About The Pocket Guide

The Pollution Prevention/Best Management Practices Pocket Guide for the New Mexico Oil and Gas Industry is a quick lookup reference for common oil and gas pollution prevention and waste management practices. The Guide, a supplement to the two-volume Pollution Prevention/ Best Management Practices Manual, will help identify ways to prevent pollution and manage wastes effectively in oil and gas field operations. While the manual promotes the development of a pollution prevention plan through an evaluation of waste-generating processes, the pocket guide stresses the quick but effective solution that would not require a plan to implement.

Appreciation is extended to the U.S. Environmental Protection Agency, the Railroad Commission of Texas, the Interstate Oil and Gas Compact Commission, and Texaco Exploration and Production for researching and developing information for this pocket guide. Also, representatives of the New Mexico oil and gas industry participated in reviewing this pocket guide and provided valuable suggestions and comments.

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WASTE		ALTERNATIVES
Absorbent materials	*Source Reduction:*	♦ Prevent spills and leaks by practicing preventive maintenance and good housekeeping.
	Recycling:	♦ Recover and contain used absorbent pads for recycling.
		♦ Return used absorbent pads to vendor for recycling.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific material.	
Acid, spent	*Source Reduction:*	♦ Micro-meter solutions to minimize unused acid (continuous mix versus batch mix).
	Recycling:	♦ Use to neutralize excess caustics (see 40 CFR 264.1 (g)(6)).
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific acid.	
Acid, unused	*Source Reduction:*	♦ Purchase only quantity needed.
	Recycling:	♦ Return unused portion to vendor.
		♦ Register unused portion with a chemical exchange program.

WASTE		ALTERNATIVES
Acid, unused (continued)	*Disposal:*	♦ Hazardous: Send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility. ♦ Nonhazardous: Obtain OCD approval and send to an OCD-approved surface waste management facility.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific acid.	
Aerosol can	*Source Reduction:*	♦ Use non-aerosol containers whenever possible. ♦ Use all contents; do not dispose of until empty.
	Recycling:	♦ Recycle metal cans at appropriate recycling facility.
	Disposal:	♦ Send empty containers to state-permitted municipal solid waste landfill.
	Special considerations: Do not puncture.	
Air emissions Includes: Nitrogen oxides (NO_x), sulfur oxides (SO_x), hydrocarbons, BTEX, carbon monoxide, particulates, halons, mercury, chlorofluorocarbons, refrigerants, VOCs, and fugitive emissions.	*Source Reduction:*	♦ Design and operate to minimize air emissions. Use regular preventative maintenance and monitoring procedures. ♦ Install and maintain catalytic converters. ♦ Use low NOx burners. ♦ Convert engines to lean-burn. Maintain and run all engines to be the most fuel efficient.

WASTE		ALTERNATIVES
Air emissions (continued)	*Source Reduction:*	♦ Install pre-combustion chambers on engines.Install electronic ignition systems on engines. ♦ Use natural gas engines instead of engines fueled by diesel or other fuels. ♦ Tighten connections and replace packing to minimize leaks and fugitive emissions. ♦ Reduce emissions of unburned hydrocarbons in new facility design (e.g., route emissions to flare, route dehydrator still emissions to first stage compression, use electric drivers for compressors, use shorter piping runs with fewer flanges, use welded rather than screwed or bolted fittings). ♦ Reduce horsepower demands to reduce emissions. ♦ Maintain tank thief hatch seals. ♦ Route dehydrator still emissions to reboiler, firebox, first stage compression, or flare. ♦ Lower glycol circulation rate - avoid over dehydrating (vapor recovery). ♦ Eliminate use of sparge or stripping gas in dehydrators.

WASTE		ALTERNATIVES
Air emissions (continued)		♦ Buy solvents and liquid chemical in bulk and keep containers covered. ♦ Buy less volatile solvents and liquid chemicals. ♦ Use dust control techniques at facilities. ♦ Eliminate the use of halon fire extinguishing materials. ♦ Revise test procedures so halon is not released.
	Recycling:	♦ Use waste heat recovery opportunities where possible. ♦ Use vented or flared gas as fuel. ♦ Collect vented or flared gas, compress, and sell as product.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Amines, used	*Source Reduction:*	♦ Use an amine reclaimer in the system to allow reuse of amine and minimization of the volume of waste amine generated. ♦ Use an amine filter to extend life of solution and maintain efficiency. ♦ Operate and maintain at proper temperatures to avoid hydrocarbon contamination. ♦ Maintain a testing program to avoid problems (e.g., corrosion).

WASTE	ALTERNATIVES	
Amines, used (continued)	*Recycling:*	♦ Return to vendor. ♦ Send to recycler.
	Special considerations: Rich amine contains hydrogen sulfide. Avoid skin contact, use PPE and consult MSDS for guidance.	
Amine sludge, precipitated	*Source Reduction:*	♦ Maintain appropriate pH to reduce the contribution of heavy metals to the sludge as a result of corrosion. ♦ Substitute potassium hydroxide for sodium hydroxide for pH control to reduce sodium content of sludge.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific material.	
Antifreeze	*Source Reduction:*	♦ Use a less toxic substitute for ethylene glycol (e.g., propylene glycol).
	Recycling:	♦ Regenerate on site by filtration (if not thermally degraded). ♦ Send to a recycler.
	Disposal:	♦ Hazardous: Send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility. ♦ Nonhazardous: Obtain OCD approval and send to an OCD-approved surface waste management facility.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance	

WASTE	ALTERNATIVES	
Asbestos, asbestos-containing material	*Source Reduction:*	♦ Purchase asbestos-free products and equipment. ♦ Maintain asbestos-containing materials to keep friable (brittle) asbestos from becoming exposed (e.g., encapsulation). Mark materials that contain asbestos according to state special waste regulations.
	Disposal:	♦ Asbestos must be removed by licensed operators and disposed of in state-permitted landfill approved for asbestos disposal.
	Special considerations: Asbestos must be handled by licensed operators	
Batteries, lead acid	*Source Reduction:*	♦ Use other sources of electrical current whenever possible.
	Recycling:	♦ Return to vendor. When batteries are permanently taken out of service, send for recycling as soon as possible.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical. Temporarily store used batteries in a leak-proof container in a dry area.	

WASTE		ALTERNATIVES
Batteries Includes nickel-cadmium, lithium alkali, and lead-acid	*Source Reduction:*	♦ Use other sources of electrical current whenever possible. ♦ Purchase long-life batteries to decrease the number needed. ♦ Use rechargeable batteries.
	Recycling:	♦ Return to vendor or manufacturer. ♦ When batteries are permanently taken out of service, send to recycler as soon as possible.
	Treatment:	♦ Remove electrolyte.
	Disposal:	♦ Hazardous: Send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility. ♦ Nonhazardous: Send to a state-permitted municipal waste landfill.
	Special consideration: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical. Temporarily store used batteries in a leak-proof container in a dry area.	

