

NSLS ESH Program
Management Review for FY05

Presented by R. Casey

9/29/2005

Scope of Discussion

- Overview of NSLS ESH Management System
- Review of ESH Performance Measures
- Stakeholder Involvement
- Financial Costs
- Targets for FY 06
- Senior Management Questions

ESH Management at the NSLS

- Program management is defined in the NSLS [OHSAS](#) and [EMS](#) Manuals
- ESH requirements are defined in BNL SBMS [supplemented by NSLS ESH Policy and Requirements Manual ([PRM](#))]
- Administration of the ESH Program is responsibility of the Associate Chair for ESH (direct report to the department chair)

ESH Management at the NSLS (continued)

- Program responsibility includes:
 - Emergency planning
 - Environmental management
 - Experimental safety review
 - Hazardous waste management
 - Industrial hygiene
 - Industrial safety
 - Radiation safety
 - Self-assessment
 - Testing of radiological and laser interlock systems
 - Training
 - Quality assurance
 - Work planning support

ESH Management at the NSLS (continued)

- NSLS ESH personnel
 - NSLS ESH Coordinator (N. Gmur)
 - NSLS Safety Officer (A. Ackerman)
 - ESH Specialist (J. Aloï)
 - Safety Engineer (B. Chmiel)
- NSLS Quality Manager (M. Buckley)
 - Quality Control Coordinator (C. Nielson)
- NSLS Training Coordinator (0.5 FTE) (M. Corwin)
- Supported by ~ 2.5 FTE from RCD, ~ 0.3 FTE from ESWMD, and additional support from BNL Safety Staff

EMS/OHSAS Committee

- R. Casey – Associate Chair for ESH/Q
- A. Ackerman – Experimental Review Coord.
- J. Aloï – ESH Specialist
- D. Bauer – ECR (EWMSD)
- M. Buckley – QA Manager
- B. Chmiel – Safety Engineer
- M. A. Corwin – Training Coordinator
- N. Foster – Facility Support Rep. (RCD)
- N. Gmur – ESH Coordinator & Local Emerg. Coord.

ESH Management at the NSLS (continued)

- Work planning is managed by Al Boerner in the Operations Division (major involvement from ESH personnel)
- [Overall ESH Organizational chart](#)

Overview of OHSAS Program

- Program fully defined and will be fully implemented by 11/05.
- Risks associated with 42 NSLS activities are under evaluation
- Close link established with job risk assessment, worker qualification and work planning. Cited in two audits as noteworthy practice
- Strong worker involvement in:
 - development of qualification matrices
 - risk assessment
 - work planning
 - ESH Improvement Committee

Overview of OHSAS Program (cont.)

- Training, JRAs, R2A2s, not fully implemented
- Management review needed
- Full implementation scheduled for November 1st

NSLS ESH Program Performance

- Performance Objective
- Performance Measures

NSLS ESH FY 05 Performance Objective

Ensure operational excellence in ESH and waste management programs

Strategy - The tenets of ISM and ISO 14001 will continue to be implemented, with on-going emphasis of work planning, training, pollution prevention, and compliance with BNL ESH regulations. This year will involve a move into OHSAS 18001 and will also focus on electrical safety issues in a substantial way.

How did we do??

ESH Performance Measures

- Progress on ESH Targets
- Results of assessments and audits
- Status of OSHA audit follow-up
- Traffic violations
- Training statistics
- Injuries
- Incidents
- Radiation exposure
- Hazardous waste generation
- Spills
- Compliance rates as measured through audits

Status of ESH Targets for FY 2005

- **Continue review and improvement within NSLS operational work planning**

Outcome – A major focus within FY 05; # of WCCs expanded, engineer assigned to manage work planning program, worker qualification procedure developed, new worker qualification matrices developed

- **Ensure department and beam line staff awareness of equipment requiring LOTO**

Outcome – Lists of hazardous equipment were developed throughout the department, tags or labels placed on all equipment

Status of ESH Targets for FY 2005 (cont.)

- **Ensure awareness and implementation of electrical safety practices consistent with NFPA 70E requirements**

Outcome – training provided to all department electrical workers, work permits re-issued, labels placed on all panels and switch boxes, department policies updated, process for evaluating short-circuit capability in distribution lines defined

- **Implement BNL requirements for NRTL listed equipment**

Outcome – NRTL requirements discussed with all staff, including users; inspectors selected and trained; program implementation defined and awaiting approval

Status of ESH Targets for FY 2005 (cont.)

- **Develop and implement an OHSAS 18001 program**

Outcome – Program implementation in process, two audits in past 2 months show significant progress; completion expected 11/2005

- **Implement OSHA fall protection requirements**

Outcome – Locations requiring fall protection have been identified and posted. NSLS PRM defining fall protection requirements has been approved. Fall protection equipment has been purchased.

Status of ESH Targets for FY 2005 (cont.)

- **Complete implementation of hoist and crane requirements**

Outcome: Training requirements have been upgraded and qualified personnel have been identified. Checklists for crane inspections have been established. All cranes have been locked.

- **Conduct a department wide safety stand-down**

Outcome: 8 separate meetings were held during Dec. 2004. Comments and concerns have been posted on web and are being tracked until completion.

Status of ESH Targets for FY 2005 (cont.)

- **Continue ESH evaluations of NSLS – II design**

Outcome: EENF has been drafted and is ready for processing.

Radiation shielding for main ring has been estimated and presented at 2 conferences. Other potential ESH issues have been discussed and will be considered during the CDR preparation.

- **Complete SAD and ASE upgrade for DUV-FEL and NSLS**

Outcome: SAD and ASE for DUV-FEL were completed and have been reviewed and approved by BNL and DOE management. The SAD for NSLS has been drafted and will begin final review in FY 2006.

Status of ESH Targets for FY 2005 (cont.)

- **Address the following environmental issues**
 - Complete evaluation of synthetic vacuum pump oils
 - Complete EENF for NSLS – II
 - Evaluate substitute for rydlyme
 - Identify mercury containing equipment and identify essential and non-essential use

Summary of Progress on Targets

- Excellent progress made on FY 05 targets
- Resulted in increased rigor and commitment to program on every issue
- Produced important gains in strength of program

Audits and Assessments Conducted in FY 2005

- NSLS Audits & Assessments
 - > 30 Tier 1 inspections of NSLS workplaces
 - Electrical safety self-assessment
 - Work planning self-assessment
 - Experimental Review self-assessment
 - Beam line reviews evaluating electrical safety issues
 - Critique of department local emergency response
 - Process assessments
- BNL audits
 - ISO 14001 by EWMS
 - Field verification of OSHA finding close-outs
 - Machine shop safety
 - Laser Safety
 - OHSAS 18001 by ESHQ
 - ALARA practices by RCD
 - IH assessment by BNL/DOE

Audits and Assessments Conducted in FY 2005 (cont)

- Non BNL assessments or audits
 - DOE electrical safety
 - Desk audit of OHSAS 18001 by NSF
 - ORR review of OHSAS 18001 by NSF
 - Triennial sealed sources
 - NYSDEC RCRA inspection

Summary of Assessments and Audits

- No significant issues identified
- Internal OHSAS 18001 audit noted that several elements are not fully implemented at time of audit.
- In some audits, minor issues reported or opportunities for improvement identified

Tier 1 Summary

- Comprehensive review of work locations through-out the department
- All findings are assigned and tracked until closed.
- Detailed reports are available

Conclusion – Effective program for monitoring work place and correcting potentially unsafe conditions.

