NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Innovation for Our Energy Future

Safe Laser Servicing By Outside Technicians

2010 DOE LSO Workshop

Lawrence Berkeley National Lab

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Seemed like a good idea at the time

Share your successes

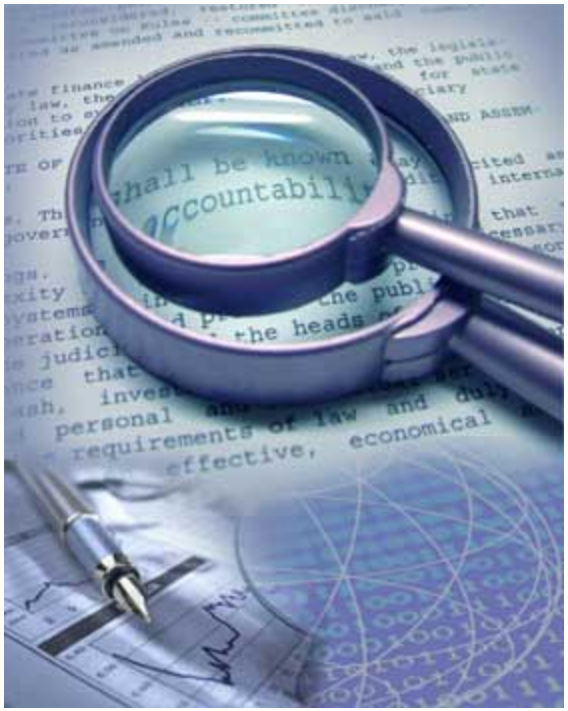
Multistep Oversight of Technician's Work

