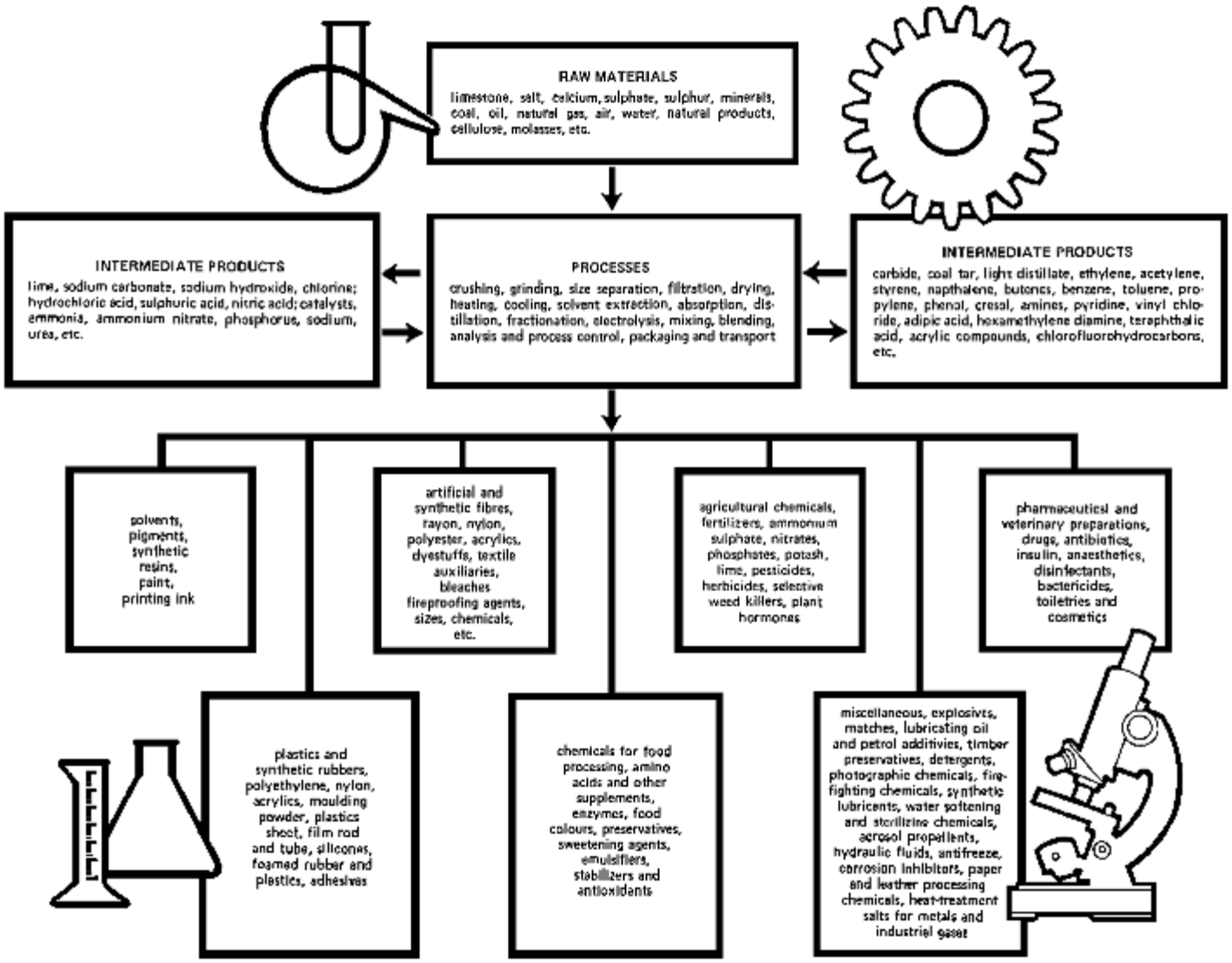
	NORTH CAROLINA DEPARTMENT OF LABOR	**No. 28-1**
	OSH DIVISION	**Date: 10/2009**
	OSHNC INDUSTRIAL DATA REPORT	**Pages: 5**

Industry: **Chemical**	Sub-Group: **Various sub-groups**
SIC: **2800 Major group**	NAICS: **211112, 311942, 325110, 325120, 325131, 325132, 325181, 325182, 325188, 325191, 325192, 325193, 325199, 325212, 325221, 325222, 325311, 325312, 325314, 325320, 325520, 325611, 325612, 325613, 325620, 325910, 325920, 325998 and 331311**

PROCESS DESCRIPTION: The chemical industry receives raw materials such as minerals, ores, coal, petroleum, air, water and natural products, such as vegetable oils, essential oils and molasses. By chemical processing, their atoms and molecules are rearranged or exchanged.

