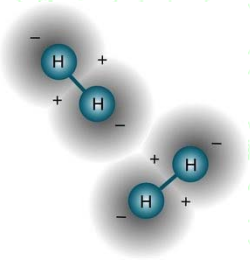
Lab Notes
Fall 2010
IUPUI ENVIRONMENTAL HEALTH AND SAFETY

Hydrogen Gas Basics

By: Amy Donofrio



Hydrogen is the lightest of all naturally occurring gases. It is colorless, odorless, and extremely flammable. Its unique properties, such as flammable over a wide range of concentrations (4%-75% in air) and low ignition energy, are what contribute to its extreme flammable nature. The flame of hydrogen is nearly invisible and has a high temperature which reaches 3,713 °F, as compared to gasoline which has a flame that reaches a temperature of 2,276°F. It is also important to note that hydrogen flames radiate little infrared heat, but substantial ultraviolet radiation, which means that when you are near a hydrogen flame, there is little sensation of heat. Two major physical hazards of hydrogen are its ability to have a fire at only 4% concentration and an explosion at 18% concentration in air.

Many labs on campus have compressed gas cylinders of hydrogen and it's essential to have the knowledge to use, move, and store the tanks safely. When beginning to use a new tank of hydrogen, only the regulator designed for hydrogen is to be used. Never use tools to open the valves due to the risk of a spark. Open the valve slowly to allow the gas to flow with as little friction as possible. Valves should be closed when the cylinder is not in use. When moving a compressed gas cylinder the valve cover must be in place and only the proper transporting device is to be used, such as a cylinder cart. The cylinders are to be stored in an upright position and strapped or bolted to walls to eliminate the hazard of being knocked over and becoming propelling rockets due to their pressurized nature. They must be separated from oxidizing gases by a distance of 20 feet or by a 5 foot high fire barrier that has a half hour fire rating. Tanks that are not currently being used should be stored in another location away from the active tank.

To help in the detection of leaks, hydrogen detection alarms should be installed on the ceiling above the tanks to alert lab personnel the concentration in the lab has reached 1%. This is critical because the hydrogen molecules are so small they are able to escape through finite spaces that other gases cannot. If the alarm does go off and there is not an immediate fire, turn the hydrogen source off, evacuate the lab, and call 911 from the nearest campus phone outside of the laboratory or 274-7911 from a cell phone and inform the emergency dispatch operator of the alarm. If a fire has started turn the hydrogen source off (if it is possible to shut off safely), pull the fire alarm, and call 911 from another building or 274-7911 from a cell phone and inform the emergency dispatch operator of the fire.

If you are a research lab on campus that uses hydrogen gas, please know and understand all the procedures and hazards associated with it. Have an emergency plan in place that all lab personnel are familiar with and at the end of the day everyone goes home the way they came in. Give hydrogen gas the respect it deserves.

Biosafety Basics

By: Rachel Bennett

Biosafety Containment Levels (BSL) defined by the CDC and NIH Guidelines

BSL	Definition	Containment
1	Defined and characterized strains of viable microorganisms not known to consistently cause disease in healthy adult humans; of minimal potential hazard to laboratory personnel and the environment.	All biological waste treated prior to disposal. A lab coat, gloves and appropriate eye protection must be worn when handling BSL1 material.
2	Indigenous moderate-risk agents that are present in the community and associated with human disease of varying severity; moderate potential hazard to personnel and the environment.	In addition to BSL-1 containment, a Biological Safety Cabinet (BSC) must be used. Cover or decontaminate waste prior to removal from BSC.
2 With BSL-3 practices	BSL-2 agents with an increased risk of inhalation hazard. For example: · Injection of lentiviral vector or lentiviral vector-transduced cells into animals engrafted with human cells that will not be tested for replication competence. · Pathogenic/oncogenic gene inserts or use of sharps with lentiviral vectors. · Lentiviral vector NOT produced using a 3rd generation system that will not be tested for replication competence.	In addition to BSL-2 containment, centrifuge safety cups must be used.
3	Indigenous or exotic agents with a potential for respiratory transmission and which may cause serious or potentially lethal infection (applicable to clinical, diagnostic, teaching, research, or production facilities).	In addition to BSL-2 with BSL-3 practices, appropriate respiratory protection must be worn. Work must be performed in a high containment, negative pressure facility.
4	Dangerous and exotic agents that pose a high individual risk of life-threatening disease, which may be transmitted via the aerosol route and for which there is no available vaccine or therapy.	In addition to BSL-3 containment, a pressure suit must be worn.

