GNC JUN 22 1978 JCW LRS ETM FP DW RAS JCL GFF DLM

Does your plant have an SPCC plan? Federal law now requires a written program of countermeasures for

Controlling Inplant Oil Spills

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THE Clean Water Act—Public Law 92-500—established a permit program and deadlines to control the quality of wastewater discharged into the nation's waters. The permit requirements have been well publicized and have been the subject of numerous articles in this and other publications. Less well publicized is the act's mandate that regulations be issued to prevent water pollution from oil spills. The regulations propose stiff fines and penalties (up to $5 million) for each illegal spill or discharge.

Spill prevention control and countermeasure (SPCC) plans must be prepared by any plant that stores more than 1320 gallons of oily material above ground or 42,000 gallons underground. Oily material is defined by federal regulation 40 CFR part 110 as "oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil *mixed with* wastes *other than* dredged spoil." According to the Environmental Protection Agency (EPA), more than 300 chemicals are covered in this definition. Essentially any oil derivative whose formula cannot be found in a standard chemical reference book is included. For example, gasoline, kerosene, and naphtha do not have a single chemical formula showing their composition, so they are subject to SPCC requirements. Benzene and toluene, on the other hand, have specific formulas, so they are not included.

SPCC Plan Requirements—The SPCC plan must be prepared by the owner or operator of the facility and must be certified by a registered professional engineer. The EPA regulations contain guidance on what should be included in a plan and the form in which the information should be presented, and suggest engineering practices that have been successful in the past. The guidelines are designed to provide flexibility so that even older facilities can prevent spills at a reasonable cost. Plans must try to predict where spills might occur and explain what actions have been taken to prevent or retain them.

The SPCC plan does not have to be submitted to EPA unless a spill occurs. But the plan must be available for review by EPA any time the agency inspects the facility. If a plant does not have an SPCC plan, prompt action may prevent the facility from being fined by EPA. Deadline was July 10, 1976.

Spill-Containment Techniques—The movement of oily material through a typical plant is shown in Fig. 1. Since most bulk deliveries by tank car or truck involve a minimum of 2000 gallons, proper handling of the material at unloading sites is important. The nature of fluid-transfer operations (connecting and disconnecting hose and pipe couplings, etc.) is such that a few gallons are inevitably spilled. If not immediately contained or cleaned up, the material will become part of the next stormwater run-off. Ponds, sumps, traps, and curbs installed at unloading, transfer, and storage points can contain spilled material.

Subsurface reservoirs are ideal

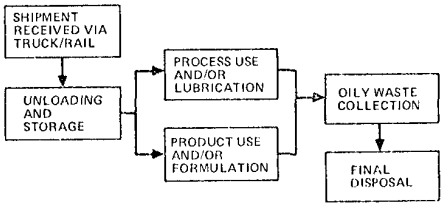
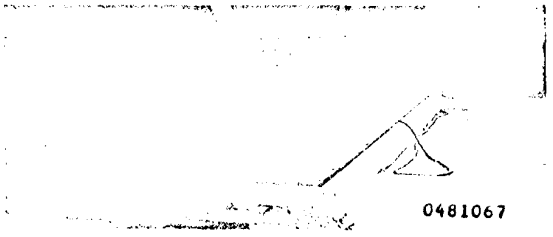


Fig. 1. Flow of oily materials through plant is typically divided between production and lubrication processes.

Fig. 2. Subsurface reservoirs are ideal for collecting spills from tank car or truck unloading operations.



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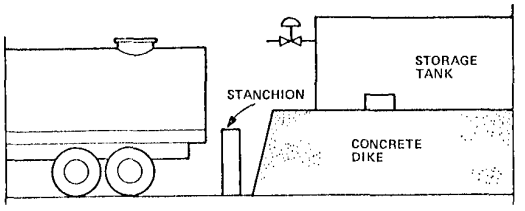

Fig. 3. Dikes around storage tanks should be protected from vehicle damage by stanchions.

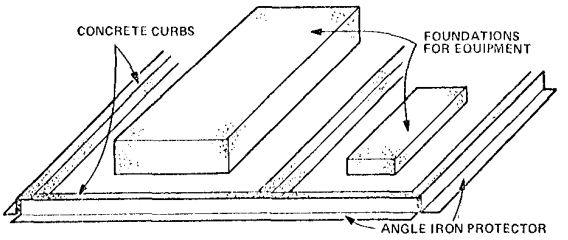

Fig. 4. Angle-iron sections fastened to exterior of concrete curbing prevent damage to curbing if hit by trucks.

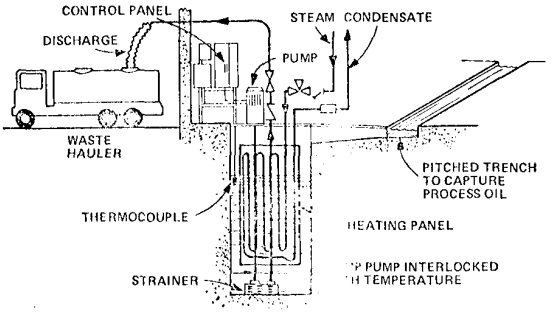

Fig. 5. Sump equipped with heating coils and temperature controls simplifies transfer of viscous waste.

