also contain other metals such as silver, copper, zinc, and cadmium.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Metal fumes
EXPLANATION OF HAZARD	Some of the metals used in solder, when in a molten state, emit vapors or fumes which are known to poison those working with the material as well as those in the surrounding area. Of the three most dangerous metals - lead, zinc, and cadmium - cadmium is the most dangerous. It has the lowest melting point, is the most volatile, and is the most poisonous. Lead, because it is present in such large amounts in solder, also presents an equally dangerous hazard.
RECOMMENDED METHOD OF CONTROL	If possible, use solders which contain no cadmium. All soldering operations should take place in well-ventilated areas.

MATERIAL	SOLDERING FLUX
TRADE OR OTHER NAME	Borax No. 2, Alcoa No. 64, Oxweld - Cast Iron
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Electrical
OPERATIONAL USES	Used in the soldering process as an adhesive.
TRANSPORTATION AND HANDLING	Stored in jars or small cans
PROPERTIES	Various compositions. Typically contains HCl, HF, H_3PO_4, acids, Zn, Cl, $AlCl_3$, etc. Also resin, animer, and oils.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Spattering may cause skin burns if flux contains acid.
RECOMMENDED METHOD OF CONTROL	No special control required.

MATERIAL	SOLVENT: CONTACT RE-NU
TRADE OR OTHER NAME	Freon
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Used as a cleaner and degreaser in the meter shop and as a cleaner for switch contacts
TRANSPORTATION AND HANDLING	Received in aerosol cans. Produced by Miller-Stephenson Chemical Co., Inc. Sprayed onto parts needing cleaned.
PROPERTIES	Label states product contains "Freon" TF, which is trichlorotrifluoroethane. It is a volatile solvent, but has a low level of toxicity. Present threshold limit is 1000 ppm by volume. Product probably also contains one of the more volatile fluorocarbons as a propellant.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Hydrogen fluoride, hydrogen chloride, and possibly phosgene.
EXPLANATION OF HAZARD	The fluorocarbon products marketed under the trademark "Freon" are low in toxicity, nonflammable, nonexplosive, and noncorrosive, but in the presence of open flame or objects operating at high temperature they will decompose to form toxic or irritant products such as hydrogen fluoride, hydrogen chloride, and possibly phosgene. The low level of toxicity and nonflammable nature makes Freon TF a good general solvent to substitute for the more hazardous materials. Its only effects of known significance are the depressant effect on the central nervous system and cardiac arrhythmia. These occur at concentrations much greater than the threshold limit.
RECOMMENDED METHOD OF CONTROL	The work area where this material is used should have adequate ventilation; personnel should be cautioned about smoking while using this material; it should not be sprayed on the skin.

MATERIAL	SOLVENT: 1,2 DICHLOROETHANE
TRADE OR OTHER NAME	Ethylene dichloride; ethylene chloride; Dutch liquid; Dutch oil; elayl chloride; CH_2ClCH_2Cl.
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical
OPERATIONAL USES	Used as a degreasing agent for mercury and the internal portions of the mercury arc rectifier tubes; also cleaning of electrical joints of old Alcoa No. 2 Joint Compound, etc. before joint is made.
TRANSPORTATION AND HANDLING	It is received in one quart glass bottles which are opened as needed.
PROPERTIES	A colorless, oily liquid; chloroform-like odor; sweet taste. Resistant to oxidation and will not corrode metals. Burns with difficulty.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	It is toxic by inhalation, by prolonged or repeated contact with the skin, and by ingestion. It is very dangerous to the eyes.
RECOMMENDED METHOD OF CONTROL	Use only in well ventilated areas; prevent excessive exposure of the skin to the liquid or vapor; protect eyes with goggles; and keep away from sources of fire.

MATERIAL	SOLVENT: METHYL NAPHTHALENE
TRADE OR OTHER NAME	Methylnaftalen
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining
OPERATIONAL USES	Used as a solvent for 50 degree pitch to make room temperature seam mix: dilutes 50 degree pitch.
TRANSPORTATION AND HANDLING	55-gallon drums
PROPERTIES	Liquid; solvent of pitch
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Unknown
EXPLANATION OF HAZARD	Fumes may cause skin and eye irritation. Toxic if ingested. All solvents contacting and wetting the skin will cause dermatitis--inflammation of the skin--may be caused by simple irritation or by systemic damage to the skin. Even the most inert solvents will dissolve the natural protective barrier of fats and oils and leave the skin unprotected against further irritation and harm.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation. Rubber gloves and eye protection.