Before they arrive – **verification**

Before they lift a tool – **orientation**

While they're working – **hosting**

Before they leave – **critique**

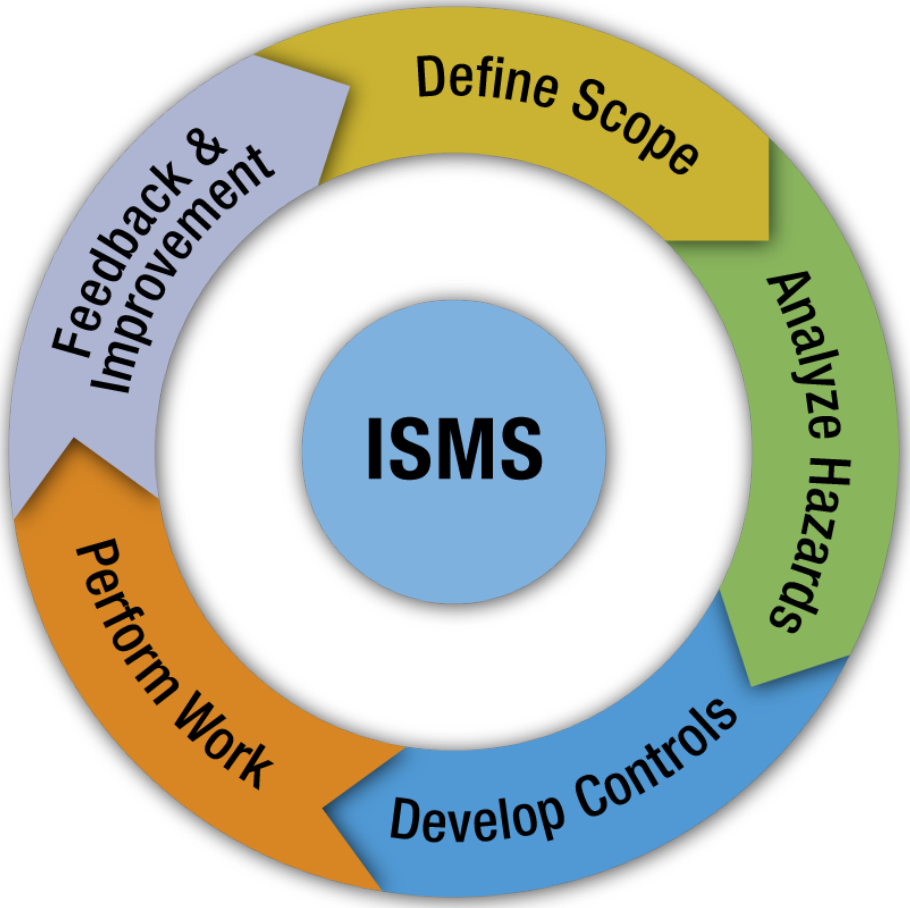


ISMS in Laser Servicing

Define the Scope –

Safety Assessment

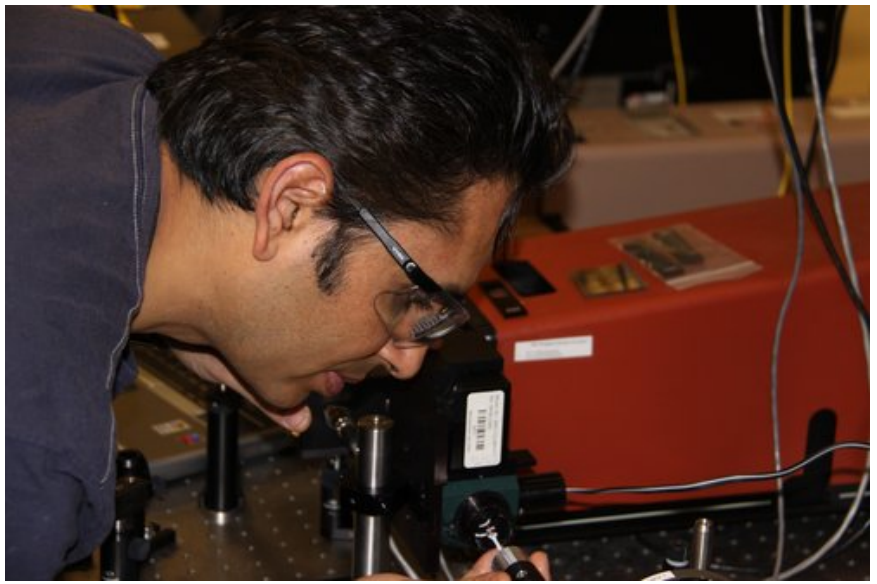
- What
- Who (credentials)
- Where
- Live diagnostics (energized)
- Open beam
- Duration of the work



Analyze the hazards

Open beam work?
- MPE
- OD

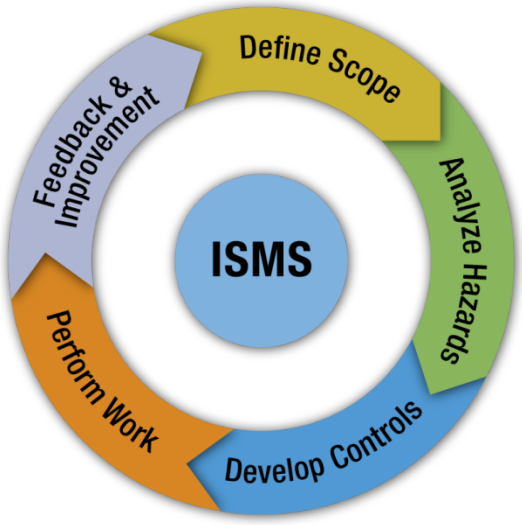
Energized diagnostics?
- Exposed conductors
- Voltage
- Amperage



Lockout/Tagout procedure needed/available?

Other non-beam hazards
- Compressed gases
- Chemicals

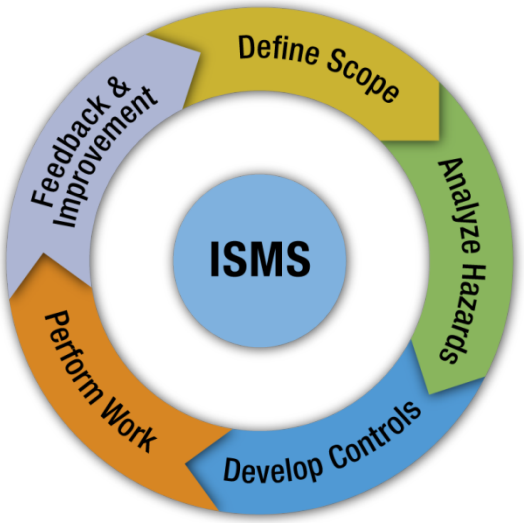
Co-located hazards
- Other activities in the lab?
- Metals, nanomaterials



