

Pollution Prevention: Keeping Score

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Measurement is Key

- Pollution Prevention & Waste Minimization activities can go unnoticed if not measured and accounted for.
- Translate efforts into environmental, social, economic, liability reduction, public relations and safety benefits

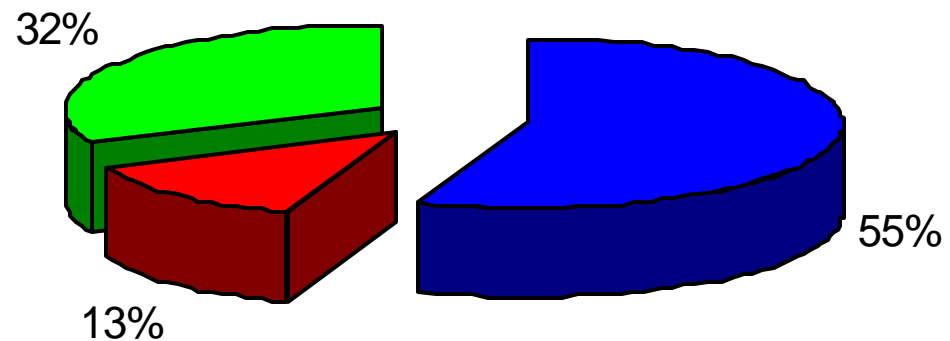
Not enough to do good....

- Need to measure, quantify, document and evaluate benefits of efforts
- Contributes to program sustainability
- Allows for development of supporting policies

Msw 74.1 tons
Rmw 17.16 tons
Recycle 42.4 tons

Understanding Your Total Waste Stream

Waste Composition Example 2001



■ msw ■ rmw ■ recycle

Solid Waste Data One Month

Date	tons of waste	\$\$ spent tip	haul fee	container rental \$	tot monthly cost for solid waste
2-Jan	11.32	723.57	80		
5-Jan	9.98	637.92	80		
10-Jan	11.47	733.16	80		
15-Jan	11.62	742.75	80		
15-Jan	1.71	109.3	80		
19-Jan	10.39	664.13	80		
24-Jan	11.7	747.86	80		
29-Jan	11.62	742.75	80		
				164.54	
tot tons	79.81	5101.44	640	164.54	5905.98

Track Data

enter data in lbs	January	February	March	April	May
Solid Waste					
Biohazard Waste					
Hazardous Waste					
Silver					
xylene					
alcohol					
formaldehyde					
pharmaceuticals					
Recyclable Wastes					
Corrugated Cardboard					
Paper					
Metal					
Glass					
Plastic					
Mixed containers					
Kitchen Grease					
Confidential paper					
Universal Waste					
Fluorescent tubes					
batteries					
Compostable Waste					
leaf and yard waste					

Rationale:

- Understand waste generation trends
- Track Costs
- Identify key relationships
 - Census/waste
 - # of procedures/waste
- Benefits of interventions
 - Recycling
 - Product substitution
 - Product elimination
- Justifying Costs of interventions