	SOLVENT:
MATERIAL	NAPHTHA, VM&P
TRADE OR OTHER NAME	Painters' naphtha; varnish-makers' naphtha, petrolium spirits; petroleum thinner; mineral spirits
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Mechanical
OPERATIONAL USES	Cleaning and degreasing purposes
TRANSPORTATION AND HANDLING	Obtained as needed in small quantities from the storeroom.
PROPERTIES	A clear colorless liquid; volatile and highly flammable; a light petroleum distillate, a mixture of small quantity of benzene and toluene with xylene and higher homologs from coal tar.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	If allowed to repeatedly contact the skin, it may cause dermatitis due to its solvent action on the natural skin oils. The vapor may prove dangerous to the respiratory system if inhaled in large quantities. Because of its low flash point, it also represents a dangerous fire hazard.
RECOMMENDED METHOD OF CONTROL	Prevent, as much as possible, contact with the skin. Use rubber gloves and use only in well ventilated areas. Keep the material and its vapor away from sources of fire. Eye protection should be worn.

MATERIAL	SOLVENT: OAKITE 117
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot, Yard Service, Mechanical
OPERATIONAL USES	Cleaning oil and grease from equipment, floors, etc.
TRANSPORTATION AND HANDLING	55-gallon steel drum
PROPERTIES	Specific gravity 0.87; 100% volatile (by volume). Colorless liquid; solvent odor; evaporation rate greater than ether (for comparison); negligible solubility in water. Flash point 135 F. but lower when evaporation in process.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Incomplete combustion may yield carbon monoxide. High vapor exposure to open flames or fire may yield traces of fumes of chlorinated organic compounds and hydrochloric acid.
EXPLANATION OF HAZARD	Fire hazard from vapor or fumes; toxic effects from fumes; tissue irritation. Inhalation of high vapor concentrations may cause symptoms ranging from headache, dizziness, nausea, and mild depression to loss of consciousness. Direct contact with eyes causes irritation. Prolonged or repeated skin contact may cause drying and/or irritation. All solvents contacting and wetting the skin will cause dermatitis -- inflammation of the skin -- may be caused by simple irritation of by systemic damage to skin. The natural protective barrier of fats and oils is dissolved, leaving the skin unprotected against further irritation and harm.
RECOMMENDED METHOD OF CONTROL	Provide adequate ventilation with safety-rated ventilating equipment. Remove all ignition sources. Recover free liquid. Cover with absorbent material and haul away to approved dump area. Flush area with soap and water. If necessary, use suitable respiratory equipment. No smoking or open lights. Use safety goggles, neoprene apron or equivalent, face shield, and other suitable protective clothing. Avoid prolonged or repeated breathing of vapors and prolonged or repeated skin contact. Avoid getting in eyes; wash thoroughly after handling. Store in cool, dry place out of direct sunlight, away from heat, sparks, and open flame. Avoid prolonged storage at high or low temperatures. Keep container tightly closed when not in use. Relieve any pressure by opening slowly. For inhalation, remove from exposure. In case of severe overexposure, get medical attention. Flush eyes with plenty of water at least 15 minutes; get medical attention. Wash skin thoroughly with soap and water. Wash clothing, shoes.

MATERIAL	SOLVENT: TRICHLOROETHANE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Potlining
OPERATIONAL USES	Used to clean oil and grease from metal conductor joints
TRANSPORTATION AND HANDLING	Small cans refilled from larger drum and carried to job.
PROPERTIES	A petroleum distillate
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	
EXPLANATION OF HAZARD	Excessive inhalation may cause respiratory irritation. Organic solvents such as petroleum distillates used for degreasing and cleaning are excellent fat solvents and will remove the natural oil from the skin, leaving it dry and scaly, and subject to cracking and infection.
RECOMMENDED METHOD OF CONTROL	Use in well ventilated areas, avoid excessive contact with skin, and wash skin well after using.