RG	Definition	Risk
1	Agents that are not associated with disease in healthy adult humans.	No or low individual and community risk
2	Agents that are associated with human disease which is rarely serious and for which preventive or therapeutic interventions are often available.	Moderate individual risk, low community risk
3	Agents that are associated with serious or lethal human disease for which preventive or therapeutic interventions are not usually available.	High individual risk, low community risk
4	Dangerous and exotic agents that pose a high individual risk of life-threatening disease, which may be transmitted via the aerosol route and for which there is no available vaccine or therapy.	High individual and community risk

Biohazard Waste Disposal Guide

By: Rachel Bennett

Note: all BSL-1 to BSL-4 materials MUST be autoclaved and marked as treated with autoclave tape prior to disposal

Type of biohazard waste	Disposal Container Options
Non-sharps	
Objects that are NOT sharp in original form or become sharp upon bending or breaking	  
Sharps	
Sharps container MUST be: Closable, puncture resistant, leakproof, labeled biohazard, easily accessible, and replaced routinely to avoid overfill (To prevent aerosol production NEVER shake a sharps container)	
Needles **Syringes** **Scalpels** **Razorblades** **Glass Pasteur pipets**	
Plastic Serological Pipets	  
Plastic Pipet Tips	   

Laboratories Continue to Improve

By: K. Lee Stone

I am pleased to announce that we have completed our laboratory safety surveys for the 2009/2010 school year and we are seeing a continued increase in the number of laboratories with no violations as compared to previous years. We are also seeing fewer labs with D or F grades. The number of laboratories on our campus has also increased from around 800 labs in 2004 to nearly 1200 labs today. This is exciting news as it is indicative of a growing research base on the IUPUI campus with an improving safety awareness. We are seeing new faculty members arrive with a strong desire to maintain compliance as well as current faculty with a renewed interest in laboratory safety.

Please see the following page for graphs that summarize the results of laboratory safety surveys that were performed over the last 7 years.

I want to commend all the laboratory faculty, staff and students for their efforts to maintain compliance. Your hard work has not gone unnoticed.

