PROGRAM DIRECTIVE

Program Directive **A-146**
Issued July 15, 1984
Revised June 26, 2000

SUBJECT: Chemical Storage: Reactive and Incompatible Materials

AFFECTED CODES/ DIRECTIVES: OAR 437-02-221(4)(d) (previously OAR 437-9-2-17 and 437-63-020(6))

PURPOSE: To provide guidance to OR-OSHA staff in the interpretation and application of OAR 437-02-221(4)(d).

BACKGROUND: During inspections and consultations OR-OSHA staff have encountered situations where chemicals identified in the chemical literature as reactive or incompatible with other chemicals, are stored in a potentially hazardous manner. These situations have been difficult to evaluate for compliance purposes due to the general scope of the rule. This has resulted in the need for definitions and guidelines in the application of OAR 437-02-221(4)(d).

OR-OSHA has adopted rules which will require chemical manufacturers and distributors to provide Material Safety Data Sheets (MSDS) to the downstream users of their hazardous chemicals. The rules require that the MSDS contain information regarding the potential for fire, explosion, and reactivity. The effective date for these rules is November 25, 1985. At that time, this directive will be reviewed to determine its applicability.

ACTION: OAR 437-02-221(4)(d) states: "Materials which could cause hazardous reactions shall be kept segregated in storage and marked with appropriate warning signs." When evaluating the storage of substances which may present potential hazards, the following definitions and guidelines should be applied:

A. Definitions.

1. Materials: Those substances identified in: 1) NFPA No. 491M "Manual of Hazardous Chemical Reactions;" 2) Title 49 Code of Federal Regulations, Transportation, Part 172.101, "Hazardous Materials Table;" and, 3) Title 46 of the Code of Federal Regulations, Shipping, Part 150, Figure 1, and Tables I and II.

   Note: The compliance officer should rely primarily on the references listed above; however, the Hand- book of Reactive Chemical Hazards, L. Bretherick and information from the Chemical Manufacturing Association may also be referenced.

2. Hazardous Reactions: An unplanned, uncontrolled reaction which could present a hazard to employees by explosion, fire, release of toxic materials, physical or chemical burns, creation of hazardous gases or toxic chemical by-products. This may be the result of the interaction of two or more chemicals or the interaction of a chemical and the environment (i.e., sodium metal and water or phosphorous and air.)

3. Segregation: A means of isolating highly reactive chemicals or a means of preventing the mixing of incompatible chemicals with one another (i.e., leakage, spillage, or breakage), by the use of adequate distance or physical barriers such as walls, partitions, or dikes.

4. Warning signs: Signs equivalent to DOT placarding or signs specified in NFPA 704 "Standard System for Identification of Fire Hazards of Materials" should be considered adequate to mark areas where reactive chemicals are stored. If the NFPA system is used a key should be posted and employees shall be familiar with and trained in the use of the key. Warning labels as permitted by 29 CFR 1910.145(a)(1) will be acceptable only if easily visible when entering the area.

5. Highly Reactive Chemicals: It is not possible to precisely define this term due to the many para- meters which must be considered; however, examples of highly reactive chemicals include sodium metal, potassium metal, anhydrides, hydrides, and strong oxidizers such as organic peroxides, perchlorates, and chromic acid.

B. Guidelines:

1. Information from the MSDS or labels should be evaluated for the reactivity of the material and proper storage practices. If a label or MSDS does not have adequate reactivity or compatibility information, the references listed under (3)(a) should be utilized for evaluation of storage practices.

2. Chemicals which are highly reactive or materials in containers greater than one gallon must be stored in separate storage cabinets or in isolated locations.

3. Containers holding one gallon or less may be stored in the same area or the same storage cabinet with materials with which they may react if one of the following conditions is met:

   a. Glass bottles of incompatible chemicals are separated by location or distance great enough to prevent bottles from being struck together, i.e., at least 12 inches apart or on different shelves; or

   b. Glass bottles are treated to make them break-resistant (resin treated), are contained in rubber buckets, or chemicals are contained in DOT approved plastic containers; or

   c. Liquid tight partitions separate the incompatible chemicals.

4. Highly reactive chemicals may be stored in ventilated laboratory type hoods if the hood is dedicated for storage. Incompatible materials shall not be stored in the same hood unless the guide- lines established in paragraphs (3)(b), (b)(C), and (b)(E) are adhered to.

5. Tanks and drums must be diked or segregated by partitions or distance great enough to prevent incompatible chemicals from mixing should spillage, leakage, or breakage occur.

6. Incompatible materials which are not reactive in the frozen

state may be stored together in an explosion proof freezer provided consideration is given to isolation or containment to prevent mixing if thawing were to occur.

7. Acids and cyanides should never be stored together.

C. Exemptions.

1. Solutions which are sufficiently dilute to prevent hazardous reactions are exempt from these requirements.

EFFECTIVE DATE: This directive is effective immediately and will remain in effect until cancelled or superseded.