WASTE		ALTERNATIVES
Biocides, herbicides, insecticides, and all other pesticides (used for site or facility maintenance)	*Source Reduction:*	♦ Use a licensed commercial pesticide application service. ♦ Properly store and label containers to prevent degradation and contamination. ♦ Use all contents/material and then triple rinse the container. Use rinsate as originally intended for the material. ♦ Practice good inventory control. Use excess at another facility.
	Recycling:	♦ Return unused chemicals to vendor for recycling. ♦ Send unusable chemicals to a recycler.
	Disposal:	♦ Hazardous: Send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility. ♦ Nonhazardous: Obtain OCD approval and send to an OCD-approved surface waste management facility.
	Special considerations: Use all pesticides in accordance with label instructions. Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

WASTE	ALTERNATIVES
Blasting sand/media	♦ Use coatings that do not require sandblasting. ♦ Use alternative methods to reduce unnecessary sandblasting (e.g., use a paint that does not require sandblast preparation, cathodic protection from corrosion rather than paint, use tanks constructed of materials that do not need to be painted). ♦ Brush-blast and paint instead of blasting to base metal. ♦ Reduce blasting/painting frequency. ♦ Substitute suitable wastes (e.g., copper slag) for virgin blast media. ♦ Use dry ice pellets or recyclable media for some applications. ♦ Use lead-free paint or paints with lower levels of other metals. ♦ Buy in bulk hoppers to minimize sacks and pallets. ♦ Insure that purchased sandblast grit does not contain metal or other contaminants. ♦ Do not allow contractors to conduct unnecessary sandblasting and painting of their equipment on site.

WASTE		ALTERNATIVES
Blasting sand/media (continued)	*Recycling:*	♦ If permissible, send to a cement kiln as a substitute for feedstock. ♦ Separate from blasted paint waste and reuse blast media. ♦ Use as aggregate in road mix, if permissible. ♦ If uncontaminated and permissible, use on site as a substitute for virgin fill material.
	Disposal:	♦ Hazardous: send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility. ♦ Nonhazardous: send to a state-permitted municipal waste landfill.
	Special considerations: Test sandblast medium for TCLP heavy metals. If RCRA hazardous waste, it is regulated by DOT. Use appropriate PPE. Avoid eye and skin contact.	

WASTE	ALTERNATIVES	
Blowdown, cooling tower	*Source Reduction:*	♦ Operate cooling towers efficiently to minimize the generation of blowdown. ♦ Cascade water use. ♦ Substitute more acceptable biocides such as isothiazoline and amines for biocides such as pentachlorophenols and formaldehyde releasing compounds. ♦ Substitute corrosion inhibitors such as sulfite and organic phosphates for inhibitors that contain chromates.
	Recycling:	♦ Recycle free liquids back into production stream.
	Special considerations: May contain hydrogen sulfide and/or other harmful chemicals. Use appropriate PPE. Consult MSDS for additional guidance for specific chemicals.	
Blow-out preventer test fluids	*Source Reduction:*	♦ Collect leakage to avoid soil contamination.
	Recycling:	♦ Return test fluids to system if uncontaminated.
	Special considerations: Use appropriate PPE. Consult MSDS for additional guidance for specific chemicals.	

WASTE		ALTERNATIVES
Catalyst, spent	*Source Reduction:*	♦ Substitute a less hazardous catalyst.
		♦ Use catalyst completely before removing from system.
		♦ Operate the system to prevent contamination.
	Recycling:	♦ Regenerate spent catalyst.
		♦ Certain types of catalysts can be sent to pulp and paper mills for reuse.
		♦ Send to recycler for metals recovery.
		♦ If permissible, send to cement kiln as a substitute feedstock.
		♦ If uncontaminated and permissible, use on site as fill material.
Caustics, used	*Source Reduction:*	♦ For gas treatment, consider alternate recyclable products.
		♦ Plan drilling operation to minimize volume of fluid, thereby reducing caustic requirements.
		♦ Use inventory control; e.g., a surplus chemicals exchange network that offers unused chemicals to other company facilities in lieu of disposal.
	Recycling:	♦ Return unused caustic to vendor.
		♦ Reuse to neutralize excess acids (see 40 CFR 264.1 (g)(6)).

WASTE		ALTERNATIVES
Caustics, used (continued)	*Disposal:*	♦ Exempt: Send to an approved, OCD-approved surface waste management facility. ♦ Non-exempt, Hazardous: Send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility.
	Special considerations: May be reactive or corrosive. Use appropriate PPE. Consult MSDS for additional guidance for specific material.	
Cement returns	*Source Reduction:*	♦ Calculate cement needs carefully to excess cement mixture. ♦ Use cement in other projects, such as erosion prevention. ♦ Require vendors to use nonhazardous cement additives.
	Recycling:	♦ Return unused dry cement to vendor. ♦ Solid cement may be reclaimed if not contaminated.
	Disposal:	♦ Send to state-permitted landfill (Class A, B, or C) for disposal.
	Special considerations: Use appropriate PPE. Avoid skin contact and inhalation of dust. Consult MSDS for additional guidance.	

WASTE		ALTERNATIVES
Chemicals, surplus or unusable	*Source Reduction:*	♦ Use inventory control; e.g., a surplus chemicals exchange network that offers unused chemicals to other company facilities in lieu of recycling, treatment or disposal. ♦ Label and store chemicals properly (e.g., protect containers from weather and keep covered). ♦ Purchase chemicals in bulk with supplier retaining ownership of containers. ♦ Calculate chemical needs carefully to avoid surplus. ♦ Use the entire product. Transfer for use at other sites or find alternate uses. ♦ Use nonhazardous products whenever possible. ♦ Minimize the use and variety of similar-use chemicals when one chemical is suitable.
	Recycling:	♦ Return surplus to vendor. ♦ Donate surplus laboratory chemicals to a high school or college. ♦ Send to a recycler.