Chart #1

Number of NSLS Tier I Inspections as of 9/6/05

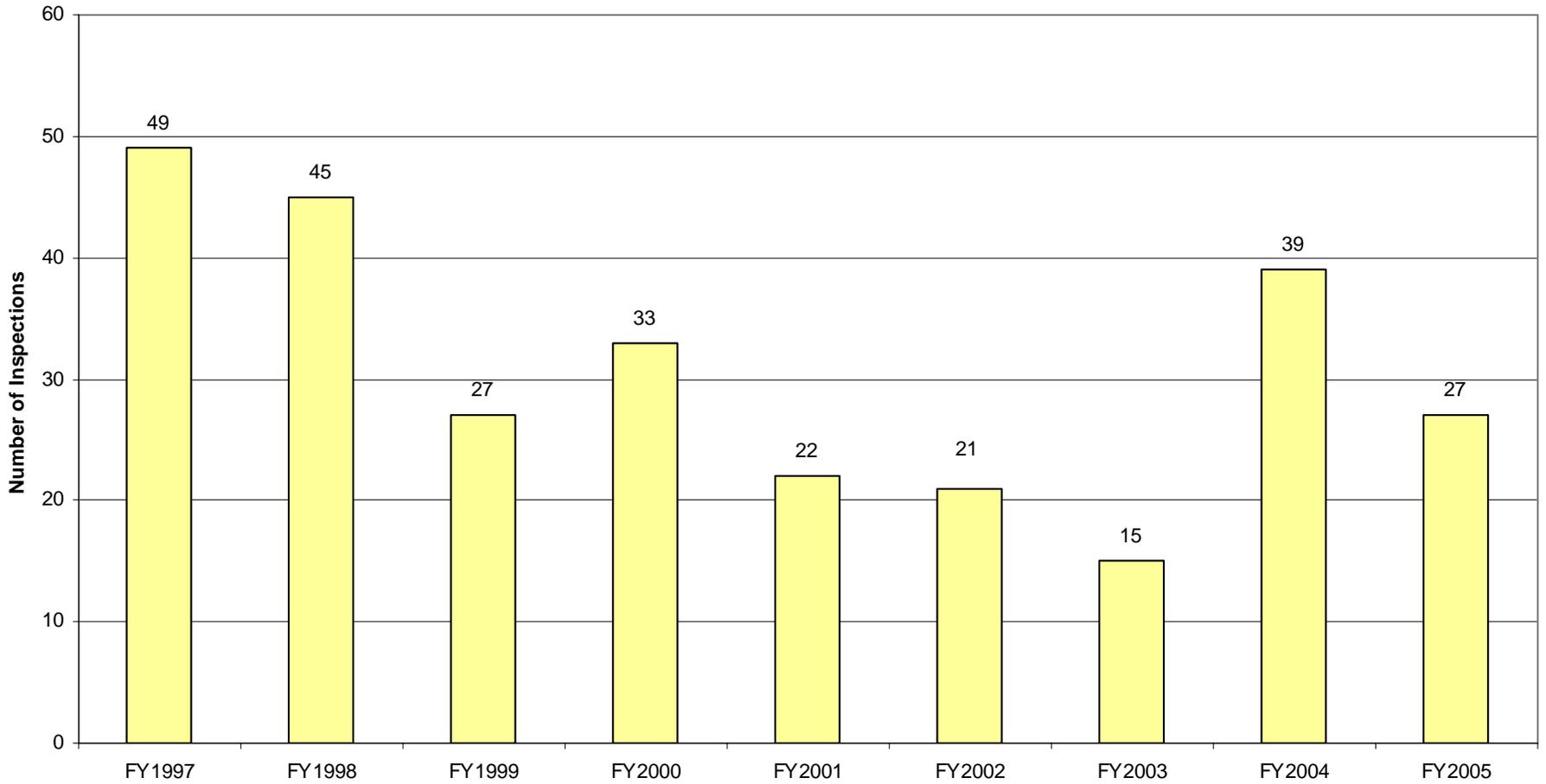


Chart #2

Number of NSLS Tier I Infractions per Year as of 9/6/05

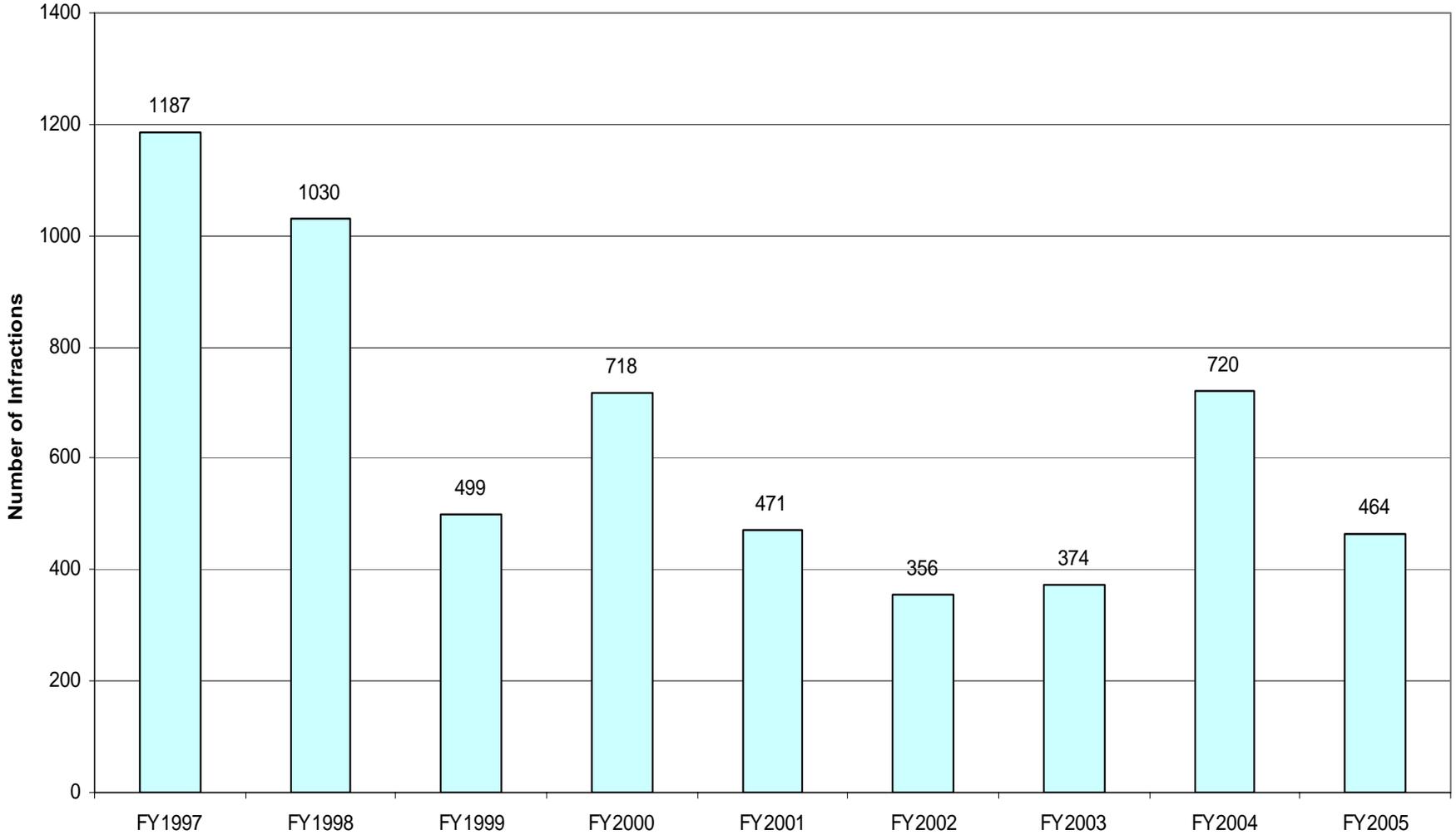


Chart #3

Number of Infractions per NSLS Tier I Inspection as of 9/6/05

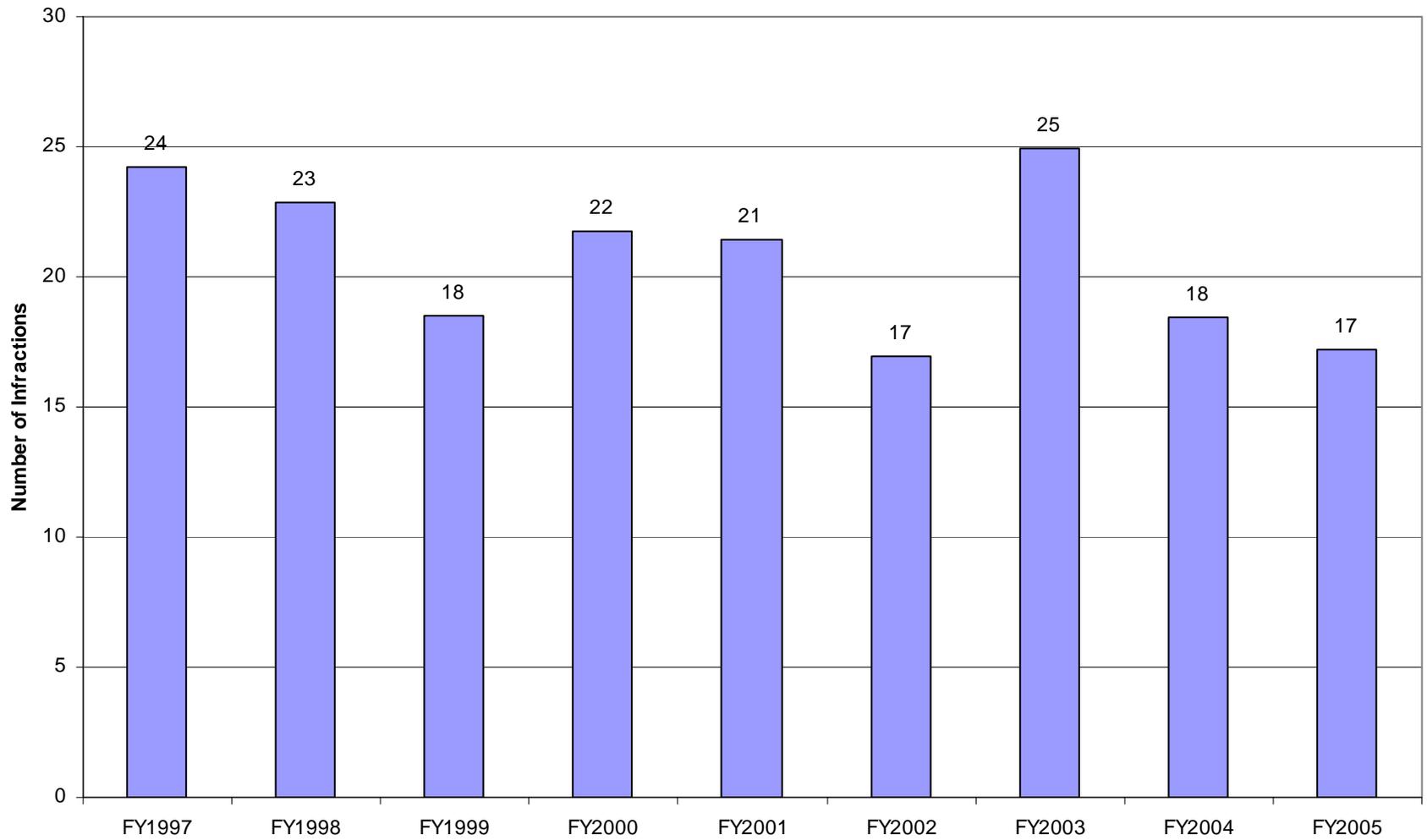
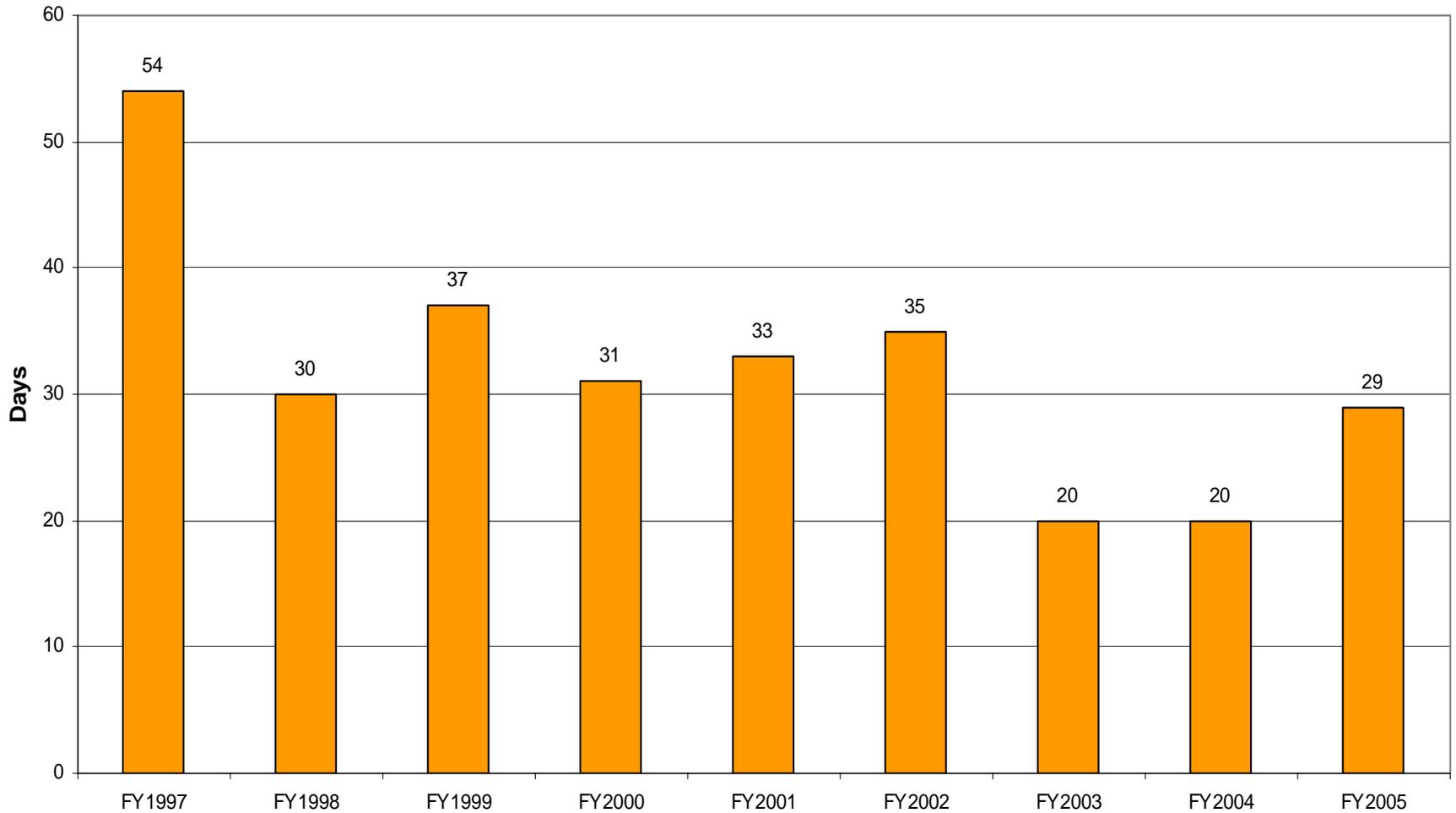