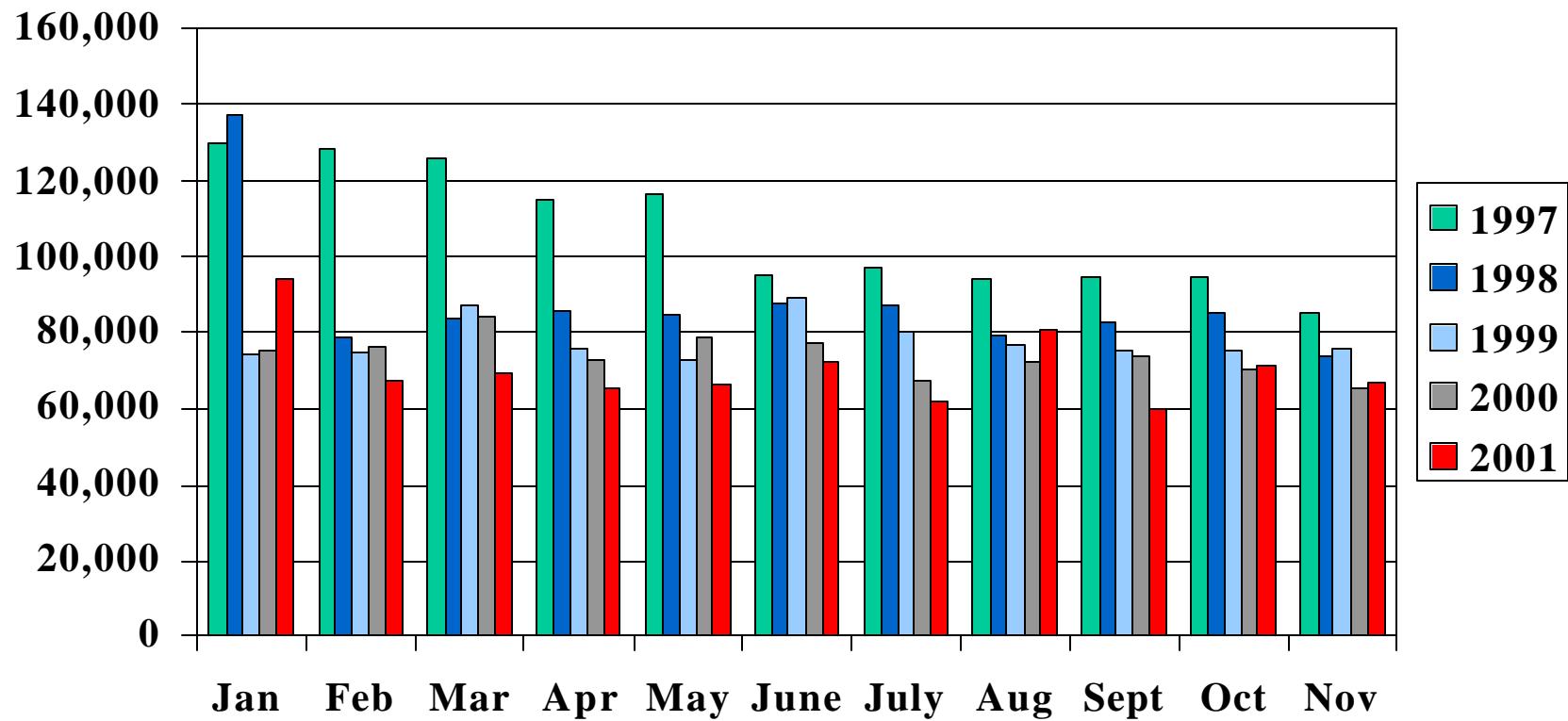
Examples: Waste Minimization

- Red bag reduction
 - Economic benefit
 - Less waste to dispose of, less cost
 - Fewer red bags to purchase
 - Less labor involved in packaging, tracking, managing waste
 - Environmental benefit
 - Less waste to treat, less effluent to the environment
 - Incineration, autoclave, other treatments

Quantify

- Biohazard waste generation rates prior to intervention, calibrated for census, number of procedures, and other key demographic indicators
- Measure biohazard waste generation rate post intervention, taking credit for waste volume reduction, translating that to \$\$ saved, less waste requiring special treatment

