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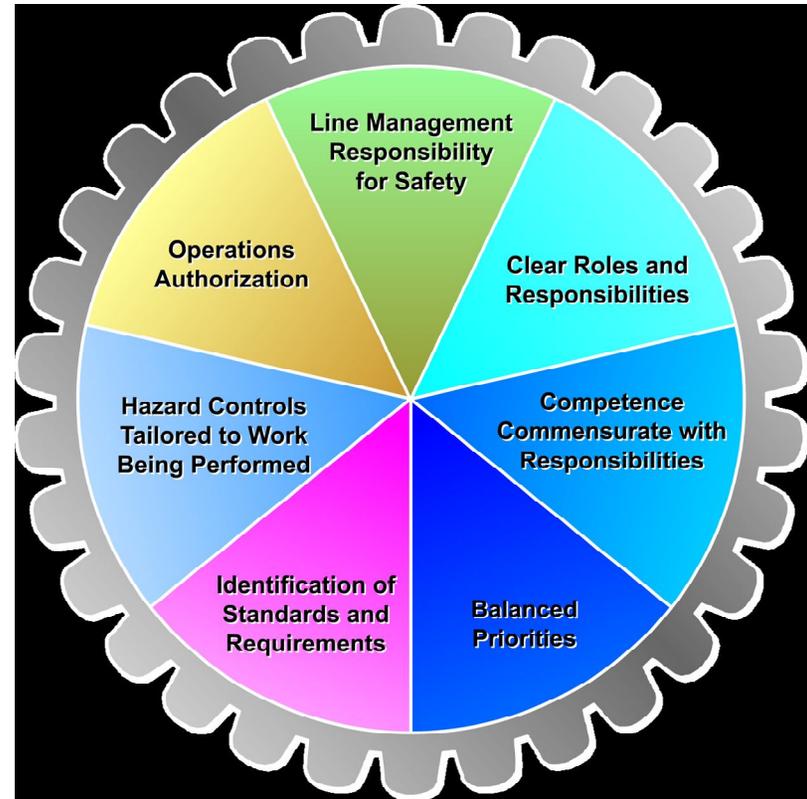
## *Experiment Safety Review*

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# Integrated Safety Management – How we work



EQO140 [http://www.eshtraining.anl.gov/course\\_info/wbt.htm](http://www.eshtraining.anl.gov/course_info/wbt.htm)

## Regulations and Standards

- 10CFR851 DOE Contractor ESH Standard  
<http://hss.energy.gov/HealthSafety/WSHP/rule851/851final.html>
- OSHA 29CFR1910.1450 Lab Haz Com  
[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10106](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10106)
- ESH Manual Section 21.2
  - References various other Manual sections
  - <http://www.aim.anl.gov/manuals/eshman/index.html>
- There are hazard specific standards in OSHA (See below)
  - ES&H manual sections address many of the specific std.
  - If you use these, you have to tell EQO-IH
  - We have to do a hazard assessment, which may include air sampling
- OSHA PPE Std. requires hazard evaluation

## ■ HAZARDS INCLUDE:

- Physical Hazards
  - Impact/Penetration/ Compression
  - Electrical ES&H Manual *Chapter 9*
  - Slips, trips and falls
  - Pinch points
  - Pressure/Vacuum *ES&H Manual 13.1, 13.2, 4.10*
- Chemicals Agents
  - Dusts, mists, fumes, gases and vapors
  - Liquids and solids
  - Engineered Nano-materials *ES&H Manual 4.13*
- Physical Agents
  - Heat and cold *EQO-IH*
  - Non-ionizing Radiation *6.1*
  - Lasers *6.2*
  - Noise and vibration *7.6*
- Ionizing Radiation *ES&H Manual chapter 5*

# Chemical Hazards

## Information sources

MSDS <https://www.cms.anl.gov>

OSHA Stds

[http://www.osha.gov/pls/oshaweb/owastand.display\\_standard\\_group?p\\_toc\\_level=1&p\\_part\\_number=1910](http://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_toc_level=1&p_part_number=1910)

ACGIH TLVs Contact EQO-IH (2-3310)

CRC Handbook of Chemistry and Physics

ES&H Manual <http://www.aim.anl.gov/manuals/index.html>

NAS Prudent Practices in the Laboratory

EQO-IH

Others working in the field

## OSHA Hazard Specific Standards

|  |                                 |
|--|---------------------------------|
| 1. Asbestos  | 16. Vinyl chloride              |
| 2. Coal tar pitch volatiles  | 17. Inorganic arsenic           |
| 3. 4-Nitrobiphenyl, Chemical Abstracts Service Register Number (CAS No.) 92933 | 18. Lead (Inorganic)            |
| 4. alpha-Naphthylamine, CAS No. 134327   | 19. Chromium(VI)                |
| 5. methyl chloromethyl ether, CAS No. 107302                                   | 20. Cadmium (all forms)         |
| 6. 3,3'-Dichlorobenzidine (and its salts) CAS No.91941                         | 21. Benzene                     |
| 7. bis-Chloromethyl ether, CAS No. 542881                                      | 22. Coke oven emissions         |
| 8. beta-Naphthylamine, CAS No. 91598   | 23. Cotton dust                 |
| 9. Benzidine, CAS No. 92875  | 24. 1,2-dibromo-3-chloropropane |
| 10. 4-Aminodiphenyl, CAS No. 92671;  | 25. Acrylonitrile               |
| 11. Ethyleneimine, CAS No. 151564  | 26. Ethylene oxide              |
| 12. beta-Propiolactone, CAS No. 57578  | 27. Formaldehyde                |
| 13. 2-Acetylaminofluorene, CAS No. 53963                                       | 28. Methylenedianiline          |
| 14. 4-Dimethylaminoazo-benzene, CAS No. 60117                                  | 29. 1,3-Butadiene               |
| 15. N-Nitrosodimethylamine, CAS No. 62759.                                     | 30. Methylene chloride          |

## ***Chemical Hazards - rule of thumb***

- Give particular attention to chemicals with 3 or 4 in the Health and Fire sections of the NFPA diamond label
- Give particular attention to chemicals with low TLVs
  - <50 ppm or < 0.1 mg/M<sup>3</sup>
- Give particular attention to pyrophoric and reactive chemical
- Make sure the hood is adequate for the work
  - 100fpm and 135 + - 15 fpm
  - Consult with EQO-IH before modifying hoods or adding hoods, gas cabinets elephant trunks to the ventilation system.
- Toxic gases and vapors may require detector alarms – Consult with EQO-IH

# *Personal Protective Equipment*

ES&H Manual 12.1

Eye protection – Safety glasses with side shields in the lab

Face shields for corrosive chemicals, cryogenic materials and other face hazards

Gloves -Select based on chemical(s), concentration, duration and dexterity

consult with EQO-IH <http://www.anl.gov/ESH>

Cover you body – no shorts, sandals, sleeveless tops

Above all, be specific. Do not say appropriate, suitable or other vague terms.

## Training

JHQ must be up-to-date

Changes in procedures or new hazards require reviewing JHQ

This will help assure that the correct training is given.

Document any on-the-job training required to do the work

## Feedback

State how and when feedback, post-experiment review will be given and documented.

Close the loop.



## *Waste management*

Identify what wastes will be created and how they will be dealt with.

Minimize waste through experiment design

Purchase only what you need

Smaller quantities may cost more initially, but consider the disposal cost.

Don't keep excess material

Satellite waste accumulation areas must be posted and the log available.

## ***Experiment Safety Review Process***

<http://www.msd.anl.gov/resources/esh>

<http://www.anl.gov/ESH>