

APPENDIX C: INHERENTLY SAFER PRACTICES

USING INHERENTLY SAFER PRACTICES ENABLES YOU TO REDUCE CHEMICAL ACCIDENTS

WHAT ARE INHERENTLY SAFER PRACTICES?

Inherently safer practices are an approach to the design of safer chemical plants, chemical processes, and storage facilities with clear potential benefits related to safety, health, and the environment. Following are strategies for achieving an inherently safer plant:

HAZARDOUS MATERIAL REDUCTION: Reduce the amount of regulated substance inventories by minimizing the quantity stored and the amount that is in a process at any given time. This can be accomplished by optimizing the quantity used or shipped, using on-site continuous feedstock production and the use of close-coupled reactors to eliminate the need for intermediate storage, and minimizing piping carrying regulated substances throughout the facility.

SUBSTITUTION: Replace regulated substances with less hazardous ones.

PROCESS DESIGN: Use less hazardous process or storage conditions (e.g., temperature, pressure, etc.) or a less hazardous form of a material to minimize potential release impact.

PROCESS AND STORAGE SITING: Design stationary sources that minimize the impact of a release of a regulated substance or energy (e.g., providing adequate distance between unloading, storage, and processing facilities to reduce the potential for one incident to initiate another incident in a nearby unit, storing and handling regulated substances as far as possible from the surrounding community, using secondary containment to minimize the impact of loss of primary containment of regulated substances, etc.).

SIMPLIFICATION: Design stationary sources that make operating errors less likely and that are forgiving of errors that are made.

HOW DO INHERENTLY SAFER PRACTICES DIFFER FROM CONVENTIONAL PROCEDURES?

The prevention of accidents or the ability to stop incidents have often relied wholly on control systems, interlocks, and alarms. Inherently safer practices rely on chemistry and physics, the quantity, properties, process conditions, siting and alternative chemicals- to prevent injuries, environmental damage, and property damage.

WHEN SHOULD INHERENTLY SAFER PRACTICES BE INTRODUCED?

At any time in its life cycle a process can be modified to be inherently safer. Carefully review your existing facility to identify potential hazards of the storage and handling of hazardous materials. Any change or modification to a unit is an opportunity to implement inherently safer design.

EXAMPLES IN CONTRA COSTA COUNTY

HAZARDOUS MATERIAL REDUCTION

Chevron Richmond Refinery reduced the amount of anhydrous ammonia stored at the refinery, when they went from two spheres to three horizontal storage vessels. In addition they moved the storage farther from the residential community.

SUBSTITUTION

Mt. View Sanitary District, a waste water treatment plant, eliminated the use of chlorine, ammonia and sulfur dioxide, and substituted ultra violet light for disinfecting the wastewater.

PROCESS AND STORAGE SITING

General Chemical Corporation relocated their production of electronic grade sulfuric acid from Bay Point to Richmond. This change in processing eliminated the handling of oleum at the Bay Point facility and the shipping of over 1000 trucks of oleum per year from Richmond to Bay Point, and reduced the amount of oleum stored at the Richmond facility by 95%.

PROCESS DESIGN

Dow Chemical Co., who couldn't change from chlorine to a less hazardous material, has reduced potential impacts by using gaseous chlorine instead of liquid chlorine.

FOR FURTHER INFORMATION...

Engineers with the California Accidental Release Prevention Team encourage you to call them for more information about inherently safer principles. They can be reached Monday through Friday, 8:00 a.m. to 5:00 p.m. at (925) 646-2286.

In addition, The Center for Chemical Process Safety has published several excellent books on inherently safer practices. Some are listed below. You can contact the Center to place an order at 1-800-242-4363, or through their web page at www.aiche.org.

Inherently Safer Chemical Processes, A Life Cycle Approach, 1996, ISBN 0-8169-0703-X *Guidelines*

Guidelines for Engineering Design for Process Safety, 1993, ISBN 0-8169-0565-7

Guidelines for Safe Storage and Handling of High Toxic Hazard Materials, 1988, ISBN 0-8169-0400-6