WASTE		ALTERNATIVES
Chemicals, surplus or unusable (continued)	*Disposal:*	♦ Hazardous: Send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility. ♦ Nonhazardous: Obtain OCD approval and send to an OCD-approved surface waste facility or send to a state-permitted municipal landfill.
	Special considerations: Consult MSDS for guidance for specific chemical. Keep labels on all containers. Do not dispose of chemicals in mud or workover pits.	
Cleaning wastes	*Source Reduction:*	♦ Minimize drips, leaks and spills by practicing good housekeeping. ♦ Wipe with recyclable rags rather than washing with cleanser or chemical.
	Recycling:	♦ Regenerate cleansers or cleaning solvents for reuse. ♦ Send to a recycler.
	Disposal:	♦ Hazardous: Send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility. ♦ Nonhazardous: Obtain OCD approval and send to an OCD-approved surface waste management facility.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

WASTE		ALTERNATIVES
Compressor oil, filters, and blowdown waste	*Source Reduction:*	♦ Use stainless steel, reusable filters. ♦ Isolate drained fluids in resealable containers. (See Oil, Lube.) ♦ When handling filters, take precautions to prevent oil spilling. ♦ Change oil and filters only when necessary. Lab testing of oil and differential pressure gauge will indicate the need for replacement. (Note: Many oil vendors provide free testing service.) ♦ Evaluate applicability of filterless centrifugal oil cleaning.
	Recycling:	♦ Before recycling spent filters, drain all free liquids from the cartridge or filter media into a container. Recycle back into production stream. ♦ Send used oil to a recycling facility. ♦ Introduce used oil into production stream.
	Disposal:	♦ Hazardous: Send to an approved, state-permitted RCRA hazardous waste treatment and disposal facility. ♦ Nonhazardous: Obtain OCD approval and send to an OCD-approved surface waste management facility.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

WASTE	ALTERNATIVES	
Completion, workover, and well treatment fluids	*Source Reduction:*	♦ Plan the job carefully to reduce excess fluids. ♦ Use less toxic substitutes for chemicals and products. ♦ Use improved acidizing technology and inhibition technology to decrease the frequency of well workovers and formation treatments. ♦ Use leftover, excess fluids on other jobs.
	Recycling:	♦ Return all unused treatment fluids to the supplier.
	Disposal:	♦ Obtain OCD approval and send to an OCD-approved surface waste management facility or send to a state-permitted municipal landfill.
	Special considerations: Use appropriate PPE. Consult MSDS for additional guidance for specific chemicals.	
Condensate	*Source Reduction:*	♦ Prevent releases by complete regular inspection and maintenance of all surface lines and facilities.
	Recycling:	♦ Condensate should be recycled back into production stream.
	Disposal:	♦ Obtain OCD approval and send to an OCD-approved surface waste management facility or send to a state-permitted municipal landfill.
	Special considerations: Highly flammable. Use appropriate PPE. Respiratory protection may be required. Consult MSDS for additional guidance.	

WASTE		ALTERNATIVES
Construction/ demolition debris Includes: Spoil, vegetation, wood, scrap metal	*Source Reduction:*	♦ Plan site to minimize size. ♦ Minimize demolition requirements. ♦ Consider portable pads or skid-mounted equipment. ♦ Use high-density polyethylene liners rather than concrete.
	Recycling:	♦ Crush uncontaminated concrete for use as aggregate. ♦ Compost vegetation and use as soil supplement. Chip uncontaminated wood to use as mulch. ♦ Sell or offer for reuse. ♦ Send scrap metals to a recycler.
Debris and soil, contaminated by used chemicals	*Source Reduction:*	♦ Use proper containers, keep lids on containers and store properly to prevent overflow or spillage. ♦ Install containment to allow for better recovery of spills.
	Special considerations: Consult MSDS for guidance for each known chemical.	
Debris, crude oil soaked (if contaminated within production system, i.e., before point of sale)	*Source Reduction:*	♦ Develop operational procedures that prevent contamination with crude oil by keeping areas clear of debris. ♦ Use leak-proof storage containers.
	Treatment:	♦ Segregate oily wastes to allow them to weather before putting them in a trash bin.

WASTE		ALTERNATIVES
Debris, lube oil contaminated	*Source Reduction:*	♦ Develop operational procedures that prevent contamination with lube oil by keeping areas clear of debris. ♦ Store all lube-oil contaminated debris in a properly labeled, sealed container. ♦ Contractors are available to pick up & clean used rags for reuse.
Debris, uncontaminated	*Source Reduction:*	♦ Store in labeled containers/dumpsters. ♦ Do not mix with material that is contaminated or may be hazardous.
	Recycling:	♦ Recycle paper, metal, cardboard, aluminum cans whenever possible.
Domestic and sanitary wastewater	*Source Reduction:*	♦ Use low flow and low water use toilets, showers and faucets. ♦ Repair or replace leaking equipment.
	Recycling:	♦ Use treated water as facility washdown water or to water grasses, plants, etc. ♦ Use digested sewage sludge for agricultural purpose, if permissible.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact.	
Drilling fluids and additives, used	*Source Reduction:*	♦ Use a closed-loop mud system whenever possible to reduce volumes of drilling fluid wastes.

WASTE	ALTERNATIVES
	♦ Use solids control technology (e.g., chemically enhanced centrifuge) to recover water from drilling mud and reserve pit. ♦ Optimize solids control (e.g., hydrocyclones or centrifuges) to minimize need to dilute mud. ♦ Use low solids, non-dispersed muds whenever drilling conditions allow it. ♦ Use an inside-diameter wiping tool for drill pipe to minimize loss of drilling fluid (can save approximately 0.4 barrels of drilling fluid per 1,000 feet of drill pipe). ♦ Use inventory control and careful planning to avoid unused materials. ♦ Use the entire product whenever possible. ♦ Transfer unused additives for use at other sites. ♦ Use products low in toxicity whenever possible.

WASTE		ALTERNATIVES
Drilling fluids and additives, used (continued)		♦ Carefully screen barite weighting agents for naturally occurring concentrations of heavy metals, particularly mercury and cadmium.
		♦ Substitute organic additives, polymers, or biodegradable additives for oil-based mud to reduce toxicity.
		♦ Use lubricants such as lubra beads and gilsonite-based additives for spotting fluids, rather than diesel oil.
	Recycling:	♦ Have a drilling mud recycler pick up waste drilling mud for reconditioning and reuse.
		♦ Reuse waste drilling mud for upcoming well spudding or plugging operations.
		♦ Return surplus additives to vendor.
		♦ Return oil-based mud to vendor for recycling.
		♦ Reuse water-based mud whenever possible.
	Treatment/Recycling:	♦ Condition mud for reuse in drilling your next well.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific material.	

WASTE		ALTERNATIVES
Drilling cuttings/solids	*Source Reduction:*	♦ Minimize hole size (if feasible) when drilling. ♦ Drill horizontal holes if feasible to reduce number of wells required. ♦ Carefully design and monitor drilling mud programs to minimize caving, etc. ♦ Substitute organic additives, polymers, or biodegradable additives for oil-based mud to reduce costs associated with cleanup of oil-based drill cuttings.
	Disposal:	♦ Dispose of oil-based drill cuttings at an OCD-approved disposal facility.
Drums/containers, containing unused chemicals or lube oil	*Source Reduction:*	♦ Use the remaining chemical or lube oil for its intended propose whenever possible before disposing of drum. (See Chemicals, surplus.) ♦ Switch to purchase of chemicals in bulk containers, reducing the amount of drums requiring handling. Added benefit: less drum handling reduces the chance of spills and releases requiring cleanup of contaminated soil or debris.