Chart #4

Turnaround Time From Notification to Correction of Infraction as of 9/6/05



Distribution of Tier 1 Findings

Cat. #	Category	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1	Housekeeping	25	25	9	6
2	Working Environment: Plant	22	10	5	2
3	Working Environment: Department	38	21	10	8
4	Outside and Grounds	0	0	0	0
5	Fire Safety	10	3	3	4
6	Electrical Safety: Distribution	36	38	13	0
7	Electrical Safety: Equipment	107	52	20	20
8	Electrical Safety: Programmatic	0	0	0	0
9	Chemical Safety: Labeling	4	8	2	1
10	Chemical Safety: Use	0	0	0	0
11	Chemical Safety: Storage	17	12	8	2
12	Personal Protective Equipment	0	1	0	0
13	Compressed Gas/Cryogenics)	11	15	9	7
14	Biohazards	0	0	0	0
15	Radiation Safety	1	1	0	0
16	Waste	8	1	1	3
17	Environmental	0	0	0	0
18	Machine Shop Safety	1	3	6	1
19	Material Handling and Equipment Safety	9	3	1	1
20	Industrial Hygiene Issues	8	2	0	0

Status of NSLS OSHA Audit Findings

- 69 findings closed. Verification by ESHQ personnel
- 2 findings open – addressed through lab-wide crane issues assigned to PE for resolution

Traffic Tickets Received by NSLS – related Personnel in FY 05

- 50 tickets through 9/8/05
 - 19 short-term users
 - *16 staff members*
 - 11 long term users
 - 2 students
 - 2 family members
- 2 people received 2 tickets in fiscal year

Types of Tickets

- 21 – stop sign violation
- 16 – speeding
- 8 – no BNL car sticker
- 2 - no signal while turning
- 2 – parking
- 1 – expired NY State Inspection sticker

Training Data

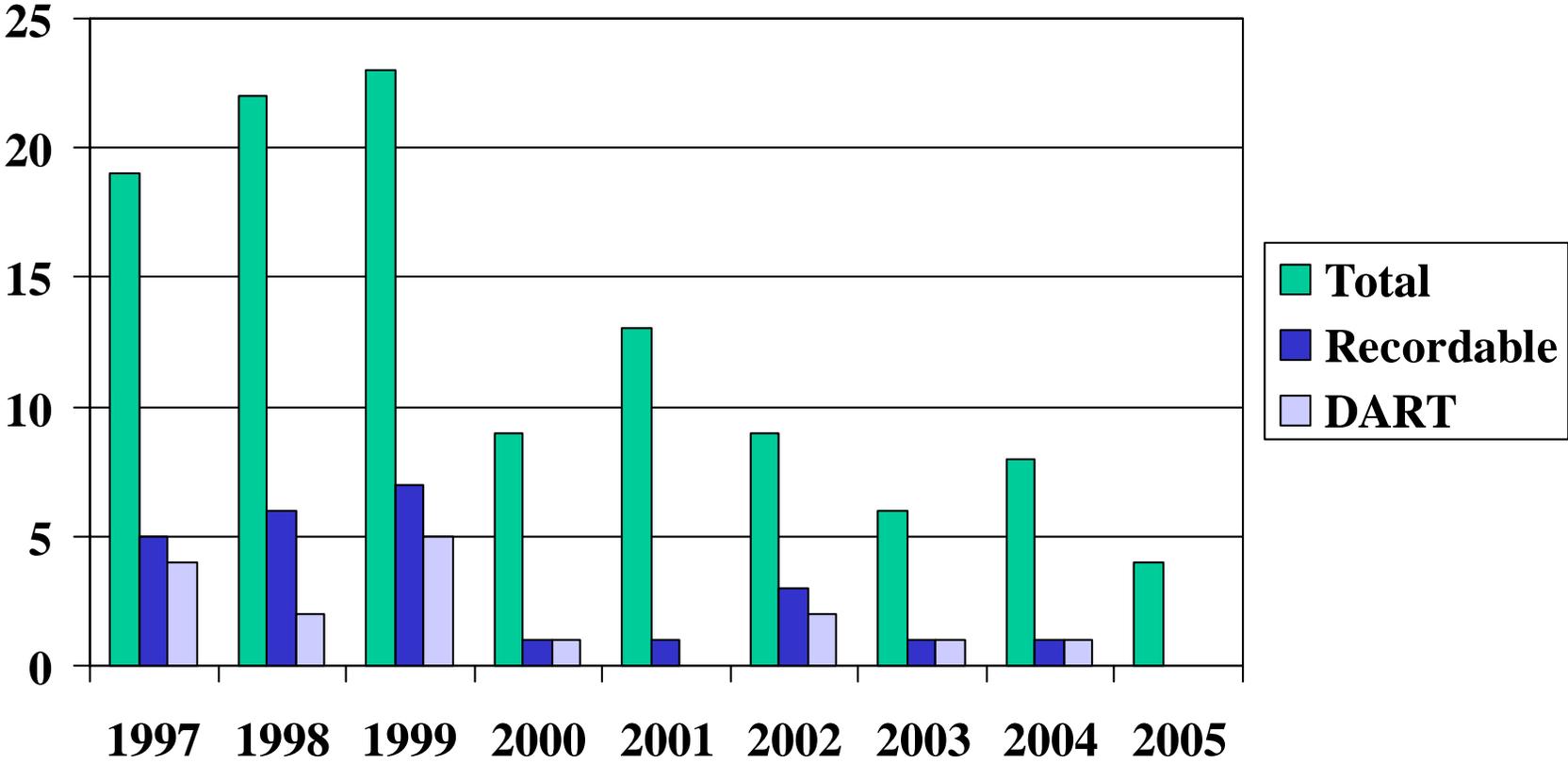
- NSLS staff training requirements - ~ 4100
 - 97 % - 98% completion rate each month
- NSLS Guest training requirements - ~5300
 - ~ 94% completion rate each month