MATERIAL	SOLVENT: TRICHLOROETHYLENE
TRADE OR OTHER NAME	C_2HCl_3
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Used as a general solvent for cleaning grease and oil from various materials.
TRANSPORTATION AND HANDLING	55-gallon drums held in storeroom and handled by truck to departments.
PROPERTIES	Chlorinated hydrocarbon, colorless liquid, sweet characteristic odor. Boiling point - 188 F., 87 C. Vapor pressure - 1.16 psia at 68 F. Relative density to air - 4.5. Decomposes eventually in the presence of moisture to hydrochloric acid and phosgene. Insoluble in water. Non-flammable and noncorrosive to common metals. *Vapor Hazard - 1,000 Threshold limit - PPM by volume - 100
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Hydrochloric acid and phosgene may be formed in small quantities.
EXPLANATION OF HAZARD	The liquid may cause skin irritations which lead to dermatitis. The vapor is a narcotic and anesthetic. It is not only effective through inhalation but also can be absorbed through the skin. Immediate toxic effects are the depressant effect on the central nervous system, dermatitis, and injury to the liver. Personality changes also have been noted. An organic solvent such as trichloroethylene, used for degreasing and hand cleaning is an excellent fat solvent and will remove the natural oil from the skin, leaving it dry and scaly and subject to cracking and infection.
RECOMMENDED METHOD OF CONTROL	Proper protective equipment such as rubber gloves, aprons, etc. should be provided, as well as eye protection. Areas should be well ventilated. Contact with the skin should be restricted as much as possible.

* Ratio (ppm/ppm) of equilibrium vapor concentration at 25 C to the Threshold Limit Value computed from vapor pressure data in references below.

Mellan. Industrial Solvents. Reinhold Publishing Corporation. New York, 1939.
Jorday. Vapor Pressure of Organic Compounds. Interscience Publishers, Inc. New York, 1954.

MATERIAL	SOLVENT: VARSOL
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Electrical, Potlining, Environmental Control
OPERATIONAL USES	As a solvent for oil and grease; lubricant
TRANSPORTATION AND HANDLING	Stored in 55-gallon drum near general work area. Smaller containers filled from this drum and carried to job.
PROPERTIES	A light petroleum distillate. An aliphatic solvent having a minimum Tag closed cup flash point of 100 F. Conforms to standard for Stoddard Solvent, (Vapor hazard 7, Threshold limit 500 ppm).
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None as used.
EXPLANATION OF HAZARD	The primary problem with this solvent is dermatitis due to its solvent action on natural skin oils. It may also cause allergic dermatitis. The liquid may also cause eye damage, and the inhalation of large amounts of the vapor may cause respiratory reactions. It is among the least reactive of solvents, however, and does not pose a serious problem.
RECOMMENDED METHOD OF CONTROL	Use only in well ventilated areas; restrict contact with the skin as much as possible; wear some type of eye protection; do not use near a source of fire.

MATERIAL	STEAM BOILER TREATMENT ADDITIVE
TRADE OR OTHER NAME	Nalpac (Stock No. 270-942-8242)
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Steam boiler tube surface scale preventive
TRANSPORTATION AND HANDLING	55-gallon metal drums
PROPERTIES	Rust and corrosion inhibitor
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None known
EXPLANATION OF HAZARD	Dermatitis, skin and tissue irritation, may cause eye injury
RECOMMENDED METHOD OF CONTROL	Avoid spills and splashes; handle with care. Unscrew l-ring slowly; let gas escape gradually. Wear eye goggles or face shield when transferring from drum. In case of contact, immediately flush with large amounts of water for at least 15 minutes; in case of eyes, also get medical attention. Remove contaminated clothing.

MATERIAL	STEAM CLEANING FLUID ADDITIVE
TRADE OR OTHER NAME	"APL" Jenny (No. 60). All-purpose liquid cleaning compound.
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Added to fluid used for steam cleaning
TRANSPORTATION AND HANDLING	55-gallon metal drums
PROPERTIES	Strong oil and grease solvent; safe on aluminum and magnesium. Biodegradable.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None known
EXPLANATION OF HAZARD	Excessive contact can cause dermatitis, skin and tissue irritation
RECOMMENDED METHOD OF CONTROL	Avoid breathing of vapors; avoid prolonged or repeated contact with skin. Wash skin thoroughly. In case of contact with eyes, flush repeatedly with water for at least 15 minutes, and get medical attention.