WASTE		ALTERNATIVES
Drums/containers, containing unused chemicals or lube oil (continued)	*Recycling:*	♦ Return unused chemical, in original drum/container (properly sealed and labeled), to vendor. ♦ If drum can be properly emptied: triple rinse, and recycle drum (add the rinse water to the chemical stream). ♦ Recycle empty drums/containers whenever possible.
	Special considerations: Consult MSDS for guidance for a specific chemical. Use appropriate PPE. Do not mix remaining contents with different chemicals. Do not dispose of chemicals in mud or workover pits. Keep labels on all containers.	
Drums/containers, empty	*Source Reduction:*	♦ Switch to purchase of materials and chemicals in bulk containers, reducing the amount of drums requiring handling. Added benefit: less drum handling reduces the chance of spills and releases requiring cleanup (of contaminated soil). ♦ Purchase materials in returnable/recyclable drums and containers.
	Recycling:	♦ Return undamaged drums/containers to vendor or send to a drum reconditioner/recycler. ♦ Reuse uncontaminated drums for other purposes (e.g., storage and transfer of nonhazardous waste. ♦ Send damaged, uncontaminated drums to a metal recycler.

WASTE		ALTERNATIVES
Drums/containers, empty (continued)	*Disposal:*	♦ Crush uncontaminated drums/containers and send to an approved, state-permitted municipal waste landfill.
	Special considerations: Drums/containers are empty if they contain the lesser: 1 inch of solid or liquid material or 3% by weight. Empty drums/containers may be explosive or flammable. Collection and proper disposal of rinsate may be regulated.	
Electrical equipment, oil-filled (less than 50 parts per million PCB content) and out of service. Includes: Capacitors, transformers, switches, heat transfer fluids	*Source Reduction:*	♦ If putting back into service, do not refill or service with oils containing more than 50 ppm PCBs.
	Recycling:	♦ Refurbish and reuse or sell for reuse. ♦ Recycle oils into production stream. ♦ Send scrap equipment to a metal recycler. ♦ Burn oil for energy recovery if permissible (PCB content may prohibit this option; check appropriate regulations).
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

WASTE		ALTERNATIVES
Filters, lube oil	*Source Reduction:*	♦ When handling filters, take precautions to prevent oil spillage and the contamination of soil, etc. ♦ Change filters only when necessary. Use differential pressure as an indicator of needed change. ♦ Use stainless steel, reusable filters. ♦ Evaluate applicability of filterless centrifugal oil cleaning. (Use "spinners" to replace or lengthen oil filter life.) ♦ Install lubricating oil purification equipment to reduce frequency of conventional filter replacement.
	Recycling:	♦ Isolate all drained fluids in a resealable container for recycling. (See Oil, Lube.) ♦ Before recycling spent filters, drain all free liquids from the cartridge or filter media into a container. Recycle back into production stream. ♦ Send to a recycling facility.
	Special considerations: Use appropriate PPE. When handling filters, take precautions to prevent oil spills. Store all drained fluids in a reusable container. Oil filters are no longer accepted at state-permitted municipal landfills. Lube oil filters are considered a RCRA hazardous waste and must be managed as such.	

WASTE		ALTERNATIVES
Filters, process	*Source Reduction:*	♦ Use or retrofit with stainless steel, reusable filters to reduce the volume of filters requiring recycling or disposal. ♦ Change filters only when necessary. Use differential pressure as an indicator of needed change. ♦ Evaluate applicability of filterless centrifugal oil cleaning. (Use "spinners" to replace or lengthen oil filter life.)
	Recycling:	♦ Before disposing of spent filters, drain all free liquids from the cartridge or filter media into a container. Recycle back through production stream, on the lease from which the filters are generated.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific material.	
Fire fighting agents	*Source Reduction:*	♦ Convert to less toxic alternatives. ♦ Eliminate the use of halon extinguishers. ♦ Avoid the use of dry agents when water will suffice.
	Recycling:	♦ Contract with vendor to maintain fire fighting equipment and take back all unused fire fighting agents.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

WASTE	ALTERNATIVES	
Fracturing fluids, unused	*Source Reduction:*	♦ Use "mix-on-the-fly" systems for frac fluids. ♦ Recycle unused frac oil back into production stream. ♦ Plan frac job carefully to avoid mixing unnecessary fluids.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Glycol	*Source Reduction:*	♦ Maintain a testing program to avoid problems (e.g., corrosion). ♦ Optimize flow rates in the dehydration system. ♦ Operate and maintain at proper temperatures to avoid hydrocarbon contamination.
	Recycling:	♦ Regenerate for reuse. ♦ Send to a recycling facility.
	Special considerations: Consult MSDS for guidance for specific material. Use appropriate PPE. Ethylene glycol or triethylene glycol may contain high levels of hydrocarbon, making it DOT regulated. Before transporting, analytical testing must be conducted to determine the flashpoint.	

WASTE	ALTERNATIVES	
Hydrocarbon liquids	*Recycling:*	♦ Reclaim and manage as product. ♦ Blend with product.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Hydrates	*Source Reduction:*	♦ Inject methanol or glycol to inhibit hydrate formation. ♦ Melt in place.
	Recycling:	♦ Return to water treating system to recover any contained hydrocarbons.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Hydraulic fluids	*Source Reduction:*	♦ Introduce into production stream at facility where generated. ♦ Practice preventive maintenance to reduce leaks and drips.
	Recycling:	♦ Recycle whenever possible.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

WASTE	ALTERNATIVES	
Hydrotest water from gathering lines (in primary field operations)	*Source Reduction:*	♦ Conduct tests only when necessary. Use of "smart pigs" or ultrasonic devices to test wall thickness or holidays may enable better targeting of pipeline sections requiring pressure testing or replacement. ♦ Efficiently pig and pre-clean pipelines prior to hydrotesting to reduce the toxicity of the hydrotest water. ♦ Use produced water for hydrotesting rather than fresh water (reduction in use of water).
	Recycling:	♦ Reuse hydrotest water in other tests.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Iron sponge and Iron sulfide scale, spent	*Source Reduction:*	♦ Consider alternative methods of removing hydrogen sulfide from gas stream. ♦ Treat production streams with biocide or scale inhibitor to reduce iron sulfide formation.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical. Dry iron sulfide and iron sponge will auto ignite; in confined space with adequate oxygen, it may explode. Contact with acid will release hydrogen sulfide. Always keep it wet. Spread iron sponge out on bare ground in an open, fenced area. Allow a minimum of 1 week for material to oxidize and cool to air temperature before transporting off site. Do not mix with acid or acidic water.	