Injury Data

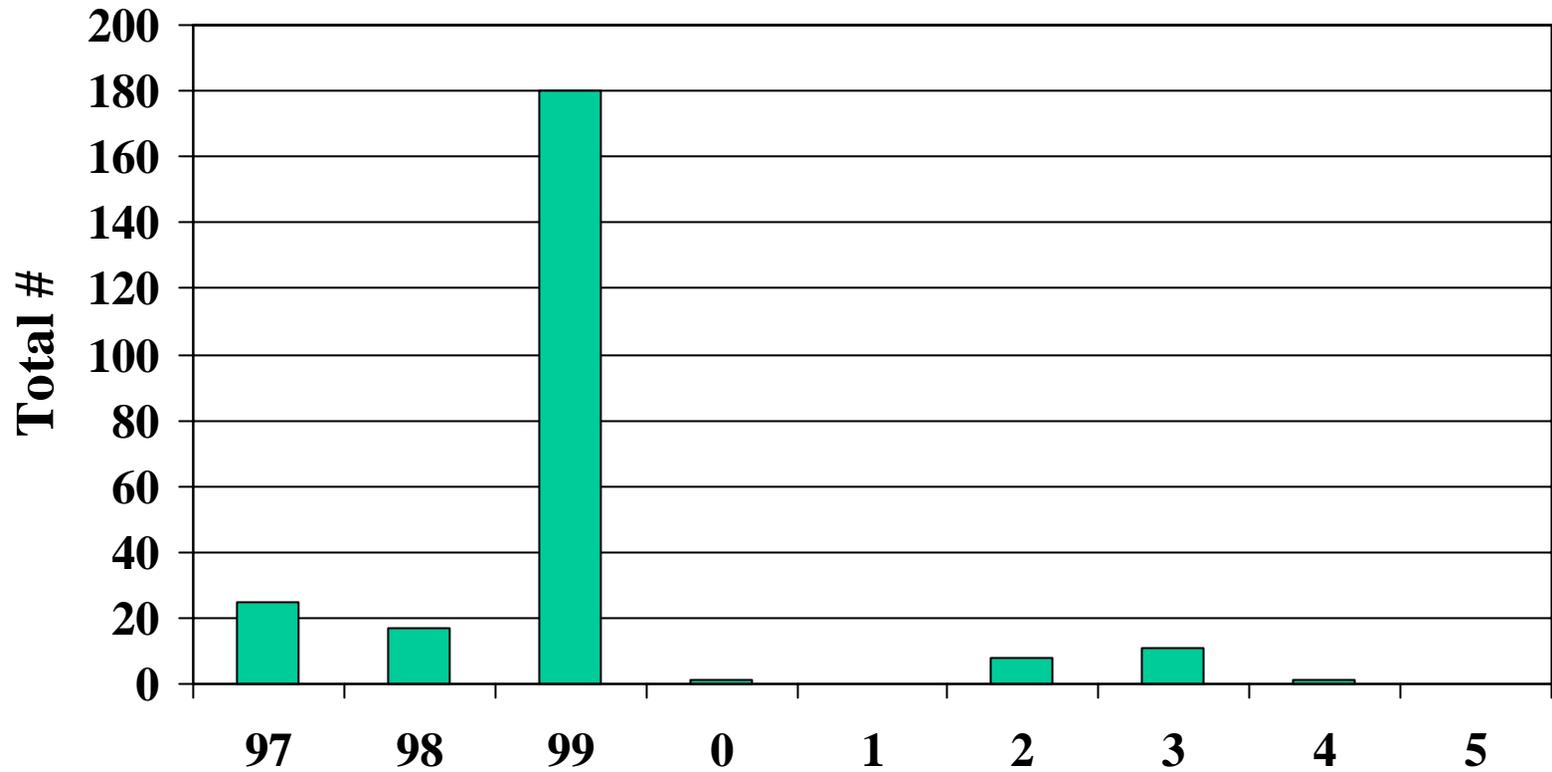
Four NSLS Injuries Reported to Clinic in FY05

- Injured finger playing volleyball
- Struck knee against equipment while descending ladder
- Pain in wrist from repeatedly lifting small cryogenic dewar
- Finger pinched while moving beam line equipment