In all, nearly four million different chemical substances are now known to man, and many thousands of these have achieved some industrial importance.

PROCESS FLOW: Due to the complexity and enormity of the number of products involved, a detailed process flow would be impossible. The following is a condensed summary to demonstrate this complexity.



Hazards Analysis

Major Hazards			Other Hazards		
Location	**Item**	**Hazard**	**Location**	**Item**	**Hazard**
Garages	Toxic vapors	Carbon monoxide poisoning	Receiving and shipping	Toxic materials leaking from lines and fittings	Skin irritation, burns

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				Wet surfaces, ladders	Slips and falls
Dye houses	Tanks of vats of toxic materials	Asphyxiation, damage to body systems, burns	Warehouse	Loading platform (dockboards), insecure storage Ruptured containers	Falls, falling objects Burns
Paint booths	Toxic organic paint vapors	Fire, explosion, damage to body systems	Garages	Solvents used for cleaning	Burns, skin irritation, dermatitis
Drug room	Caustics, dyes	Skin burns, inhalation of caustics, carcinogens	Paint booths	Solvents used for cleaning Toxic vapors	Dermatitis Respiratory damage
Dye houses	Mechanical power transmission apparatus (no lockouts)	Amputations and mangled limbs from contact with gears, shafts, pulleys, belts, chains and sprockets	Dye houses	Lack of eye protection Wet floors Chemical contact Lack of respirators or inadequate ventilation Exposed steam lines	Eye injuries Slips and falls Dermatitis Bronchial and lung irritation Burns

Key OSHNC Standards

Reference	29 CFR 1910 — General Industry Standards
Subpart D	Walking and working surfaces
Subpart E	Exit Routes, Emergency Action Plans, and Fire Prevention Plans
Subpart I	Personal protective equipment
Subpart O	Machinery and Machine Guarding
Subpart Q	Welding, Cutting, and Brazing
1910.94	Ventilation

1910.95	Occupational noise exposure
1910.101	Compressed gases (general requirements)
1910.106	Flammable and combustible liquid handling and storage
1910.107	Spray finishing operations using flammable and combustible materials
1910.119	Process safety management
1910.122 – 1910.126	Dipping and Coating Operations
1910.147	Control of hazardous energy (lockout/tagout)
1910.151	Medical services and first aid (especially eye wash and emergency shower stations)
1910.169	Air receivers
1910.176	Handling materials – general requirements
1910.178	Powered industrial trucks
1910.1000	Air contaminants
1910.1200	Hazard Communication

Inspection Analysis

Since this data sheet encompasses the chemical industry as a whole, the inspection procedure will cover specific hazards in some instances and general hazards in other areas. Chemicals will be found in the majority of firms inspected, from small dry cleaning establishments to large scale chemical plants processing materials which may be further processed and used in other operations.

Where liquid chemicals are unloaded or stored at bulk stations from tank cars or tank trucks, the safety officer must check the electrical system, pumping and piping system, and ladders or platforms. The use of and availability of protective equipment must be checked. The operating procedures shall be observed to determine if the operator is aware of the hazards and the proper steps to take in an emergency.

In unloading, loading and storing chemicals in drums, boxes or other containers by means of hand or forklift trucks, operator procedure must be observed. Three questions to ask are: 1) Is the operator aware of the hazards involved with the materials being handled? 2) What safety measures, if any, are required if a container is ruptured during the handling? And 3) Is protective equipment available and in good condition?

In textile plants where chemicals are mixed in the drug room of the dye house, the inspector must inspect the electrical equipment, machine guarding, condition of floors, steam lines for insulation, ladders and walkways, floor holes and openings, protective equipment and means of flushing chemicals from the eyes and body. Operator procedures shall be observed to ascertain if proper precautions are being taken in handling the chemicals. The safety officer must note the chemical being used and record its trade or actual name, especially if the presence of a carcinogen is suspected.

In any industry where chemicals are being used, handled or produced, the trade name or actual name of the chemical must be obtained. A referral can then be made for an industrial hygienist to continue the inspection and ascertain if any hazard exists.

The inspector must thoroughly familiarize himself with the standards involving chemicals and flammable and combustible materials prior to making an inspection where these materials might be found.

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Other Pertinent Comments: Other sources of information available to the safety officer are NFPA Pamphlets Nos. 49, 325A and 325M. The NCDOL Library has *Encyclopedia of Chemical Technology 4th ed TP9.E685*. This explains how chemicals are used in industry today. There are 25,000 potentially toxic chemicals (677 with TLVs and approximately 600 PELs). Toxic effects often are not evident for 10-20 years.

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