Infectious Waste 1997-2001



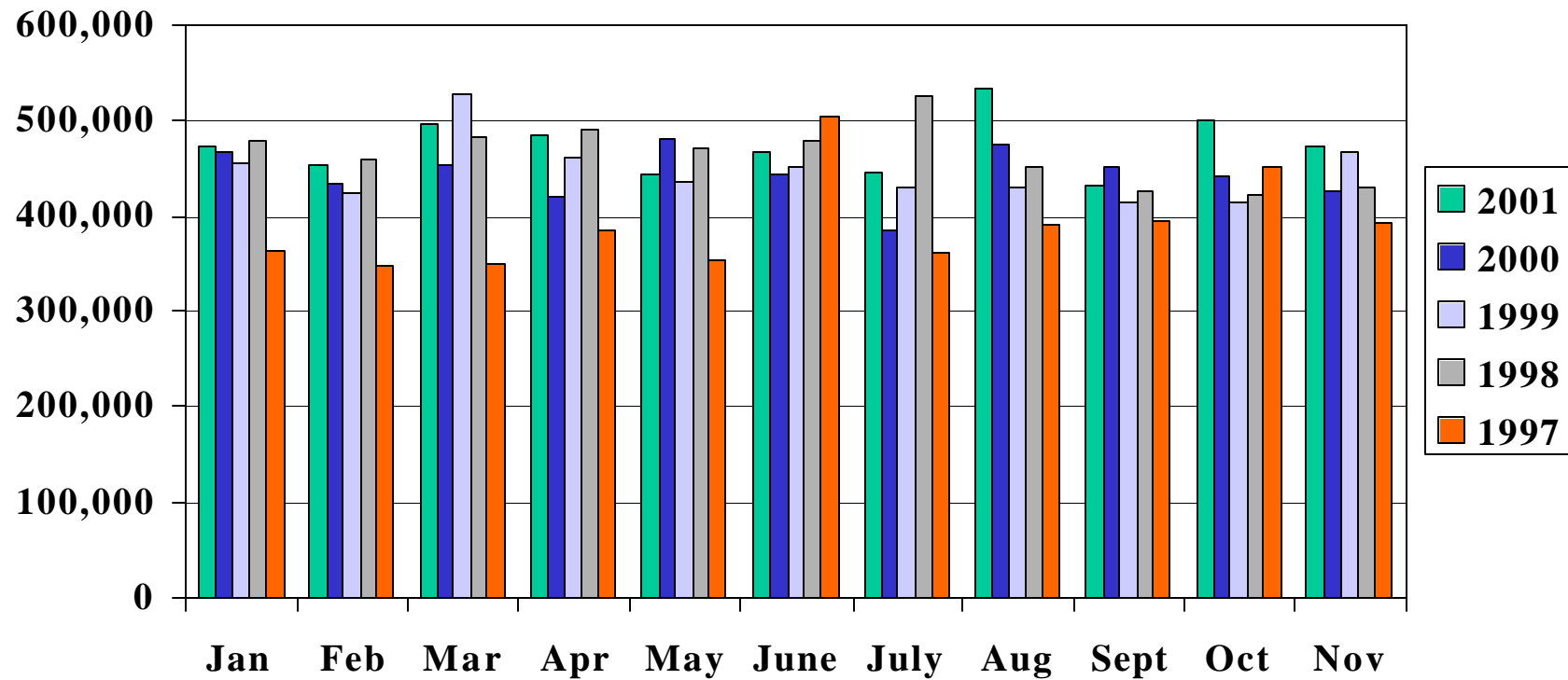
Examples: Waste Minimization

- Solid Waste Reduction through recycling
 - Economic benefit
 - Less waste to dispose of, less cost
 - Fewer hauls to landfill
 - Environmental benefit
 - Less waste to bury or burn
 - Keep resources in economy
 - Saves energy