WASTE		ALTERNATIVES
Laboratory samples	*Source Reduction:*	♦ Collect only the amount necessary for analysis. ♦ Minimize testing; sample and analyze no more often than required. ♦ Use test methods/procedures which generate no or less waste (e.g., colorimetric testing). ♦ Use process knowledge instead of testing.
Laboratory waste	*Source Reduction:*	♦ Segregate waste chemicals (i.e., keep hazardous and nonhazardous waste chemicals separate) to reduce the amount of hazardous waste for management. ♦ Buy only the amount and size necessary. ♦ Use test methods that generate less or no waste.
	Recycling:	♦ Sell or exchange excess unused chemicals. ♦ Send laboratory wastes to a recycler. ♦ Provide excess laboratory chemicals to schools for their use.
	Special considerations: Consult MSDS for guidance for specific material.	

WASTE		ALTERNATIVES
Lubricating oil	*Source Reduction:*	♦ Minimize the volume of lube oil by extending its use. ♦ Test oil and extend its use based on wear vs. accumulated operating hours. (Note: Many lubricating oil suppliers offer testing service at no charge.) ♦ Install lubricating oil purification equipment on engines to eliminate the need for lubricating oil changes. ♦ Practice preventative maintenance to reduce leaks and drips. Label containers appropriately. ♦ Contract with service company to purify and regenerate oil for reuse rather than replacing with new lubricating oil. ♦ Consider use of synthetic oil. ♦ Use oil additives that improve engine and oil performance.
	Recycling:	♦ Recycle back into production stream on facility where generated. (Note: Ensure that no conflict arises with purchaser or refiner.) ♦ Send to an approved state-permitted recycling facility.
	Special considerations: Used oil for disposal is assumed hazardous unless analytical testing determines it to be nonhazardous. Use appropriate PPE. Avoid eye and skin contact.	

WASTE		ALTERNATIVES
Mercury, free	*Source Reduction:*	♦ Replace mercury manometers, level switches, flow meters and gas meters with electronic (digital) instruments.
		♦ Do not use mercury in operations.
	Recycling:	♦ Send to mercury recycler.
	Treatment:	♦ Hazardous: Treat to meet 40 CFR 268.40 standards
	Special considerations: Highly toxic. Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance.	
Metal, scrap	*Source Reduction:*	♦ If clean, re-use for structural steel.
	Recycling:	♦ Sell to salvage/scrap dealer (metal recycler).
	Special considerations: Check for naturally occurring radioactive material (NORM) before disposal.	
Methanol, used	*Source Reduction:*	♦ Use all of the product whenever possible.
	Recycling:	♦ Send to an approved, state permitted recycling facility.
	Special considerations: Highly flammable. Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for guidance.	

WASTE		ALTERNATIVES
Molecular sieve, spent	*Source Reduction:*	♦ Install activated carbon upstream of the unit to remove corrosion inhibitors, amines, absorber oils, glycol, and other contaminants to extend the life of the molecular sieve.
		♦ Regenerate molecular sieves for reuse.
	Recycling:	♦ Before disposing of spent filters, drain all free liquids from the sieve media into a container. Recycle back through production stream, on the lease from which the sieves are generated.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific material.	
Naturally Occurring Radioactive Materials (NORM), NORM-containing materials	*Source Reduction:*	♦ Periodic monitoring for accumulations of NORM may minimize potential risks and liabilities.
		♦ Use scale inhibitors where NORM scale accumulates. Circulate inhibitor in well or inject inhibitor into producing formation.
		♦ Avoid mixing incompatible produced waters that will result in scale formation.
		♦ Design facility to reduce locations prone to scale formation (e.g., large pressure drops and unnecessary pipe elbows).

WASTE		ALTERNATIVES
Naturally Occurring Radioactive Materials (NORM), NORM-containing materials (continued)	*Source Reduction:*	♦ Do not mix NORM with other materials. ♦ Dually complete oil zone and water zone to allow water to be produced simultaneously but separately from oil and to allow control of water coning. (Research indicates that water production may be reduced by as much as half, thereby reducing exposure to NORM of production equipment carrying the oil stream.) ♦ Use polymer injection to reduce permeability to water in the production zone, thereby reducing the volume of radionuclide-containing water produced. ♦ Use rock plugging with gel slugs to block off water production in completions where there is a discernible separation of the oil and water zones. ♦ Carefully design gravel packs and other well screening procedures to reduce the volume of NORM-contaminated formation sand (coated by NORM scale) that is produced.

WASTE		ALTERNATIVES
Naturally Occurring Radioactive Materials (NORM), NORM-containing materials (continued)	*Recycling:*	♦ Coat material surfaces with chemicals at critical points in the production system to reduce the availability of nucleation points for NORM-containing scale formation. ♦ Reinject NORM-containing produced water (containing scale inhibitors) for enhanced recovery, (preferably into the same zone from which it was produced), as soon as possible after initial production to increase the amount of NORM returned to the subsurface and decreasing the potential for the precipitation of NORM-containing scale in surface equipment. ♦ Store NORM-contaminated waste in either tanks or lined pits which will accommodate the eventual recovery and proper disposal of the NORM-contaminated waste. The contamination of soils with NORM may be averted by not storing NORM containing produced water or other waste in earthen pits, thereby decreasing the volume of NORM-contaminated waste. ♦ Provide NORM management procedures training for employees involved with the operation and maintenance of affected production facilities.

WASTE		ALTERNATIVES
Naturally Occurring Radioactive Materials (NORM), NORM-containing materials (continued)		♦ Clean NORM-contaminated scale from pipe and equipment to minimize the volume of NORM- contaminated waste requiring disposal and allow the recycling of the pipe and equipment. However, restrictions on the level of radioactivity of the NORM-contaminated waste may be imposed. ♦ Use of NORM-contaminated waste (metals) as feedstock at smelters may be a potential method of recycling. However, restrictions on the level of radioactivity of the NORM-contaminated waste may be imposed.
	Disposal:	♦ Send to licensed radioactive waste land disposal facility.
	Special considerations: Use appropriate PPE. Consult MSDS for additional guidance.	
Oil, slop	*Source Reduction:*	♦ Recycle back into production stream. ♦ Install a mechanical stirrer inside slop oil tank to keep sediment in suspension. ♦ Implement the use of canned submersible pumps to replace conventional impeller type pumps used for fluid transfer service. ♦ Eliminates leaks from impeller pump seals and gear boxes.
	Recycling:	♦ Send slop oil that cannot be recycled into production stream to a state-permitted tank bottoms reclamation facility.
	Special considerations: May contain hydrogen sulfide and/or NORM. Use appropriate PPE. Avoid eye and skin contact. Handle as crude oil; consider fire hazard.	

