APPENDIX E—POLLUTION PREVENTION INFORMATION

Introduction

The TCEQ encourages businesses to implement policies that are beneficial while complying with state and federal rules. This appendix contains Best Management Practices (BMPs) devised by the TCEQ's Pollution Prevention and Industry Assistance Section in order to help businesses improve performance and reduce air pollution from various sources. The purpose of these BMPs is to encourage businesses to move above and beyond regulatory requirements.

Marine Terminals

Steps that can improve marine terminals:

- Institute a hose–connector management system to ensure consistent transfer of liquid that results in fewer leaks. Responsibilities are defined by a responsible care management system (RCMS) and procedures.
- Improve corporate policy on docked barges and make sure they meet terminal emission and operating standards. Ensure vessel operators conform to maintenance standards for terminal relief valves and terminal "closed dome" loading and unloading procedures.
- Improve VOC containment where vapor balance is not completely effective when loading barges, tankers, railcars, and trucks. Use a VOC detector to ensure tight connections.
- Use combined heat and power (CHP) technology for energy recovery rather than using a flare or vapor incineration
- Supply the electricity in a CHP configuration, with the exhaust gases providing waste heat for steam or refrigeration.
- Use CHP chillers to deliver refrigeration for tanks requiring condensers to reduce product loss. CHP technology can supply electricity, steam, and refrigeration from any fuel source with 80–90 percent efficiencies.
- Use pipe purge fluids as solvents, or as fuel for CHP, rather than sending them off-site for disposal.

Storage Tanks

Breathing Losses

Breathing losses are the escape of vapor from a tank vapor space that has expanded due to daily variation in temperature and pressure. Reduce breathing losses by reducing vapor space in the tank. In fixed-roof tanks, breathing losses can account for 10 to 95 percent of total annual emissions. Much of the breathing losses result from thermal expansion of the VOC-saturated vapor in the tank head space. To prevent these losses, reduce the tank head space by operating at a full level and constant rate (fill rate = withdrawal rate). Keep the tank at a more constant temperature by painting it white to reflect more sunlight and by insulating it to reduce heat transfer between the tank liquids and the surrounding air. Supplemental cooling or heating from a CHP system can be used to keep the tank at constant temperature. Raise the vent temperature and consider raising the pressure at which the conservation vent opens to reduce emissions caused by thermal expansion of the tank vapor space. However, do not exceed the tank design pressure. Tanks that operate conservation vents at 2.5 psig or higher will often have low breathing losses, or none.

Working Losses

Working losses result from filling and emptying tanks and can be reduced significantly by implementing BMPs. Install vapor-return lines to send the displaced vapor from the tank being filled back to the liquid source (tank truck, railcar, barge). Equalize vapor space between tanks in a tank farm using a common vent header. This would apply to tanks containing the same solvent or where cross-contamination is acceptable. The displaced vapor space of a tank being filled will fill the resulting vapor space of a tank being emptied. Equalize the fill rate and withdrawal rate to eliminate working losses.

Reducing the number of tank turnovers per year will reduce working loss emissions. Vapors displaced during filling and thermal outbreathing can be contained by installing a vapor holder (giving the tank a variable vapor space). The vapors from the holder can then be returned to the liquid storage tank during emptying and inbreathing.

Floating-Roof Landing Losses

In a floating-roof tank, the roof floats on the surface of the liquid inside the tank to reduce evaporative losses during normal operation. However, when the tank is drained to a level where its roof lands on its deck legs or other support mechanism, a vacuum breaker opens to prevent collapse of the roof and a vapor space underneath the roof is created. Liquid

remaining in the bottom of the tank continuously emits vapors to replace those expelled by breathing (in the case of internal floating-roof tanks) or wind action (in the case of external floating-roof tanks). These emissions, referred to as *standing-idle losses*, occur daily as long as the tank roof remains landed. Significant air emissions and loss of product can occur during landing of floating roofs. Floating-roof tanks should be operated in a manner that minimizes the amount and length of time of roof landings.

Other Tank Options

Other options to consider:

- using insulating paint on the roofs of floating-roof tanks
- installing vapor-recovery systems
- using tank emissions for energy recovery in a CHP system

Cooling Towers

Ways to improve cooling tower performance:

- Replace old, leaking heat exchangers.
- Install backup heat exchangers to avoid plant shutdowns.
- Monitor cooling tower exhausts to provide real time notification of heat exchanger leaks.
- Replace cooling towers with heat recovery systems. This will reduce water evaporation rates, nuisance fog, and mist discharges to plant roads and vehicles.