Develop the controls

Well in advance - Contact the technician and verify:

- Training is current
- They know what Personal Protective Equipment (PPE) is required,
- They will bring their own eyewear
- Familiarity with equipment
- Training and correct PPE for energized diagnostics



Develop Controls - Safe Work Permit

Specify Hazards and Controls

Work Authorization

Frequency

- Issue up to 15 SWPs annually

Common services covered

- Set up & shake down
- Microscope set up
- Replacement of parts

Connections to other Control Documents

SOPs list reminders for work with technicians (mgmt of change)

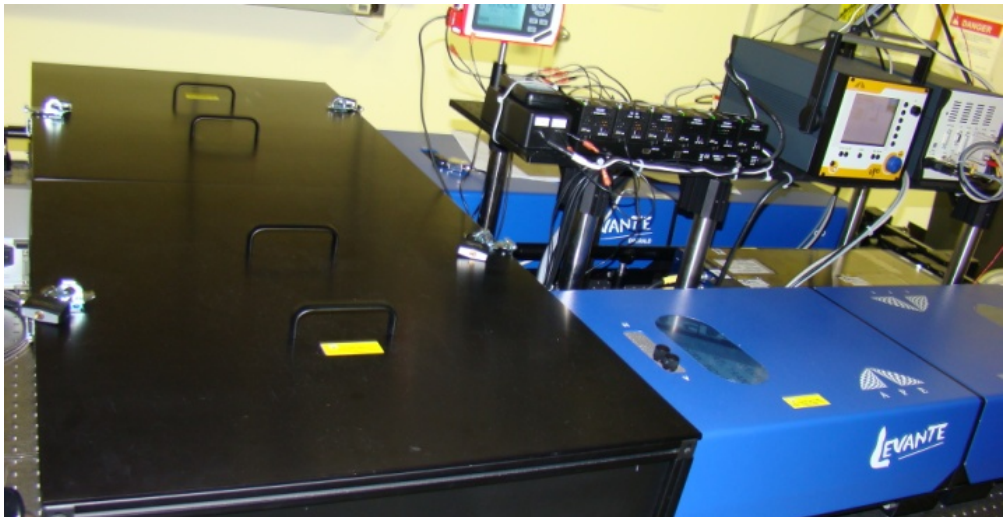
> "When maintenance, servicing, alignment, or repair work is to be conducted by manufacturer's laser technicians this work must be pre-planned with the EHS Office so a Safe Work Permit can be issued, and verification can be made by the research host that the technician is prepared to perform such work safely".

Case Studies –

Eyewear Considerations

International Challenges

- High Q Laser
- Technician from Germany
- OD on eyewear was in IEC terms not US/ANSI (needed to translate)



Case Studies –

Eyewear Considerations

Alignment eyewear vs. more conservative eyewear

Case Studies –

Energized Diagnostics

- Performed only if there is no exposure i.e. no exposed conductors and low voltage work (<50 v)

- NFPA 70E Requirements
  - Most laser techs don't have this training
  - Prohibit this work on site.

Case Studies –
Training

Technicians not trained

Case Study –
Electrochromic Window Testing

Window testing with portable Class 3B repetitively pulsed laser system (Nd: YAG)

Beam enclosure
Shielding on outside of window
Access Control to Work Area
Building Notifications
Laser Protective Eyewear
Written procedures developed by Mfgr

Heed the Warning Signs

Technicians arrive without proper eyewear – indicator that they may not habitually wear LPE

Not knowing the OD's

Not having safety training

Shiny tools

Your experiences?

Options – What to Do when you have a sinking feeling

Send them packing

Constant oversight by Laser System Supervisor

Call their employers