WASTE		ALTERNATIVES
Oil, weathered	*Source Reduction:*	♦ Pick up spilled liquids or solids as soon as possible after the spill is contained. Recycle back into production stream. ♦ Prevent spills or waste whenever possible. **Special considerations:** Use appropriate PPE. Avoid eye and skin contact. Handle as crude oil.
Paint and paint wastes	*Source Reduction:*	♦ Paint less frequently; only when necessary. ♦ Buy in bulk and only the volume needed. Use all of the product before it becomes unusable. ♦ Size paint batches systematically to specific jobs. ♦ Eliminate the use of lead paint; use waterbase, lead-free paint or high-solids coatings. ♦ Purchase less toxic, less volatile paints and solvents. Purchase paints with greater durability. ♦ Paint contractor should be responsible for the proper management of unused paint, solvents, and empty containers. ♦ Reduce and control overspray. Use a brush for small jobs rather than spraying.

WASTE		ALTERNATIVES
Paint and paint wastes (continued)	*Source Reduction:*	♦ Keep containers closed to reduce evaporation. ♦ Ensure paint containers are completely emptied and dried. ♦ Use separate solvents and/or containers for each paint color. When solvent is spent use it as a thinner for that particular color.
	Recycling:	♦ Regenerate solvents for reuse. ♦ Send to a recycler.
	Special considerations: Dried paints are not regulated by DOT.	
Pallets	*Source Reduction:*	♦ Buy materials in skid-mounted bulk hoppers or containers. ♦ Purchase recycled plastic pallets which have a longer life than wooden pallets.
	Recycling:	♦ Reuse pallets. ♦ Return pallets to the vendor. ♦ Send wooden pallets to a pallet or wood recycler. ♦ Chip uncontaminated wooden pallets and use as mulch.

WASTE		ALTERNATIVES
Paraffin	*Source Reduction:*	♦ Collect solidified paraffin in tanks, mix with paraffin solvent, and recycle back into production stream. ♦ Investigate the feasibility of installing magnetic fluid conditioner(s) to prevent paraffin formation. ♦ Use paraffin inhibitor chemicals. ♦ Use hot-oil treatment to dissolve paraffin in well and flow lines; send to production.
	Recycling:	♦ Send mechanically removed paraffin to a recycler.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact.	
PCB, oil	*Source Reduction:*	♦ Replace any electrical equipment that is determined to be PCB containing with non-PCB containing, electrical equipment.
	Disposal:	♦ Hazardous: Send to an approved, state-permitted RCRA/TSCA hazardous treatment and waste disposal facility.
	Special considerations: Cleanup of PCB spills and contaminated soils is regulated by both RCRA and TSCA. Special Handling: *Contact your Health and Safety Coordinator immediately!*	

WASTE		ALTERNATIVES
Pesticides	*Source Reduction:*	♦ Use rinse water in original application whenever possible. ♦ Use inventory control; e.g., a surplus chemicals exchange network that offers unused pesticides to other company facilities in lieu of disposal. ♦ Use a licensed commercial pesticide application service. ♦ Properly store and label containers to prevent degradation and contamination. ♦ Use all contents/material and then triple rinse the container. Use rinsate as originally intended for the material. ♦ Practice good inventory control. Use excess at another facility.
	Recycling:	♦ Return unused chemicals to vendor for recycling. ♦ Send unusable chemicals to a recycler.
	Special considerations: Highly regulated substances. Use licensed applicators/contractors. Avoid eye and skin contact. Read warning labels; consult MSDS for additional guidance. Triple rinse drums/containers before disposal. Manage rinse water as hazardous unless reused.	

WASTE	ALTERNATIVES	
Pigging wastes from gathering lines	*Source Reduction:*	♦ Minimize paraffin accumulation (see paraffin). Add appropriate chemical agents to reduce accumulation of paraffin. ♦ Reduce accumulation of hydrates (see hydrates). ♦ Reduce accumulation of scale (see scale).
	Recycling:	♦ If possible, reuse pigs. ♦ Recycle paraffin whenever possible. (See Paraffin.)
	Special considerations: May contain hydrogen sulfide; use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance.	
Pigging wastes from transportation pipelines	*Source Reduction:*	♦ Minimize paraffin accumulation (see paraffin). Add appropriate chemical agents to reduce accumulation of paraffin. ♦ Reduce accumulation of hydrates (see hydrates). ♦ Reduce accumulation of scale (see scale).
	Recycling:	♦ If possible, reuse pigs. ♦ Recycle paraffin whenever possible. (See Paraffin.)
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

WASTE		ALTERNATIVES
Pipe dope, used	*Source Reduction:*	♦ Choose biodegradable, lead-free pipe dope. ♦ Use all of the product whenever possible. ♦ Minimize waste, conserve compound for use at the next job. ♦ All drilling, well servicing, pipeline, and other contractors should be responsible for unused and waste pipe dope and containers.
	Special considerations: Pipe dope must be TCLP tested for lead to determine if it is a RCRA hazardous waste and therefore subject to DOT requirements.	
Pit wastes Includes: waste in reserve pits and emergency pits	*Source Reduction:*	♦ Use rig wash judiciously. Install high-pressure, low-volume spray nozzles with automatic cutoffs. ♦ Segregate fresh water, salt water, and oil-based fluids and solids. Use the "reserve pit management system." ♦ Remove oil as soon as possible to minimize contamination of pit. ♦ Locate and eliminate all sources of water leaks. ♦ Grade site and use diversion structures to prevent or minimize stormwater run-on volume. ♦ Use a closed-loop drilling fluid system if feasible.

WASTE		ALTERNATIVES
Pit wastes (continued)		♦ Design pit and pit system to minimize waste. For example, use the "V" shaped pit or the "reserve pit management system."
		♦ Size and construct pits to accommodate only the necessary volumes anticipated plus an adequate freeboard.
		♦ Use tanks/vacuum trucks rather than earthen pits for workovers.
	Recycling:	♦ Stabilized, uncontaminated solids may be suitable for use as daily cover at landfills.
		♦ Recover and reuse weighting materials and drilling fluids. Waste drilling mud can be reused at other locations for spudding or plugging and abandoning operations.
		♦ Contract a drilling mud recycler to take waste drilling mud.
Plastic liners	*Source Reduction:*	♦ Use reusable steel pits or portable tanks whenever possible.
		♦ Purchase liners constructed of recycled plastic.
	Recycling:	♦ Send to a plastic recycler.