MATERIAL	STEEL STUBS
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Rodding, Utility, Mechanical
OPERATIONAL USES	Part of carbon anode assembly; iron alloy material in pots.
TRANSPORTATION AND HANDLING	Rod trailers, trolley conveyor, fork trucks, on pallets.
PROPERTIES	Solid, cylindrical forms of steel
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	TAR
TRADE OR OTHER NAME	Cold-mix asphalt, Randustrial F161
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service, Mechanical
OPERATIONAL USES	Mix and patch floors, roads
TRANSPORTATION AND HANDLING	
PROPERTIES	Bituminous substance, usually a solid until heated. Similar in composition to low softening pitch. Thin liquid primer used to preheat patch area.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Phenolic compounds given off during melting: toluene, benzene
EXPLANATION OF HAZARD	During melting the fumes fiven off will contain phenolic compounds, toluene and benzene. Melting and application should be performed outside so that the hazard is reduced to a minimum.
RECOMMENDED METHOD OF CONTROL	Provide adequate ventilation. Preferable to do work outside. Careful monitoring of fumes. Avoid skin contact with primer and asphalt. Wash off skin thoroughly.

MATERIAL	TITANIUM (5%) - BORON (10%) ALLOY
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot, Shipping
OPERATIONAL USES	Alloy, grain refiner
TRANSPORTATION AND HANDLING	20-pound bricquetted slabs, small ingot bars
PROPERTIES	Titanium is used in alloy to impart lightness and tensile strength
POSSIBILITY OF HAZARD	None, as used here
AZARDOUS REACTION PRODUCTS	(Titanium dioxide)
EXPLANATION OF HAZARD	None as used here
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	TURPENTINE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	Paint thinner
TRANSPORTATION AND HANDLING	Metal cans
PROPERTIES	A mixture of resin and volatile oil obtained from coniferous trees. Flammable.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None as used
EXPLANATION OF HAZARD	Turpentine is a skin irritant and will cause dermatitis if allowed to remain on the skin for any length of time. The fumes act as an irritant affecting principally the eyes and lungs. Very small amounts produce discomfort. The continued inhalation of the vapors may cause serious inflammation of the kidney and a predisposition to pneumonia.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation. Dilution with uncontaminated air.

MATERIAL	USED A-446 ALUMINA
TRADE OR OTHER NAME	None
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Environmental Control
OPERATIONAL USES	Used as aerating bed medium for collecting A-446 carbon furnace gas emission hydrocarbons (both solid and gaseous)
TRANSPORTATION AND HANDLING	Piped in closed system
PROPERTIES	Inert alumina with entrained high melting point gaseous hydrocarbon and pitch, with some entrained petroleum coke particles.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	CO_2 and SO_2 from reaction with natural gas in alumina regenerator units.
EXPLANATION OF HAZARD	Excessive exposure can cause skin irritation and/or lung irritation
RECOMMENDED METHOD OF CONTROL	Avoid leaks to atmosphere; wear approved dust masks and/or respirators if leaks are encountered.

MATERIAL	VELVOLEUM CLEANER AND PROTECTOR
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Throughout the plant by janitors
OPERATIONAL USES	For the removal of dirt and stains and for protection of velvoleum desk tops against permanent staining by inks and carbons
TRANSPORTATION AND HANDLING	one-quart cans
PROPERTIES	Cleaner contains ethyline glycol and diethylene glycol. Protector contains petroleum distillates. Highly flammable.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Materials are highly flammable and can be harmful or fatal if swallowed. These concentrated heavy duty cleaners may result in dermatitis upon repeated contact with skin. Vapors can cause irritation of the mucous membranes.
RECOMMENDED METHOD OF CONTROL	Materials should be kept away from heat and open flame and should be stored in closed, labeled containers. Avoid prolonged breathing of vapors, and use in well-ventilated areas. Avoid repeated contact with skin, and exercise personal hygiene. If prolonged contact with skin is necessary during cleaning operations, rubber gloves should be provided. If Velvoleum Cleaner #50 is swallowed, induce vomiting immediately and call physician. If Velvoleum Protector #100 is swallowed, do not induce vomiting. Call physician immediately.