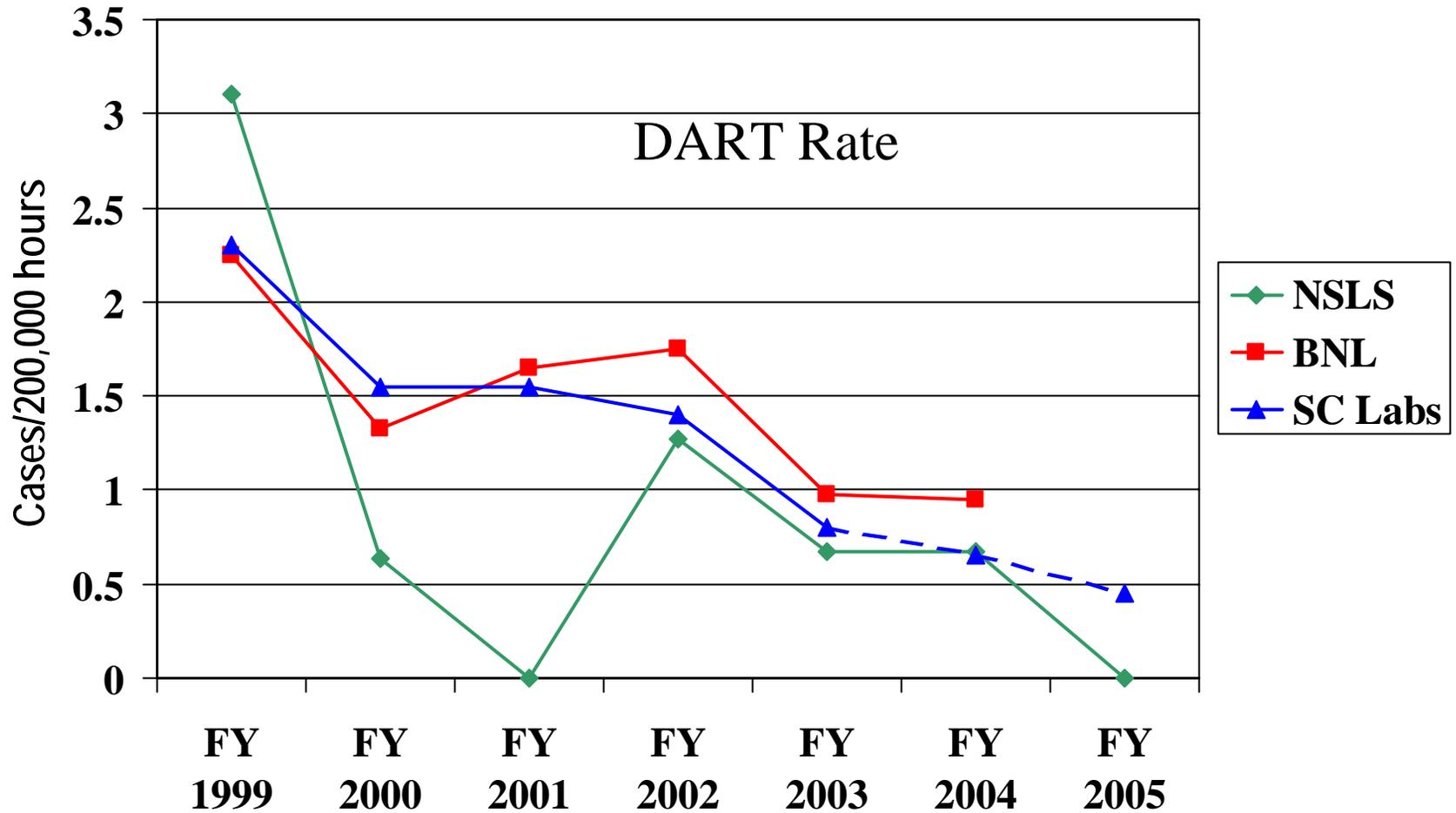
Clinic Visits per Fiscal Year



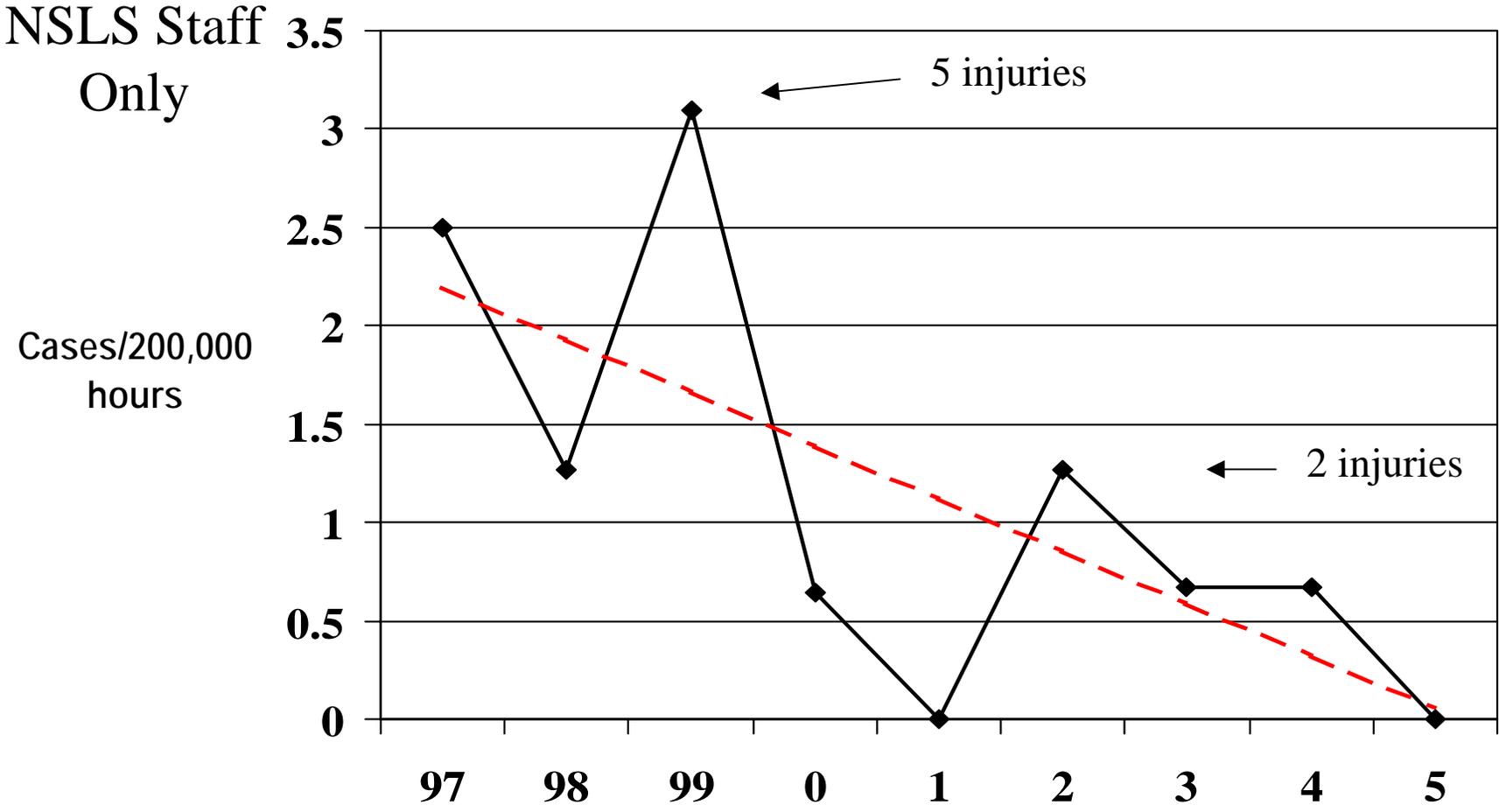
Lost Work Days FY 1997 - present



NSLS Compared to BNL & DOE SC Labs



NSLS DART Rate by FY



Conclusion

- Injury rates and severity continue significant decline

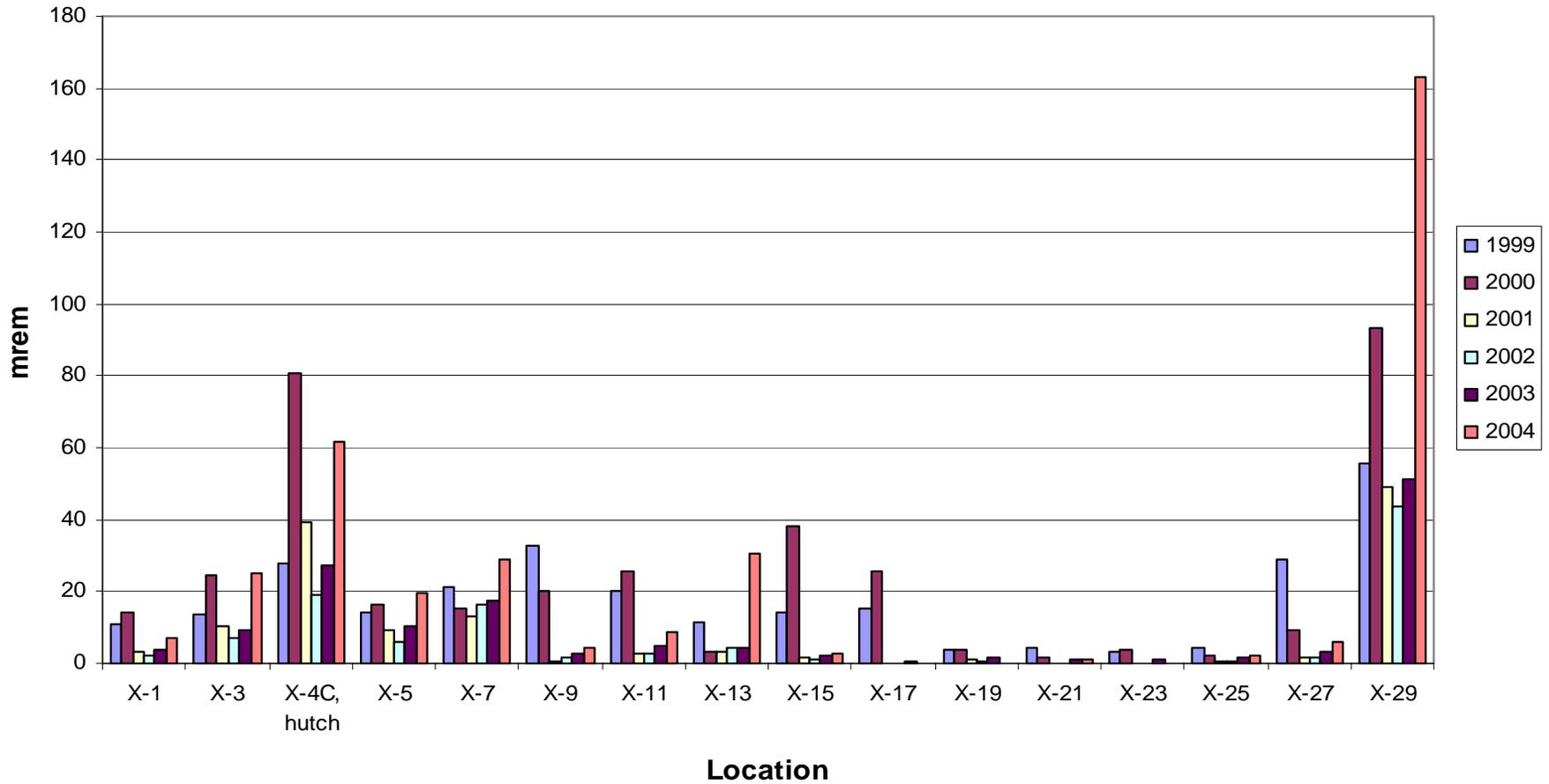
Radiological Exposure Data

Personnel Radiation Exposures for CY 2005

- Radiation exposure is very low. Total recorded dose equivalent to all badged personnel is 21 mRem through August.
- However, administrative controls continue to be needed on VUV floor and some locations on the 2nd floor and X-ray floor

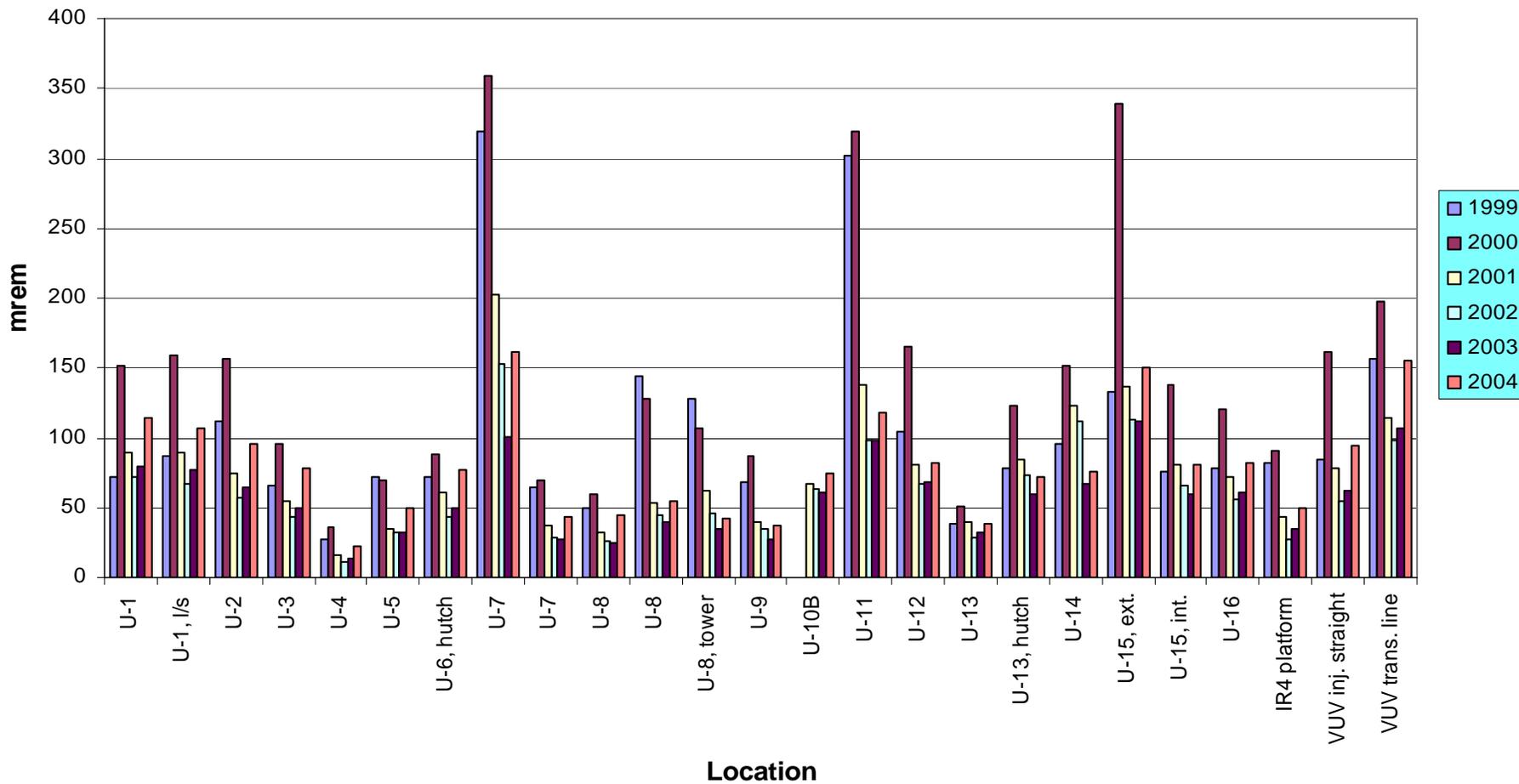
X-ray Radiation Patterns – 1999 - 2004

Calculated Person Dose From Area Monitor Data
Bldg. 725, X-ray Floor
(Assumes 40 hours/week occupancy)