WASTE		ALTERNATIVES
Produced sand	*Source Reduction:*	♦ Improved gravel pack design. ♦ Optimize production rate to minimize sand production. ♦ Design perforations in completion to minimize sand production.
	Recycling:	♦ Use as fill material, if uncontaminated ♦ Send to cement kiln as a substitute for feedstock, if permissible.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Produced water	*Source Reduction:*	♦ Assess the feasibility of treating the producing formation with polymers that decrease the permeability of the formation for water, while the permeability of hydrocarbons remains unchanged. ♦ Use rock plugging with gel slugs to block off water production in completions where there is a discernible separation of the oil and water zones. ♦ Dually complete oil zone and water zone to allow water to be produced simultaneously but separately from oil and to allow control of water coning. (Research indicates that water production may be reduced by as much as half.) ♦ Investigate feasibility of dually completing gas/water producing zone and injection (Class II) disposal zone (water phase separates and is not produced at surface).

WASTE		ALTERNATIVES
Produced water (continued)		♦ Carefully planned well completions. ♦ Reperforate well to reduce water production. ♦ Drill wells to minimize water production (e.g., horizontal wells when feasible). ♦ Optimize production rate to minimize the influx of water (e.g., coning).
	Recycling:	♦ Create a system that distributes produced water to various waterfloods in area. Results: reduction in volume of produced water requiring disposal and reduction of the amount of make up water purchased. Also, the need for water storage tanks for suction at water injection stations is eliminated by pumping directly from the water separation tanks to provide pressured water to the high pressure injection pumps. This reduces cost associated with operating charge pumps at the water station. ♦ Use produced water for hydrotesting of pipelines, equipment and tanks. ♦ Desalinate for use in other E&P operations if water supply is scarce and the process is cost effective.
	Special considerations: May contain flammable or combustible compounds and hydrogen sulfide. Produced water that is oil-free is not regulated by DOT.	

WASTE		ALTERNATIVES
Rags, oily	*Source Reduction:*	♦ Maintain equipment and facilities to prevent drips, leaks, and spills which would require cleanup. ♦ Use drip pans or other containment devices to collect leaks, drips or accidental spills. Empty containment devices properly.
	Recycling:	♦ Keep separate from other wastes and wash for reuse. ♦ Send to recycler.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Rigwash	*Source Reduction:*	♦ Prudent use of water in rig maintenance. ♦ Use high-pressure, low-volume hose nozzles with automatic cutoffs. ♦ Set up a regular maintenance program for water systems to reduce leaks and drips. ♦ Remove paint solids from water arrestor holding tanks with a centrifuge or cyclone system. ♦ Reduce rigwash use by sweeping or other dry cleaning when feasible. ♦ Collect rigwash in tanks rather than earthen pits.

WASTE		ALTERNATIVES
Rigwash (continued)	*Recycling:*	♦ Collect and reuse rigwash for subsequent rig washdowns or for first stage washing of equipment. ♦ Use as make-up water in drilling and completion operations. **Special considerations:** Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.
Scale, pipe and equipment	*Source Reduction:*	♦ Use scale inhibitors. Circulate inhibitor in well or inject inhibitor into producing formation. ♦ Avoid mixing incompatible produced waters which will result in scale formation. ♦ Design facility to reduce locations prone to scale formation (e.g., large pressure drops and unnecessary pipe elbows). ♦ Dually complete oil zone and water zone to allow water to be produced simultaneously but separately from oil and to allow control of water coning. (Research indicates that water production may be reduced by as much as half, thereby reducing scale formation in production equipment carrying the oil stream.) ♦ Use polymer injection to reduce permeability to water in the production zone, thereby reducing the volume of water produced which is the source of scale.

WASTE	ALTERNATIVES	
Scale, pipe and equipment (continued)	*Source Reduction:*	♦ Use rock plugging with gel slugs to block off water production in completions where there is a discernible separation of the oil and water zones. ♦ Coat material surfaces with chemicals at critical points in the production system to reduce the availability of nucleation points for scale formation.
	Recycling:	♦ Clean scale from pipe and equipment and recycle the pipe and equipment.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Scrubber wastes	*Source Reduction:*	♦ Convert to natural gas as a fuel to avoid generating SO_2 and flyash.
	Recycling:	♦ Remove solids through gravity separation, filtration, etc., and send liquids to water softening for steam generation or direct injection for enhanced recovery. ♦ Use as an oxygen scavenger.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

WASTE		ALTERNATIVES
Silver-containing waste	*Source Reduction:*	♦ Minimize the number of film reproductions.
		♦ Install on-line equipment to remove silver from process liquids.
	Recycling:	♦ Recover silver from the film/developing solution before disposal and recycle.
		♦ Send waste liquids to a recycler.
		♦ Send waste solids and film to a recycler.
Soils, unused-chemical contaminated	*Source Reduction:*	♦ Develop operational procedures that prevent contamination of soils. For example, use containment devices in chemical storage areas to prevent contamination of soils.
		♦ Install fencing around chemical storage to discourage losses due to vandalism.
	Recycling:	♦ Recover free liquids and recycle.
	Special considerations: Chemical spills on soils may produce a hazardous waste . Consult MSDS for guidance for each chemical.	

WASTE		ALTERNATIVES
Soils, crude oil contaminated (in primary field operations)	*Source Reduction:*	♦ Pick up free liquid or solids spilled as soon as possible after the spill is contained. Recycle back into production stream. ♦ Develop operational procedures that prevent contamination of soils. For example, preventative maintenance on flowlines and containment under tank battery load-line connections. ♦ Use impervious secondary containment. Use pit liner material around and under production facilities. ♦ Consider use of magnetic ion coating technology for stuffing box packing rubbers, valve stems and other friction and wear points that may provide a source of leakage. ♦ Prepare and implement Spill Prevention, Control and Countermeasures (SPCC) Plans for each facility. ♦ Use cathodic protection or coated pipe to reduce leaks caused by corrosion. ♦ Consolidate produced fluid separation and well testing facilities. ♦ Use "canned submersible pumps" to replace conventional impeller type pumps use for fluid transfer service.
	Recycling:	♦ Recover free crude oil and return to production stream.
	Special considerations: Handle as crude oil. Use appropriate PPE. Avoid eye and skin contact.	

WASTE	ALTERNATIVES	
Soils, lube oil contaminated	*Source Reduction:*	♦ Pick up spilled liquid or solids as soon as possible after the spill is contained and recycle. ♦ Develop operational procedures that prevent contamination of soils. For example, preventative maintenance on lubricating oil system and containment under system. ♦ Use impervious secondary containment. Use pit liner material around and under lubricating oil systems.
	Recycling:	♦ Recover free lubricating oil and recycle.
	Special considerations: Test for heavy metals (TCLP) to determine if hazardous. Use appropriate PPE. Avoid eye and skin contact. Lube-oil contaminated soil is assumed to be RCRA hazardous waste, unless analytical testing indicates it is nonhazardous.	
Soil, produced water-contaminated	*Source Reduction:*	♦ Develop operational procedures that prevent contamination of soils. For example, preventative maintenance on flowlines and containment under tank battery load-line connections. ♦ Use impervious secondary containment. Use pit liner material around and under production facilities. ♦ Consider use of magnetic ion coating technology for stuffing box packing rubbers, valve stems and other friction and wear points that may provide a source of leakage.