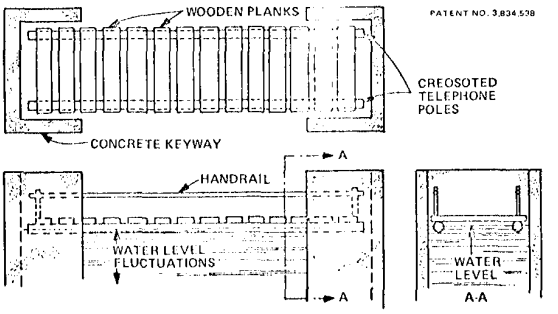

Fig. 6. Floating, wooden-plank walkway installed across narrow, slow-moving stream doubles as boom to trap oily wastes.

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for tank car or truck unloading sites, Fig. 2. The reservoir can be of any design, but shallow pits measuring at least the length of one car are preferred. Sump pumps, oil skimmers, and filters should also be considered for use in the pit. If the area is outdoors, rainwater can easily collect in the pit, making periodic emptying necessary. A shallow pit simplifies the cleaning task. Pits should be lined with rubber or some other durable material if corrosive liquids are handled. Collected product from a major spill can be pumped to a storage tank, cleaned (if necessary), and transferred to its intended point of use.

Spills from storage tanks at or above ground level can be easily contained by concrete dikes. However, the dikes should be protected from vehicle damage by stanchions installed between the dike and vehicle at the unloading point, Fig. 3. As a general rule, if stored products are nonflammable, a dike surrounding several tanks in an area should be installed that will retain about 100 percent of the largest tank's volume. If the product is flammable, dike capacity should be 110 percent.

Isolated storage tanks and some manufacturing areas will also occasionally experience oil spills. In such cases, the plant engineer must determine if localized dikes are warranted and feasible. Often, it is easier to permit spills to follow normal drainage routes, if they are channeled into settling ponds or oil-water separation equipment. Oil and water accumulations too viscous to flow—but not viscous enough to be shoveled—should be treated with sorbent materials. Accumulations can be collected and hauled away at required intervals.

Leaky lubrication and hydraulic lines are always troublesome. Concrete curbing can contain such leaks. Curbing is almost always necessary if there are open floor drains in the area. Unfortunately, concrete curbing is often difficult to keep intact. For example, it can be easily damaged when hit by lift trucks or other inplant vehicles. A recommended method of preventing curbing damage is to reinforce the curbing's vulnerable outer surfaces with sections of angle iron, Fig. 4.

Curbing may be impractical if vehicles have to get extremely close to equipment. In such cases, a trench (moat) can be dug around the equipment and pitched to drain into a collection sump. If the waste is viscous, the sump can be equipped with heating coils and temperature controls to expedite emptying, Fig. 5. Oil-skimming devices may also be used to remove collected oil continuously and keep sump volume to a minimum.

PCB Spills—Areas housing electrical transmission equipment are often overlooked when spill-control programs are instituted. Transformers using polychlorinated biphenyls (PCB's) are especially critical. Although U.S. production of PCB's was phased out in 1977, many plants are still using PCB's and the threat of toxicity will exist for many years.

PCB spills can be very expensive to clean up. In a recent case, a 200 gallon spill cost $240,000. PCB-laden soil must be removed, drummed, and encased in concrete before being disposed of in an approved landfill. PCB-laden soil can be decontaminated by incineration, but facilities for such processing are extremely limited.

Complications can be minimized by mounting electrical equipment using PCB's and other oily materials on concrete pads surrounded by curbing. Any leaks or spills from damaged or ruptured equipment will be contained. It must be remembered that disposal of any hazardous waste is the responsibility of the generating source—final responsibility cannot be easily transferred to a contract waste hauler. Regulations emphasizing this responsibility are now being prepared by the EPA. Issuance of the new regulations is required by the Solid Waste Act, officially known as Public Law 94-580, the Resource Conservation and Recovery Act of 1976.

Stream Control—*Even the most* sophisticated inplant oil-spill control program can fail. Many plants discharge stormwater run-off and treated effluent into small, adjacent streams. Cleaning up a floating or partially submerged oil spill starts with containing it. The containment needed depends on the type of waterway, size of the spill, weather conditions, and techniques to be used to remove the material.

A dam of baled straw can absorb oil and trap or filter floating materials in stationary, shallow water. In small, fast-moving streams, wire fencing can be packed with straw and placed in the stream at an angle. A series of barriers can be positioned downstream to catch any oil that escapes.

Small booms with a weighted apron or shield, or earthen dikes, may be used in slow-moving streams. One novel approach involves using a floating, wooden plank walkway of creosoted telephone poles. The walkway is loosely anchored by concrete keyways on both sides of the stream, Fig. 6. The walkway, which acts as a boom, falls and rises with the water level. Oil and other floating waste are trapped and forced to the side of the stream. Accumulations are removed periodically.

Spill Awareness—The attitude of people toward oil spills may be even more important than the engineering practices used to prevent and control spills. Good observation and prompt action can make the difference between a minor incident and a catastrophe. Often, a spill can be stopped by simply closing a valve or stopping a pump.

A plant's SPCC plan should include the names of individuals who must be contacted if a spill occurs. The responsibilities and duties of each person should be clearly defined. However, for a spill-control program to be truly effective, all plant personnel must participate in it. Each employee should be aware of the importance of spills and know how to report them.

Spill awareness must be continuing. The need for spill detection and prevention should be explained to every new employee and re-emphasized frequently to all employees. Constant alertness on the part of all employees will greatly reduce the chances of spills because of human errors and may protect lives and property. If properly conducted, spill prevention and control programs are definitely cost effective.

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