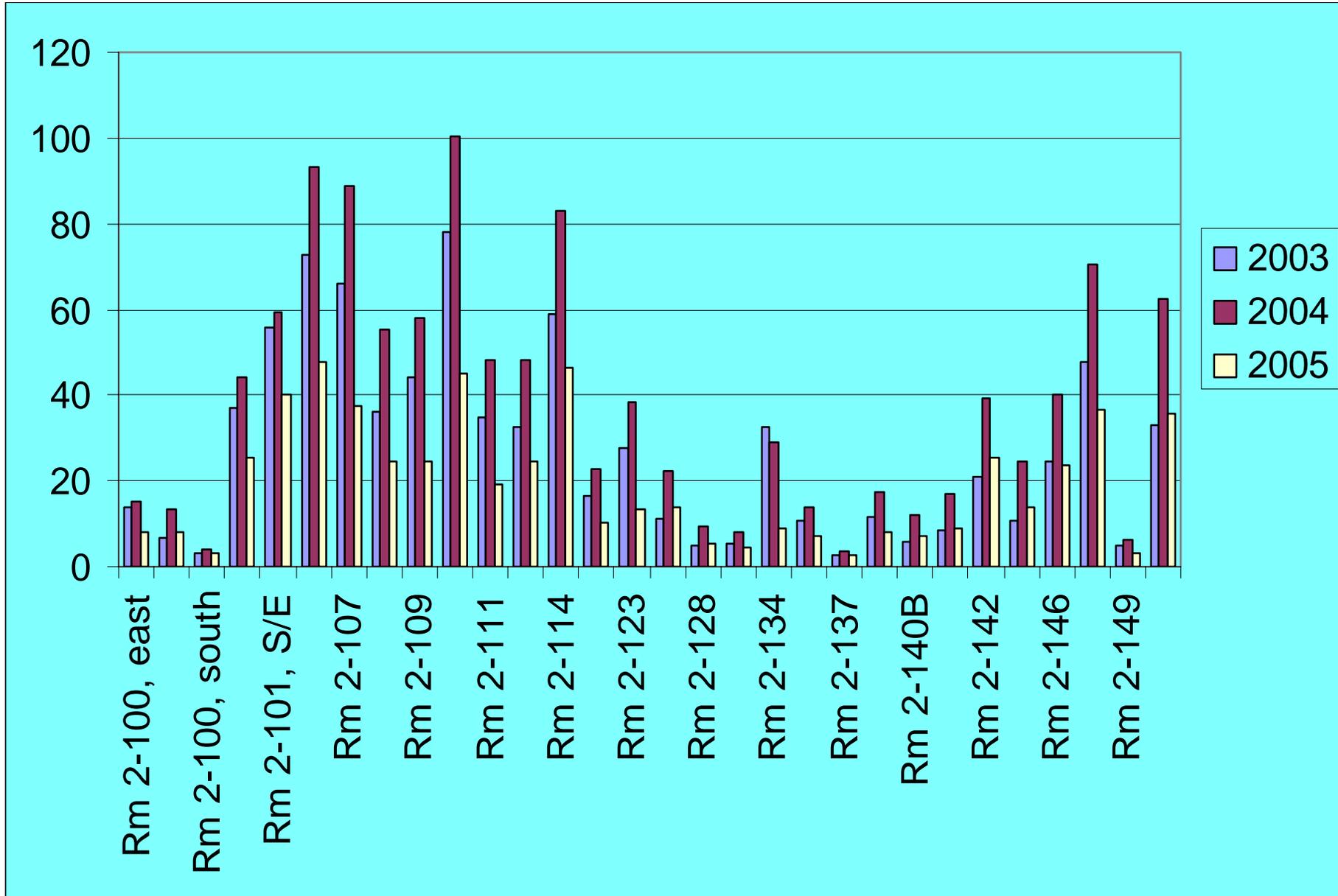


VUV Radiation Patterns 1999 - 2004

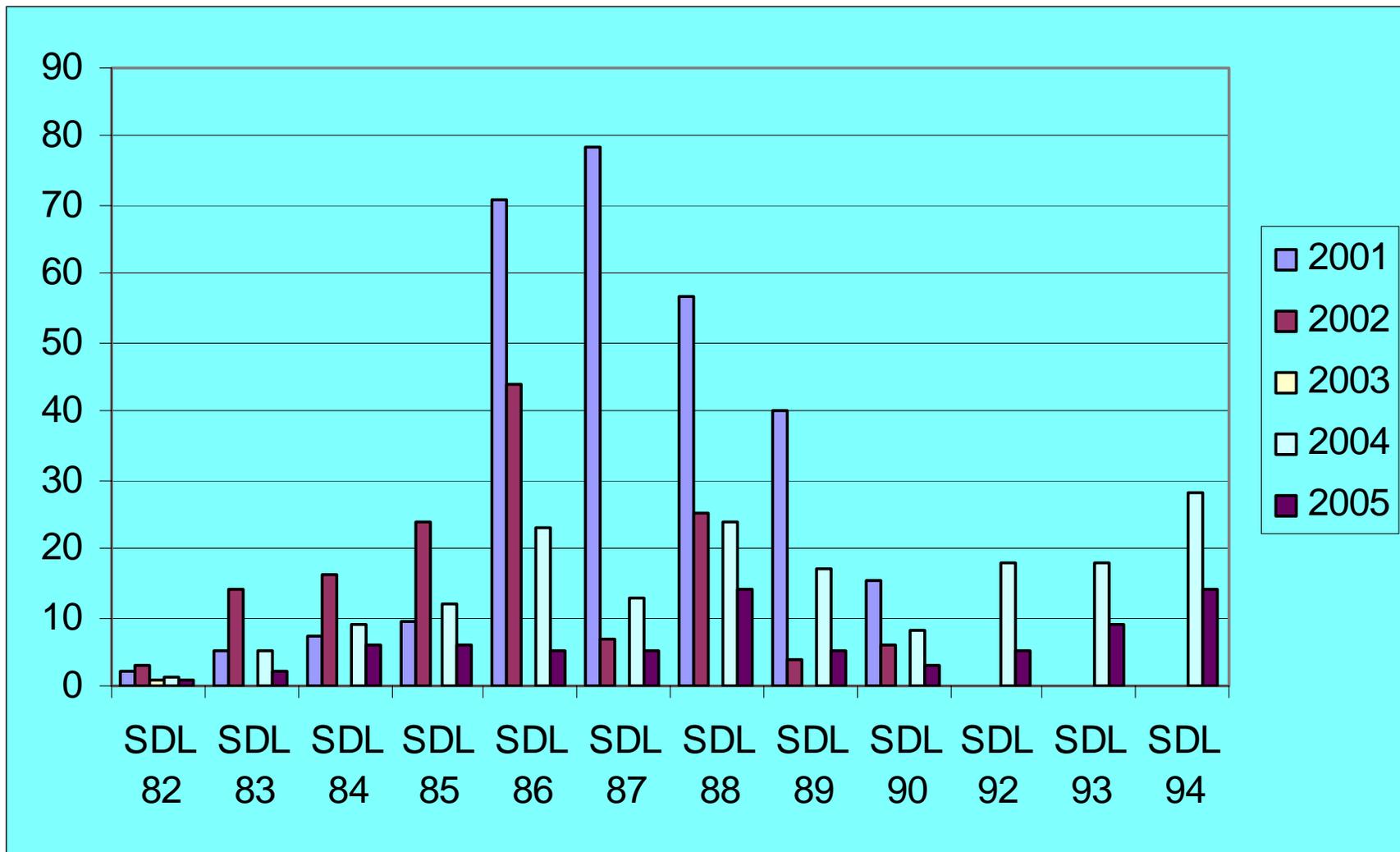
Calculated Person Dose From Area Monitor Data
 Bldg. 725, VUV Floor
 (assumes 40 hours/week occupancy)



2nd Floor Offices – 2003& 2004 & ½ year 2005



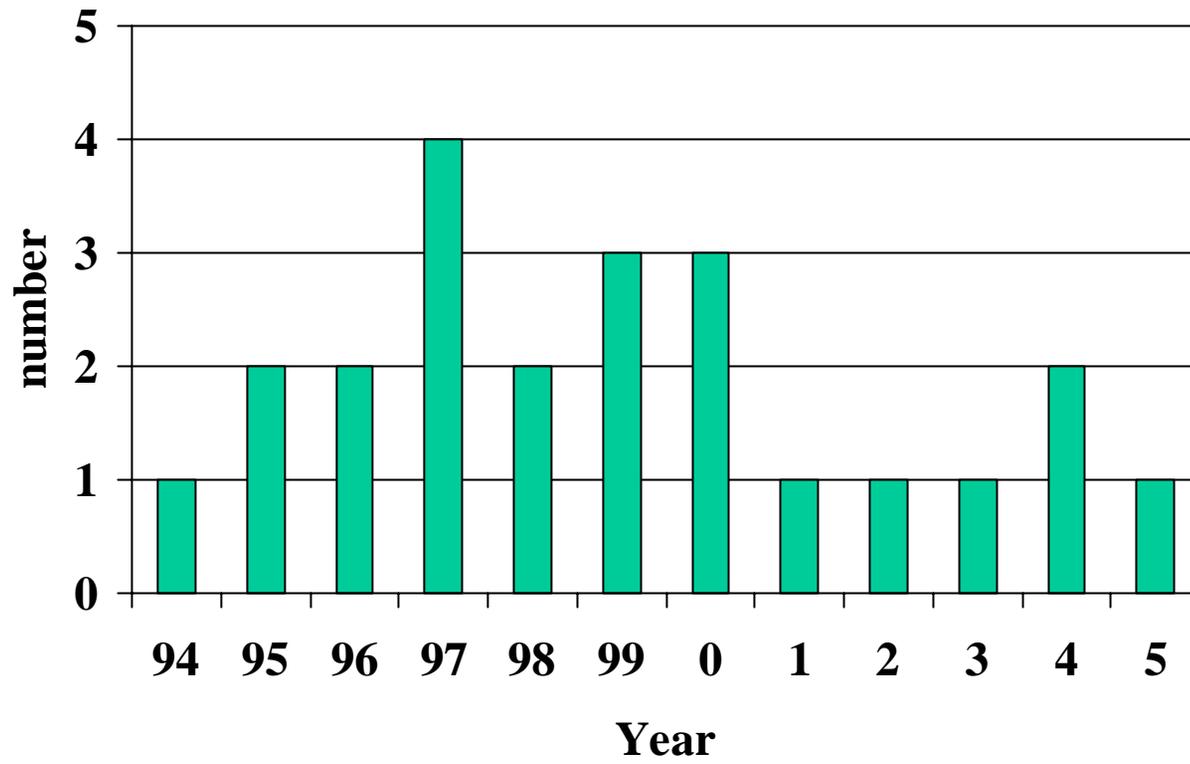
SDL Area Radiation Exposures



FY 05 Investigated Occurrences

- 1 reportable occurrence
 - Suspect bolts in several hoists on experimental floor
- 1 NCR
 - Syringes thrown into regular waste
- No radiological awareness reports