WASTE		ALTERNATIVES
Soil, produced water-contaminated (continued)		♦ Use cathodic protection or coated pipe to reduce leaks caused by corrosion. ♦ Consolidate produced fluid separation and well testing facilities. ♦ Use "canned submersible pumps" to replace conventional impeller type pumps use for fluid transfer service. ♦ Pick up spilled liquid as soon as possible after the spill is contained. ♦ Use smaller injection pumps at each injection well for secondary recovery projects and supply water by gravity drainage (low pressure lines) from a central water storage tank. ♦ Prepare and implement Spill Prevention, Control and Countermeasures (SPCC) Plans for each facility. **Special considerations:** Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.
Solvents (organic solvents used in cleaning and degreasing equipment)	*Source Reduction:*	♦ Use water-based solvents or soap cleaners that are biodegradable whenever possible. ♦ Substitute nonhazardous surfactants (soap) for hazardous solvents (mineral spirits) for equipment cleaning. ♦ Use up all solvent in container, ensuring no residue remains.

WASTE		ALTERNATIVES
Solvents (organic solvents used in cleaning and degreasing equipment) (continued)	*Source Reduction:*	♦ Minimize amount of solvent being lost during cleaning or maintenance; for example, use drip pans to collect solvent for reuse. ♦ Use high-pressure water, steam or other non-toxic solvents to clean equipment. ♦ Keep solvent containers tightly covered when not in use to decrease loss due to vaporization. ♦ Use inventory control to minimize volume of unnecessary solvent stored. ♦ Use dirty solvent for initial cleaning and clean solvent for final cleaning.
	Recycling:	♦ Send to a recycler. ♦ Filter/clean or regenerate solvents and reuse. ♦ Use spent solvent for paraffin removal.
	Special considerations:	May be highly flammable. Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for guidance for a specific solvent. Can be tested to determine hazard status.

WASTE		ALTERNATIVES
Stormwater	*Source Reduction:*	♦ Improve work process and properly maintain equipment and facilities to reduce leaks, spills, etc. ♦ Cover facilities to eliminate contamination of stormwater. ♦ Segregate stormwater drainage from liquid storage, loading/ unloading facilities and, operations areas from unimpacted areas. ♦ Clean up spills and leaks promptly to minimize stormwater contamination.
	Recycling:	♦ Use stormwater as make-up water in the process. For example, use contaminated stormwater for first stage washing of equipment, use stormwater as make-up water in drilling/ completion operations, and use stormwater for process water and agricultural purposes.
Sulfur recovery unit wastes, including sulfur-contaminated	*Source Reduction:*	♦ Substitute a less hazardous catalyst in the Scot Tailgas process of a sulfur recovery plant. Nonhazardous spent catalyst waste can result, thereby resulting in disposal cost savings.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	
Tank bottoms (basic	*Source Reduction:*	♦ Recycle back through treatment system, with no additional

WASTE	ALTERNATIVES
sediment and water)	requirements. ♦ Keep turbulent flow in tank to prevent sedimentation whenever possible. The use of mechanical stirring devices in oil storage tanks will eliminate build-up of tank bottom sediments and reduce chemical storage. ♦ Add appropriate chemical agents to reduce tank bottom accumulation. ♦ Treat light oil tank bottoms with high temperature in heavy oil dehydration facilities. ♦ Recover product by recycling light oil tank bottoms through heavy oil dehydration facilities. Results: added revenue and substantial cost savings through reduction of waste disposal. ♦ Use cone bottom stock tanks and run bottoms through heater-treater more frequently than normal. ♦ Reduce the number of tanks by consolidating produced fluid storage facilities.

WASTE		ALTERNATIVES
Tank bottoms (basic sediment and water) (continued)		♦ Keep a gas blanket on tanks to reduce oxygen and formation of iron oxides. A gas blanket can also reduce risk of explosion and subsequent leakage due to lightning strikes. ♦ Identify and minimize the source of solids.
	Recycling:	♦ Send tank bottoms to crude oil reclamation plants. (Call OCD for current list of permitted crude oil reclamation plants.) ♦ Send to a refinery coker. ♦ Use a centrifuge or filter press to recover oil and water from tank bottoms.
	Special considerations: May contain hydrogen sulfide. Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance.	
Thread protectors	*Source Reduction:*	♦ Avoid using excess pipe dope. ♦ Return to vendor.
	Recycling:	♦ Reuse in operations or sell for re-use. ♦ Send to a reclamation facility that removes pipe dope and markets the thread protectors for reuse. ♦ Send to a scrap metal or plastic recycler.
	Special considerations: Considered hazardous waste if pipe dope is present and intended for disposal. Use gloves.	

WASTE		ALTERNATIVES
Tires	*Source Reduction:*	♦ Rotate tires and align regularly. ♦ Maintain proper inflation pressure. ♦ Purchase tires with greater road-wear abilities.
	Recycling:	♦ Send to a tire recycler. ♦ Purchase retreaded tires if feasible.
Vacuum truck rinsate	*Source Reduction:*	♦ Use chemicals and products that are less hazardous or toxic. ♦ Avoid mixing nonhazardous and hazardous wastes in vacuum truck.
	Treatment	♦ Hazardous: Treat to meet 40 CFR 268.40 standards
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical. Dangerous fumes may collect inside the tank. Use appropriate PPE. Avoid eye and skin contact.	

WASTE	ALTERNATIVES	
Well completion, treatment, and stimulation fluids, unused	*Source Reduction:*	♦ Recycle unused frac oil back into production stream. ♦ Use all of the product whenever possible; e.g., use excess frac oil, acid, stimulation fluids, and xylene in other wells. ♦ Use inventory control; e.g., a surplus chemicals exchange network that offers unused chemicals to other company facilities in lieu of disposal. ♦ Return unused portion to vendor.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for guidance for specific material. Can be tested to determine hazard status.	
Workover wastes, used	*Source Reduction:* *Recycling:*	♦ Place into production stream whenever possible. ♦ Recycle free liquids back into production stream.
	Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.	

ACRONYMS

BTEX	benzene, ethyl benzene, toluene, xylene
CFR	*Code of Federal Regulations*
DOT	Department of Transportation
E&P	Exploration and Production
MSDS	material safety data sheet
NORM	Naturally Occurring Radioactive Materials
OCD	Oil Conservation Division
PCB	polychlorinated biphenyl
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
SPCC	Spill Prevention Control and Countermeasures
TCLP	Toxicity Characteristic Leaching Procedure