Glycol Units

Things to consider when dealing with glycol units:

- Replace gas pneumatics with air system instruments.
- Install flash tank separators on glycol dehydrators.
- Implement directed inspection and maintenance at gas plants and booster stations.
- Join the EPA's Natural Gas STAR Program.
- Install vapor recovery units on natural gas liquid transfer lines from storage tanks to rail and truck transportation vehicles.

General BMPs for VOC Emissions Control

Tips on controlling miscellaneous VOC sources:

- Process waste products for resource recovery, or as salable by-products. Recover VOCs via nondestructive methods (e.g., membrane recovery, biofilter, or cryogenic recovery) at or near the point of generation.
- Implement product substitution, product conservation, and changes in product composition. Use alternative products that would do the same job but with less harmful environmental impact (e.g., low-VOC or water-based products).
- Modify process chemistry or equipment design, improve operational procedures, increased automation, and improve process controls.
- Recover potential emissions for use as feed to the original process or in another process within the facility.
- Practice good housekeeping, implement an effective preventive maintenance or leak detection and repair program (or both), institute training and awareness programs, have effective supervision, encourage employee participation, review production scheduling and planning, and implement accounting and allocation practices that reflect the true cost of wasted products.
- Recycle wash solvents elsewhere in the process, use less volatile cleaning agents, and design equipment and procedures to minimize the need for cleaning.
- Employ parts washers that use steam instead of conventional ones that use solvents.
- Prevent the losses of volatile materials to wastewater streams where they may reappear as VOCs and evaporate.
- Keep paint and paint thinner away from high-traffic areas to avoid spills. Recycle paint, paint thinner, and solvents.
- Train employees on proper painting and spraying techniques, and use effective spray equipment that delivers more paint to the target and less overspray (high volume, low pressure spray guns).
- Replace existing atmospheric blowdown stacks with vapor recovery systems for energy recovery.
- Estimate the cost to install a marine vapor loss control system. Consider both vapor recovery and a CHP configuration.
- Reduce refinery odor from sour water.
- Replace solvent-based paints with low-VOC or water-based paints.
- Improve material handling, storage, and management practices. Such improvements may result in substantial reductions in spills, fugitive emissions, and leaks.

- Mix paints and solvents in designated areas, preferably indoors or under a shed.
- Have absorbent and other cleanup items readily available for immediate cleanup of spills.
- Keep VOC saturated pads, rags, and gloves in closed and vapor tight containers.
- Do not transfer or convert pollution from one medium to another.
- Modify the underground drainage system and process water treatment system to improve water treatment and reduce air emissions.
- Burn hydrocarbons for energy recovery in a CHP system.
- Enclose, cover, or contain painting and related activities to the maximum extent practical.

Sandblasting

Enclose, cover, or contain blasting and sanding areas completely. Use shrouded or vacuum-assisted tools that can prevent abrasives, dust, and paint chips from leaving the area being worked on (e.g., dustless sanders and vacuum blasting robots).

Boilers and Process Heaters

Ways to improve boiler and heater operations:

- Measure the gas temperature of stacks. If it is too high, install heat-recovery equipment such as an economizer or absorption chiller to chill water.
- Measure flue gas hydrocarbon concentration to ensure complete combustion.
- Clean the water and fire sides of the boiler to enhance heat transfer.
- Reduce excess air. It can lower boiler temperature.
- Install automatic combustion controls.
- Implement an environmental management system (EMS) that calls for continuous improvement of energy efficiency. Involve every employee in source reduction and minimizing waste.
- Improve water quality in the boiler tubes to decrease blowdowns.
- Harvest rainwater and use it in your boiler. Rainwater contains very few impurities and needs less demineralization and dealkalization.
- Reduce radiation and convection losses (*shell losses*) by improving insulation. Periodically measure shell temperatures.

- Steam leaks are very expensive, so repair steam leaks as soon as possible.
- Recover condensate and feed it back to the boiler.

If you have questions about these best management practices, or for additional technical assistance, please contact the TCEQ's Pollution Prevention and Industry Assistance Section at:

- 512-239-3100 (Austin)
- 713-767-3763 or 713-767-3693 (Houston)
- 817-588-5827 (Dallas)