NSLS Reportable Occurrences for FY1994-2005



Overview of EMS

NSLS Environmental Aspects

- Radioactive, hazardous, mixed, industrial, & medical wastes *
- Chemical storage *
- Liquid discharges *
- Air Discharges *
- Soil activation
- Electrical consumption
- Radioactive material
- Water use

* Deemed significant by BNL Criteria

Environmental Aspects Determination

- Process Evaluations
 - Safety Assessment Documents
 - Experimental Reviews
 - Routine Work Planning
 - ESH & other Committee Reviews
 - Design Reviews
-
- Activities reviewed include all work done within NSLS – both administrative and technical

Activities that involve a Significant Environmental Aspect

- Machine shops
- Regeneration of mixed resin bed de-ionizing systems and other activities involving the NSLS Cooling Water systems
- Vacuum pump maintenance
- Crystal etching facility
- Photographic dark rooms
- Machine operation
- Electrical/Mechanical maintenance
- Some experiments

Environmental Performance Measures

- Progress on Targets
- Results of audits and assessments
- Waste generation rates
- Regulatory compliance
- Spill history

FY 2005 Environmental Targets

- Complete EENF for NSLS – II
 - Status – Final draft EENF is completed.
- Evaluate synthetic oil as a means of reducing the generation rate of waste vacuum pump oil.
 - Status - Vacuum pump tests using Permavis-8 synthetic oil (in one Alcatel pump and one Varian pump) and Alcatel-119 mineral oil (in a 2nd Alcatel pump) running at 500 mTorr with a controlled gas load are continuing (test is currently 2 ½ years in duration). Samples are withdrawn quarterly for analysis. Additional pump oil tests using the dump oil from mechanical pumps at different beamlines are also ongoing. The results to date will be presented at the 52st AVS International Symposium & Exhibition in Oct. 2005.

FY 2005 Environmental Targets (cont.)

- Evaluate substitute for rydlyme

Outcome: Tests were conducted to determine if neutralization and filtration are possible processes to eliminate waste characteristics. Need to be conducted on actual wastes to determine practicality. PE unable to address issue this fiscal year.

- Identify mercury containing equipment and identify essential and non-essential use

Outcome: NSLS does not have large mercury use. ~ 24 mercury thermometers replaced. 70 mercury thermostats in cooling systems have been included as part of PE site wide project and should be eliminated this year. P2 proposal submitted to replace RF ignitrons which contain a total of 9 lbs. of mercury.

FY 2005 EMS Assessments

- EWMS conducted comprehensive audit in Feb. 2005
 - One note-worthy practice related to analysis of waste streams
 - one minor non-conformance related to a user who had not completed refresher training for handling of photographic wastes.

Chart #5

NSLS Waste Infractions as 9/6/05

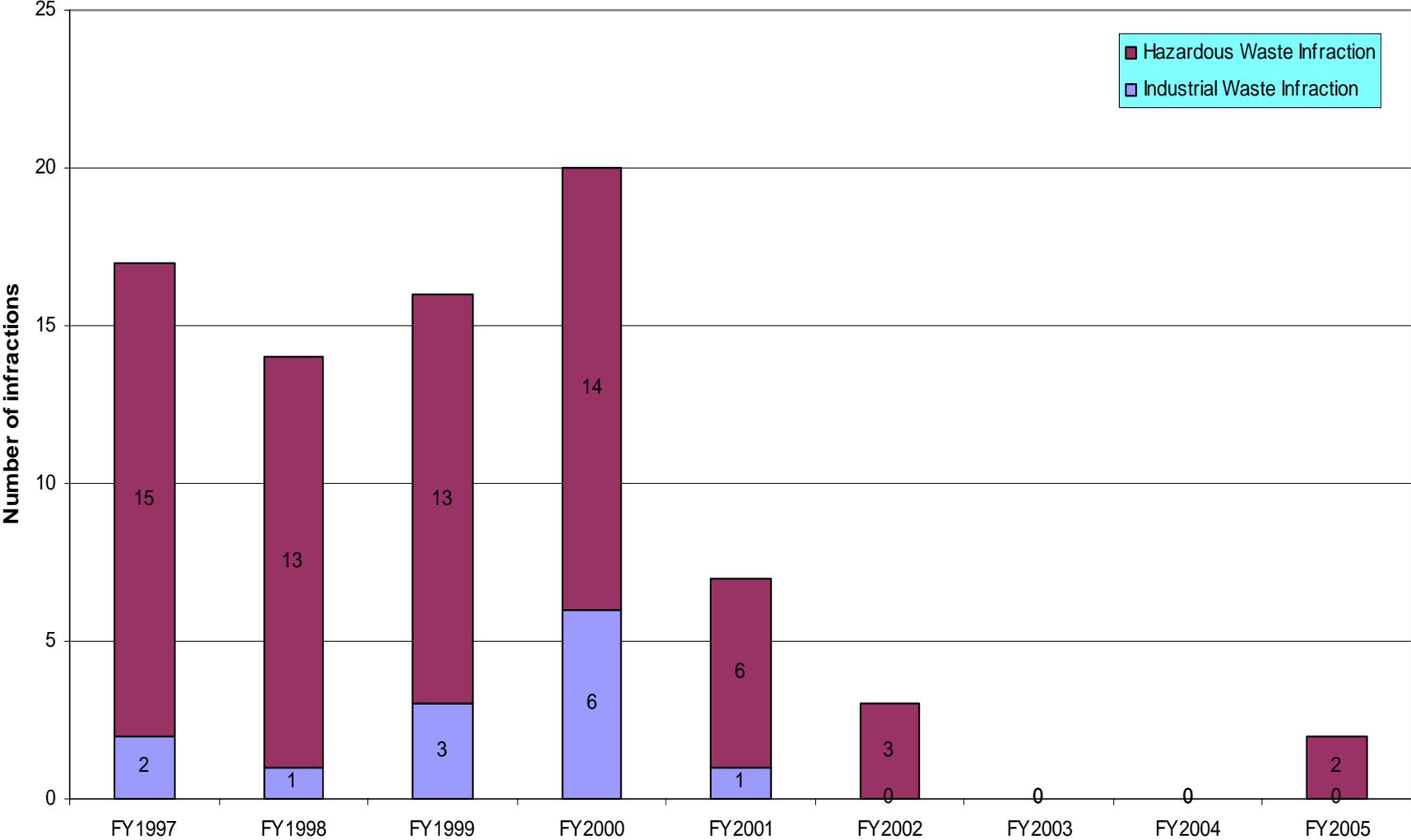
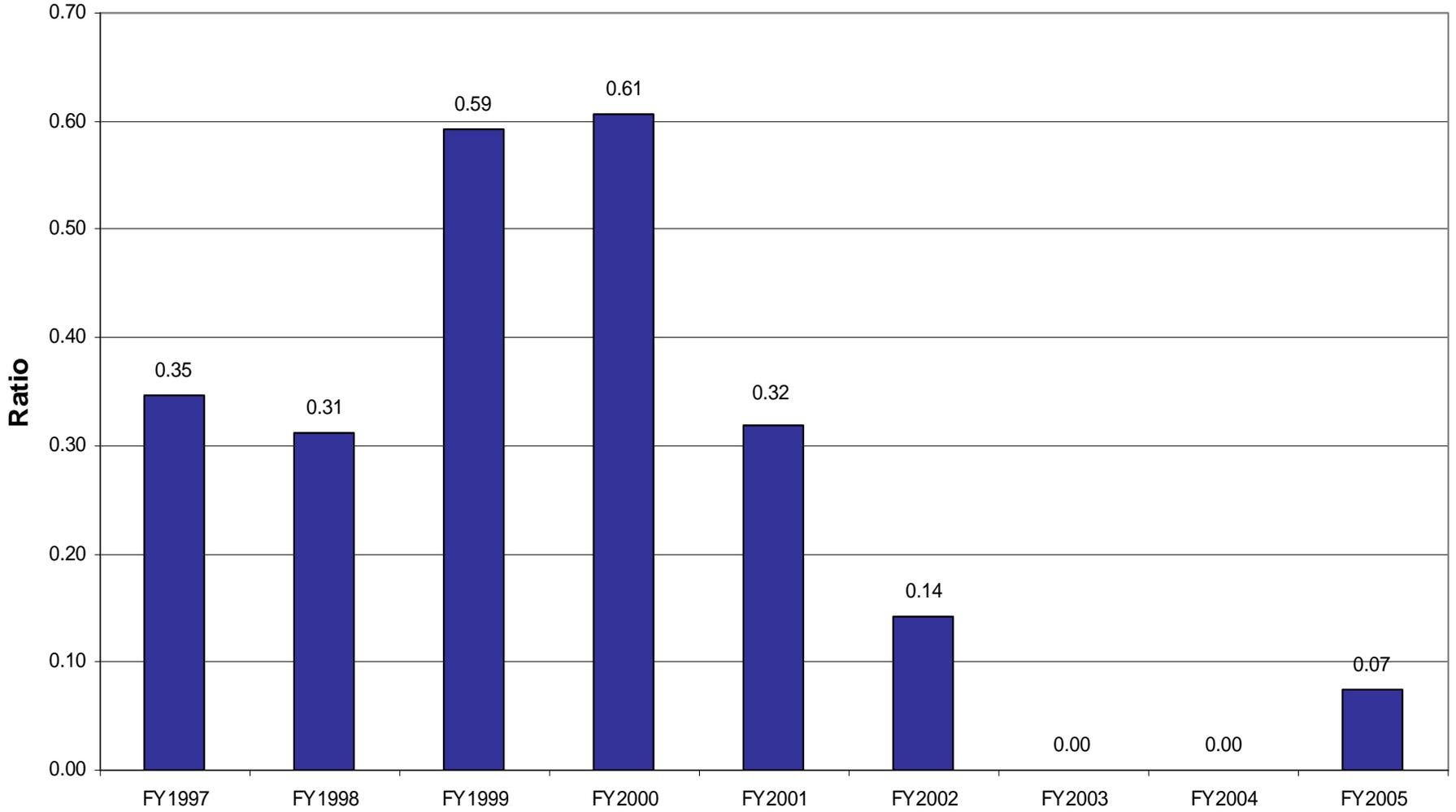