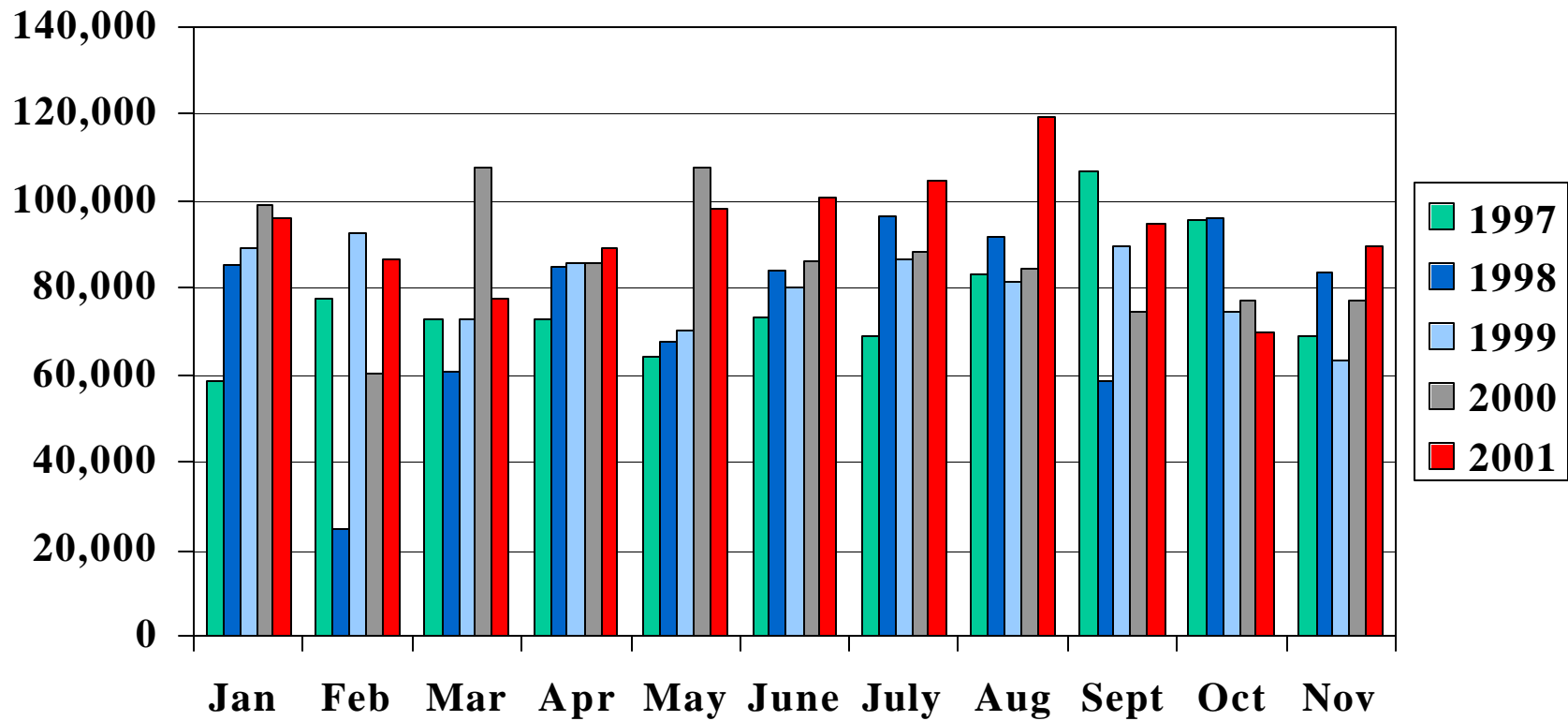
Quantify

- Avoided hauling fees
 - \$\$ saved for fewer hauls to landfill/incinerator
- How much less waste was generated in month's time after intervention
- Avoided tipping fees
 - Fees NOT paid to dispose of trash
- Graph & chart waste avoided. Track and trend \$\$ saved on waste disposal

Solid Waste 1997-2001



Recycled Material 1997-2001



Examples: Toxicity Reduction

- Metals
 - Mercury elimination
 - Thermometers, sphygmomanometers
 - Esophageal dilators
 - B5 Fixative in lab
 - Thermostats
- Calculate grams of mercury eliminated from facility (see chart to obtain data on quantities of mercury in devices)

Quantify

- Amount of mercury recovered
- Dollars saved in avoided mercury spill clean up costs, training, supplies, staff time
- Reduced liability for organization
 - Reduced risk of environmental release/spills
 - Reduced risk of worker/patient exposures

Kaiser Permanente: Cost Accounting Model for Mercury Elimination

\$550,000 savings over 10 yrs

34+ facilities, 90,000 employees

Avoided Cost Category	Amount	Sources of Cost Avoided Estimate
Spill preparation/response	\$20k/yr	The cost of a mercury spill kit is known, as is the cost of a spill response by KP's contractors. These costs along with the aver. # of historical spill incidents from broken devices in a year permit an avoided cost estimate to be made.
Compliance Liability	\$15k/yr	Use of Hg containing products necessitates staff spill/exposure training
Treatment & Exposure	\$20k/yr	Treatment of exposure \$20K/yr A probabilistic cost. Based on cost of treating 1 pediatric exposure.

Getting Started

- Case Study: Small New England facility
- Mercury sphygmomanometer phase out & replacement with aneroid devices
 - Cost comparison: Cost of new devices & cost of disposal of old devices
 - Is the project feasible?
 - Cost of disposal of 30 old mercury devices \$1093
 - Cost of replacement for 30 sphygmomanometers

Outcome: Facility identified vendor willing to provide non-Hg sphygmomanometers & accept old mercury sphygmomanometers for \$78/each (Welch Allyn)

Examples: Toxicity Reduction

- Used battery recovery
 - Lithium
 - Nickel cadmium
 - Mercuric oxide
 - Lead acid
 - Zinc air
 - Lead
 - Alkaline
- Keeping used batteries out of solid and biohazard waste streams prevents pollution

Quantify

- How many batteries are recovered each month (weight in lbs)
- Avoided costs for non-compliance with hazardous waste regulations
- Cost for battery recovery program, staff education, used battery disposal and recycling