MATERIAL	VERMICULITE
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Refractory - insulating material
TRANSPORTATION AND HANDLING	Paper bags
PROPERTIES	A hydrated silicate of indefinite composition. A micaceous material
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	VIRA FLUXES
TRADE OR OTHER NAME	C-200 and PR-5
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Used as mold washes. Use of this material prevents the molten aluminum from attacking the iron molds.
TRANSPORTATION AND HANDLING	Received in drums
PROPERTIES	Mixed with water to form a slurry which is painted on the mold and allowed to dry
POSSIBILITY OF HAZARD	Unknown
AZARDOUS REACTION PRODUCTS	Unknown
EXPLANATION OF HAZARD	
RECOMMENDED METHOD OF CONTROL	

MATERIAL	WATER-SOFTENER RESIN
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Water softener bed
TRANSPORTATION AND HANDLING	Shovel
PROPERTIES	Deionizing medium
POSSIBILITY OF HAZARD	None
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	WATER SOLUBLE OIL
TRADE OR OTHER NAME	None
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Disposal of scrap oil to dump or onto roadways (to settle oil)
TRANSPORTATION AND HANDLING	Bulk tank trailer
PROPERTIES	- - -
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Dermatitis, skin irritation
RECOMMENDED METHOD OF CONTROL	Avoid contact; wear adequate clothing, including rubber boots, plastic gloves; wash skin thoroughly.

MATERIAL	WELDING AND BRAZING FLUXES
TRADE OR OTHER NAME	Oxweld, Fleetweld, Stoody, Lincoln; Brass-Bronze-Malleable Iron Brazing Flux; Silver Soldering Flux; Soldering Paste Flux
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	These materials assist in the welding or joining of metal parts by aiding in the free flowing of the welding or brazing alloy, cleaning the area to be joined, and preventing the formation of oxides during the joining process.
TRANSPORTATION AND HANDLING	Received at storeroom in various size cans. By can to various areas in the plant where welding is carried on. May also come as coating applied to welding rods.
PROPERTIES	Composition of the fluxes varies with the metals being joined. They may be either acid or alkaline in nature. In general fluxes may contain silicates, carbonates, fluorides, oxides, or nitrates.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Fumes from various constituents of the flux
EXPLANATION OF HAZARD	Certain fluxes, especially those containing fluorides, may give off fumes during use which will irritate the eyes, skin, and respiratory tract. Some of the paste types, if allowed to contact the skin, may cause burns or dermatitis.
RECOMMENDED METHOD OF CONTROL	Conduct welding operations, if possible, in open well-ventilated areas or under exhaust hoods. If much welding is to be done in a confined area, forced ventilation should be used. Skin areas exposed to these fluxes should be washed thoroughly.

MATERIAL	WELDING FUMES
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical
OPERATIONAL USES	A product resulting from welding operations
TRANSPORTATION AND HANDLING	Welding operations
PROPERTIES	See WELDING AND BRAZING FLUXES and WELDING RODS AND WIRE
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Very toxic due to the various oxides which may result
EXPLANATION OF HAZARD	See WELDING AND BRAZING FLUXES and WELDING RODS AND WIRE
RECOMMENDED METHOD OF CONTROL	Adequate ventilation. Respirators or gas masks in enclosed areas. Goggles.