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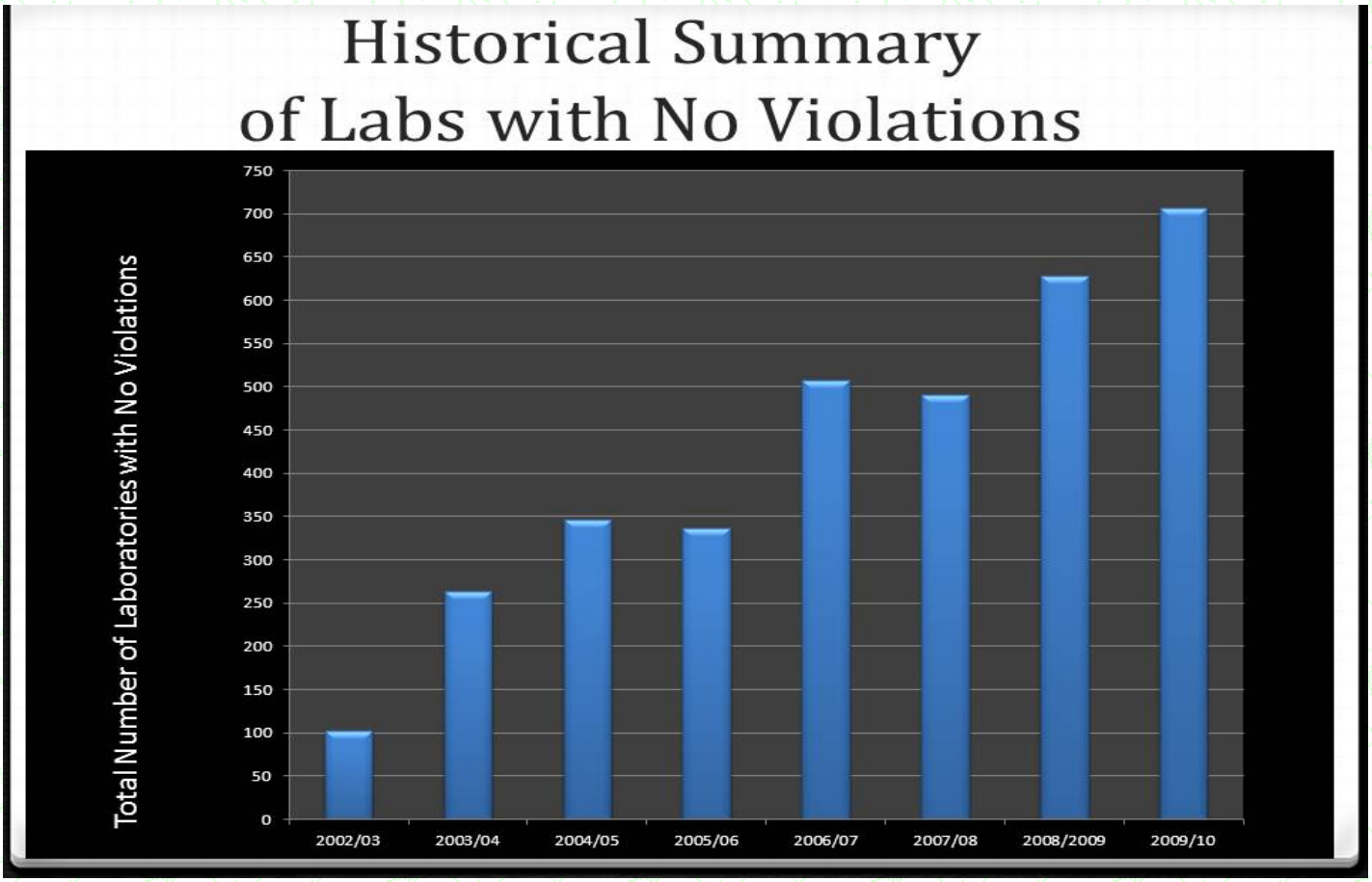
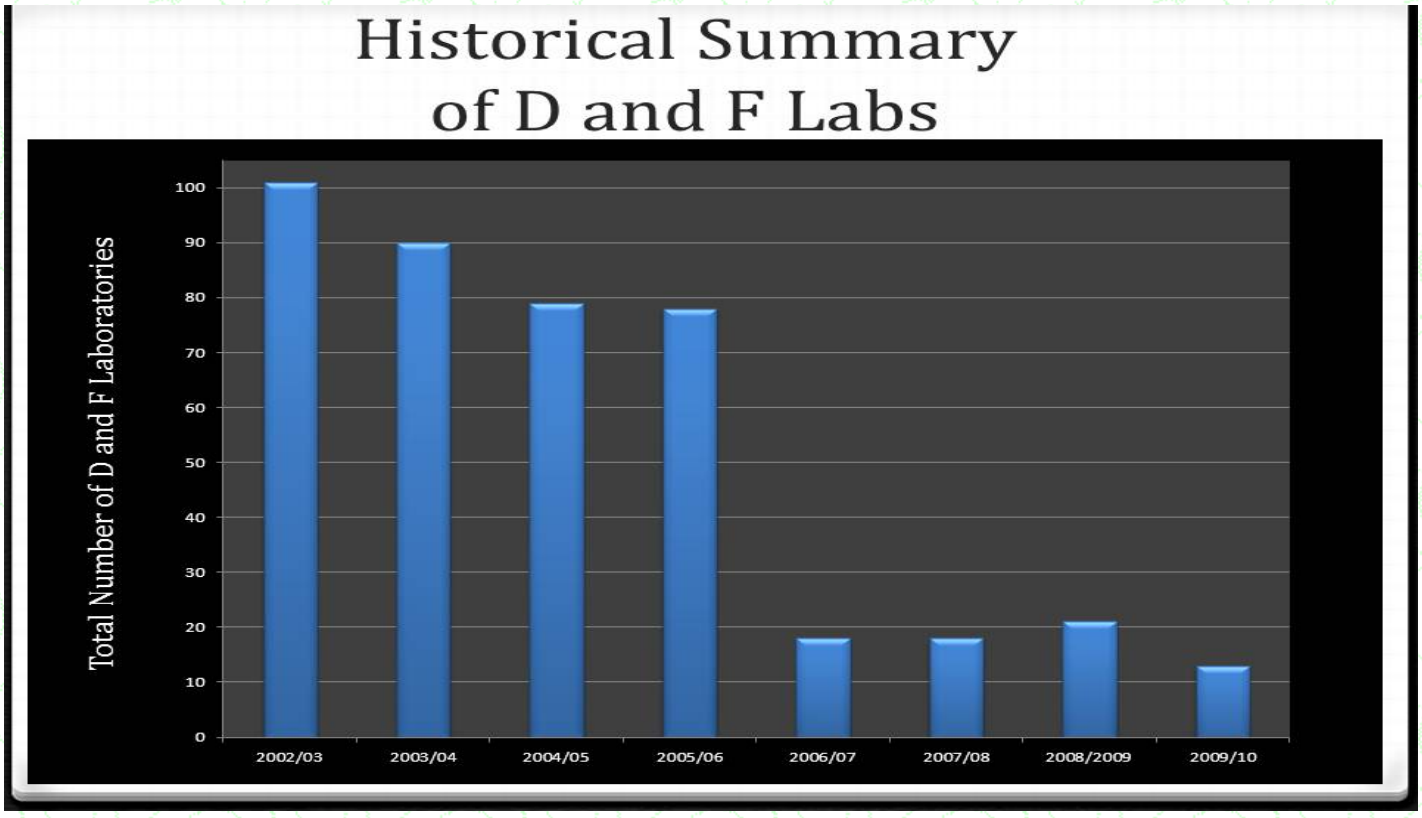
New Employee Training Schedule

Training	Time	2010/2011 Dates	Building	Room
Laboratory Safety- **REQUIRED** for all new employees working in laboratories with hazardous chemicals.	9:30AM-Noon	November 8 December 13 January 10 February 14	Union Building	Roof Lounge-6th Floor
Bloodborne Pathogens- **REQUIRED** for all employees working with human blood, body fluids or tissues.	8:30AM- 9:30AM	November 8, 22 December 13 January 10, 24 February 14, 28	Union Building	Roof Lounge-6th Floor
New Employee Orientation- **REQUIRED** for all new employees.	1:30PM-4:00PM	November 2, 9, 16, 30 December 7, 14	Campus Center	305 305
Biosafety Training- All employees who work with biohazardous materials are encouraged to attend.	9:30AM-11:30AM	November 8 No Sessions in December January 24 February 28	Union Building	Roof Lounge-6th Floor





"A handful of common sense is worth a bushel of accident prevention."