Examples: Solvent Recovery

- Capture used solvents
- Distill with solvent recovery unit
- Saves on solvent disposal
- Saves on procurement costs of new solvent

- Case studies: Albany Medical Center (NY) and Alexian Brothers Hospital (IL)

Quantify

- Cost for distillation unit
- Staff time to operate unit
- Costs avoided by reducing hazardous waste disposal volume of solvent
- Costs avoided by reduced procurement of new solvent
- Costs/liability avoided by maintaining SQG status

Case Study from **Alexian Brothers Medical Center**

800 Biesterfield Road / Elk Grove Village, IL 60007

Special Thanks to Mr. Tom Johnson (Facilities Director) and the entire Histology and Pathology Laboratories.

Financial Impact

Cost/yr of disposal prior to still:		Cost/yr of solvents prior to still:
Alcohol	\$ 1,050	\$ 1,313
Xylene	\$ 825	\$ 6,325

Total Cost/yr Prior to Distillation: \$9,513

Cost of Still: \$15,000 Cost/yr of operating \$871

Cost/yr of disposal after still:		Cost/yr of solvents after still
100% Alcohol	\$ 56	\$ 375
Xylene	\$ 44	\$ 1,840

Total Cost/yr with Distillation: \$3,185

Payback Time: 2 1/3 years.

Examples: Formalin Filtration

- Capture used formalin
- Filter with formalin recovery unit
- Saves on formalin disposal
- Saves on procurement costs of new formalin

Quantify

- Cost of formalin filtration unit
- Staff time to operate unit
- Costs avoided by not having to purchase new formalin
- Costs avoided by not having to dispose of spent formalin as hazardous waste

Examples: Cleaning chemical dispensing systems

- Allows for use of less chemical product
- Allows for exacting measurement
- Product delivered in bulk containers (less waste)

Quantify

- Costs for dispensing systems
- Costs for staff training
- Costs for purchasing cleaning products in concentrate
- Less wasted product
- Fewer spills and spill clean ups
- Safer environment for staff
- Decreased training requirements

Examples: Recycling kitchen grease

- Allows for recovery of used cooking oils and grease
- Prevents drains from clogging
- Avoids placement of hydrocarbon/liquids into landfills
- Grease is recycled into cosmetics, soap, dog food

Quantify

- Avoided landfill costs
- Grease weighs 12 lbs/gallon
- Avoided costs for non-compliance with regulations. Grease is banned from landfills and from wastewater discharge
- Maintenance costs saved by avoided clogged grease traps

Examples: fluorescent lamp & u-bulb recycling

- Allows for recovery of spent lamps for recycling into base components
 - Glass
 - Aluminum end caps
 - Mercury/phosphorous powders

Quantify

- How many bulbs recycled
- Cost of compliance with universal waste rules
- Avoided costs of having bulbs recovered as hazardous waste
- Amount of mercury diverted from landfills/incinerators

Examples: Integrated pest management

- Allows for multiple strategies in managing pests besides using pesticides
 - Includes good housekeeping practices
 - Includes use of bug lights
 - Includes use of decoys (E.g. owl statues to scare pigeons)
 - Includes use of bug sex hormones to attract insects to sticky tape

Quantify

- Reduced toxicity of pest management products used
- Cost savings, pollution avoidance

Examples: slow grow grass, indigenous landscape practices

- Landscaping that is most environmentally friendly, requires least amount of pesticides, herbicides, fungicides
- Least amount of mowing
- Least amount of watering
- Indigenous to region, thrives in local climate

Quantify

- Reduced costs in less frequent need for mowing
- Reduced use of pesticides, herbicides, fungicides
- Reduced use of water for maintaining landscaping

Hazardous Waste Management Program

- Spill preparedness and prevention program
- Proper storage
- Drain covers
- Secondary containment
- Product substitution where possible
- Hazardous waste policies, program monitoring, inventory