MATERIAL	WELDING RODS AND WIRE
TRADE OR OTHER NAME	1100 Aluminum; 4043 Aluminum; Oxweld # 63 and 66 Copper; Lincoln NS3; Nichrome V; Fleetweld 5 and 7; Speedex 24; Softweld; Stainless AWS309; Stoody # 21, 110, and 134; Oxweld 25M; Airco # 926; 5P Wire
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Rodding
OPERATIONAL USES	Fabrication and repair and maintenance of equipment, rod welding
TRANSPORTATION AND HANDLING	Various size units received in storeroom and small amounts to welding locations
PROPERTIES	Welding rods are available in many sizes and compositions. Some use an inert gas (argon) shield to prevent the formation of oxides, and some are used with a liquid or paste flux. However the majority are coated with a flux material. These fluxes may contain sodium, calcium, potassium, aluminum, cadmium, fluorine, silicon, and nitrogen.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	Metal fumes and possibly some volatile fluoride and nitrogen compounds
EXPLANATION OF HAZARD	The liberation of metal fumes during welding which may cause metal fume fever is entirely dependent on the welding rod being used and the metal being welded. Metal surfaces coated with zinc or lead base paints probably present the greatest hazard. Long exposures to iron oxide which is liberated during the welding of steel may cause a bronchial cough. Exposure to fumes, such as fluorides, from the flux coatings may cause irritation of the respiratory tract. These hazards exist mainly when welding is carried out in areas with poor ventilation.
RECOMMENDED METHOD OF CONTROL	Adequate ventilation at all welding locations. If welding must be done in a confined area, some system of forced ventilation should be used.

MATERIAL	WHITE LEAD
TRADE OR OTHER NAME	Basic lead carbonate
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Mechanical, Electrical
OPERATIONAL USES	Its main use is as a pipe joint compound. Occasionally it may be used as a lubricant in machining operations, and it may be present as pigment in white paints.
TRANSPORTATION AND HANDLING	It is usually received in small cans mixed with oil. Occasionally, however, the dry powder is received, and it must be mixed with oil.
PROPERTIES	As a dry material it is a poisonous, white, amorphous powder with a specific gravity of 6.9. However, it is usually mixed with an oil, such as linseed, to the consistency of a thin paste. Decomposes and is soluble in acids, insoluble in water.
POSSIBILITY OF HAZARD	Yes
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Inhalation of any dust created during the handling of the dry powder can cause lead poisoning. Ingestion of any of the powder or oil mixture also could cause lead poisoning.
RECOMMENDED METHOD OF CONTROL	Careful handling of the dry powder to prevent dusting. Thorough washing of skin and clothes which have come in contact with the dry powder or the oil mixture.

MATERIAL	WHITING
TRADE OR OTHER NAME	Atomite
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Ingot
OPERATIONAL USES	Metal trough protection
TRANSPORTATION AND HANDLING	Paper bags
PROPERTIES	Whiting is a crude product obtained from chalk deposits. Approximate analysis of dry whiting should be 98% calcium carbonate, 1.5% silica and 0.50% iron, alumina and organic matter.
POSSIBILITY OF HAZARD	None
HAZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	None
RECOMMENDED METHOD OF CONTROL	None

MATERIAL	WOOD AND BLACKTOP SEALER
TRADE OR OTHER NAME	Squeeze-Cote
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Yard Service
OPERATIONAL USES	Sealer
TRANSPORTATION AND HANDLING	Metal cans
PROPERTIES	Flammable, resistant to oils, gasoline, and solvents
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	None
EXPLANATION OF HAZARD	Skin and eye irritant
RECOMMENDED METHOD OF CONTROL	Proper attire (long sleeves); protective glasses. Keep away from heat and open flame; adequate ventilation. Avoid breathing spray or mist. Wash eyes repeatedly with water and contact First Aid.

MATERIAL	ZINC
TRADE OR OTHER NAME	
DEPARTMENT IN WHICH USED, PRODUCED, OR HANDLED	Unloaded and stored by Shipping; Ingot
OPERATIONAL USES	Aluminum alloying element
TRANSPORTATION AND HANDLING	100-pound slabs, palletized
PROPERTIES	A heavy shiny, white metal. Readily oxidizes at temperatures above melting point. Melting point - 419 C. Boiling point - 918 C.
POSSIBILITY OF HAZARD	Yes
AZARDOUS REACTION PRODUCTS	Metal fumes
EXPLANATION OF HAZARD	Pure zinc represents no hazard. However if it is volatized, it can cause metal fume fever and respiratory problems. Zinc oxide in large concentrations will also cause fume fevers. Zinc as it is used in this plant probably presents no hazard, as exposure to metal fumes or oxide would be of very slight duration.
RECOMMENDED METHOD OF CONTROL	Personal hygiene; adequate ventilation