Quantify

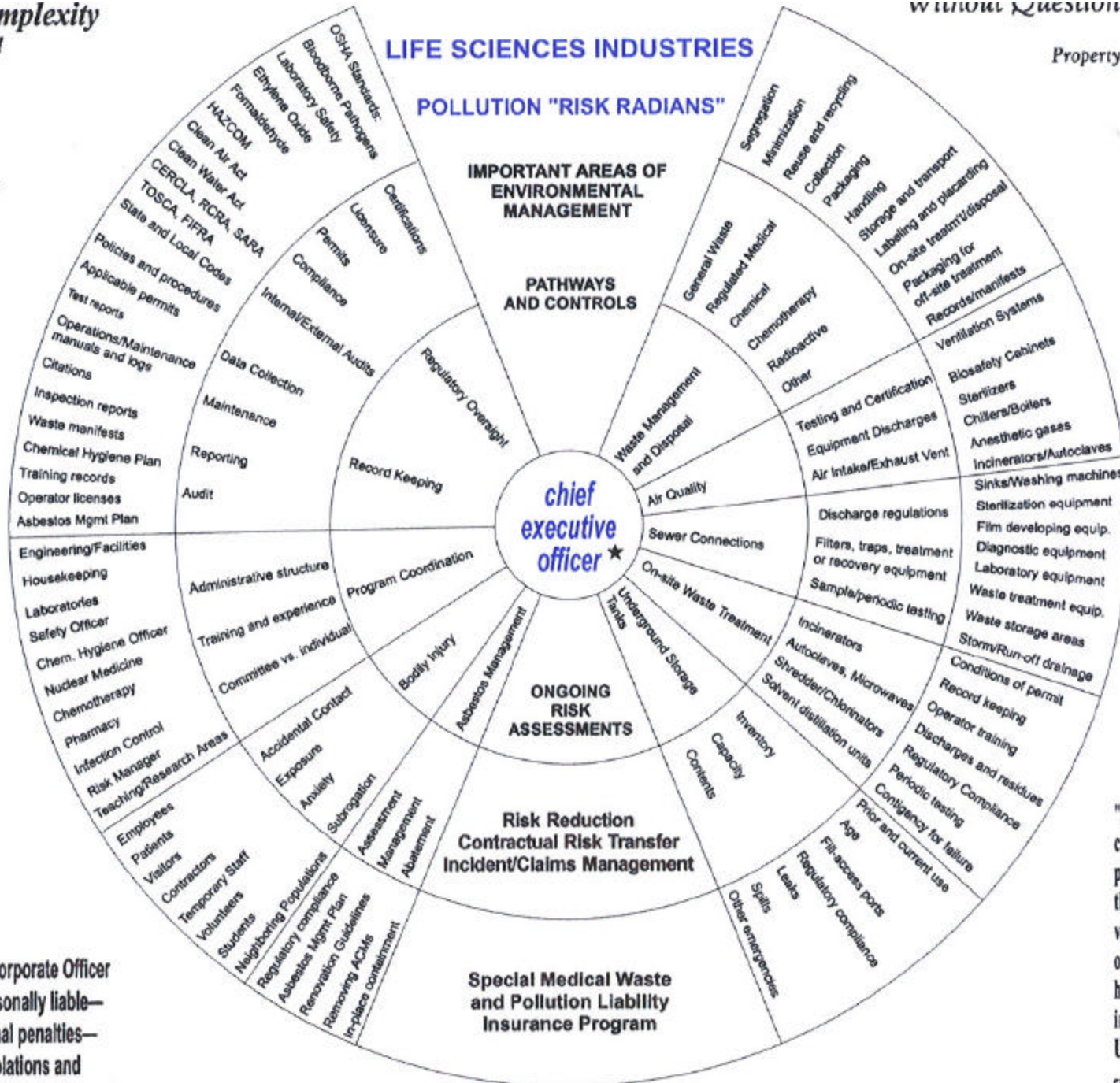
- Cost of spill preparedness
- Cost of training
- Cost of program monitoring
- Cost of proper storage, labeling and handling
- Avoided costs for non-compliance
- Avoided clean up costs
- Avoided cost of liability

Volume and complexity

environmental laws and regulations in existence combined with the potential for individual criminal liability, operative that these organizations are exposed to increasingly

Journal of Health and Hospital Law

Responsible Corporate Officer (RCO) can be held personally liable—potential for criminal penalties—all environmental violations and offenses - whether he or she had actual knowledge of the violations/incidents or not



"First, Do No Harm" is the credo of every health care professional. But for decades that vow has been insidiously violated through the emission of toxic pollution . . . at hospitals and other health care institutions throughout the United States.

excerpt from the Executive Summary of the comprehensive industry study by the Environmental Working Group, Washington, D.C.