Chart #6

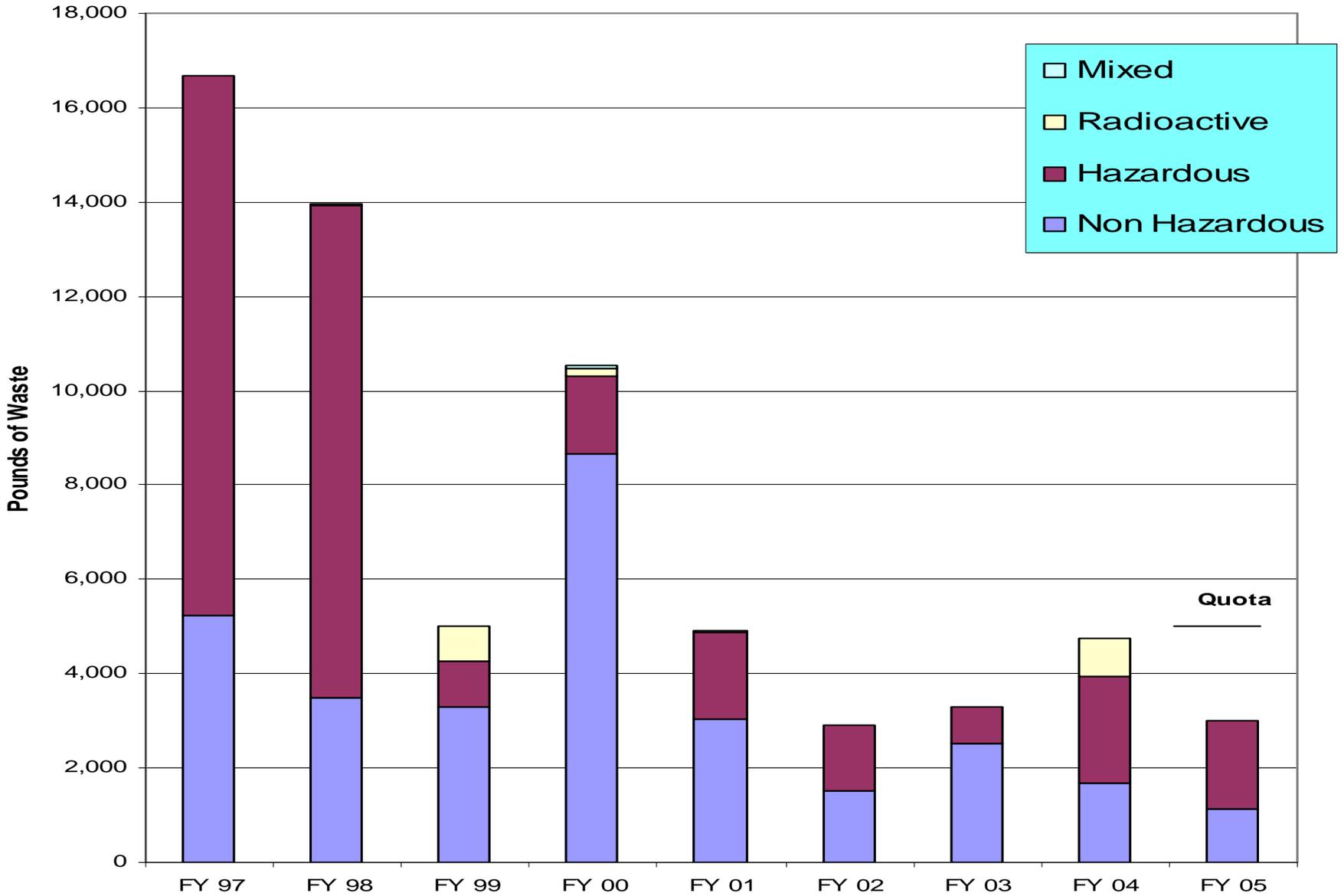
Waste Violations per Inspection as 9/6/05



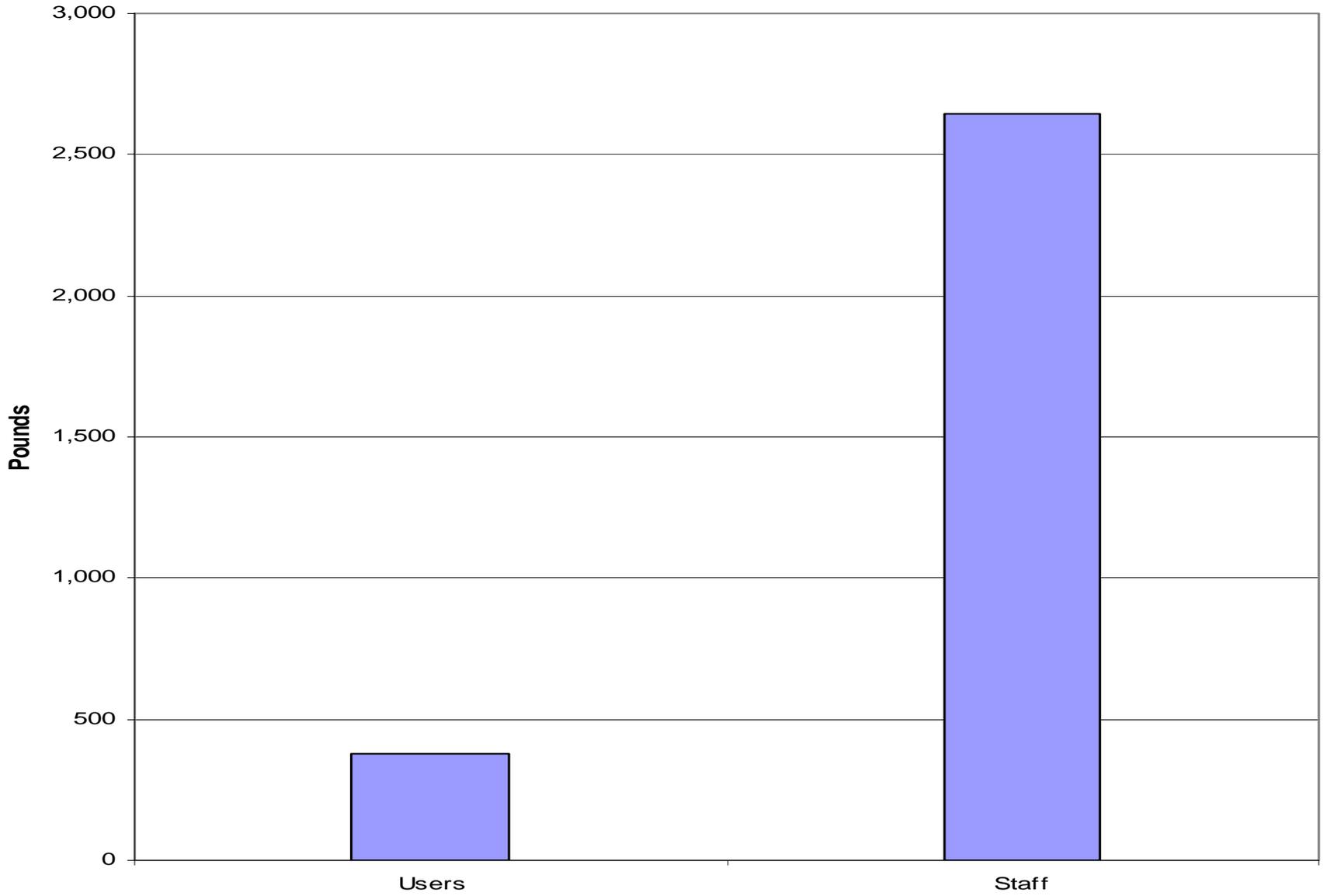
Summary of Pollution Prevention/Waste Minimization Initiatives for FY 05

- Targets for the year
 - Evaluate use of synthetic oils to to reduce generation of vacuum pump oil waste
 - Evaluate replacement for use of rydlyme
 - Identify non essential mercury use
- P2 Request submitted to replace mercury containing ignitrons
- On-going program
 - eliminate unneeded, orphaned, out-of date, or high hazard chemicals in the NSLS inventory .
 - Continued emphasis in experimental review to minimize the chemicals brought to NSLS and the amount of waste generated.

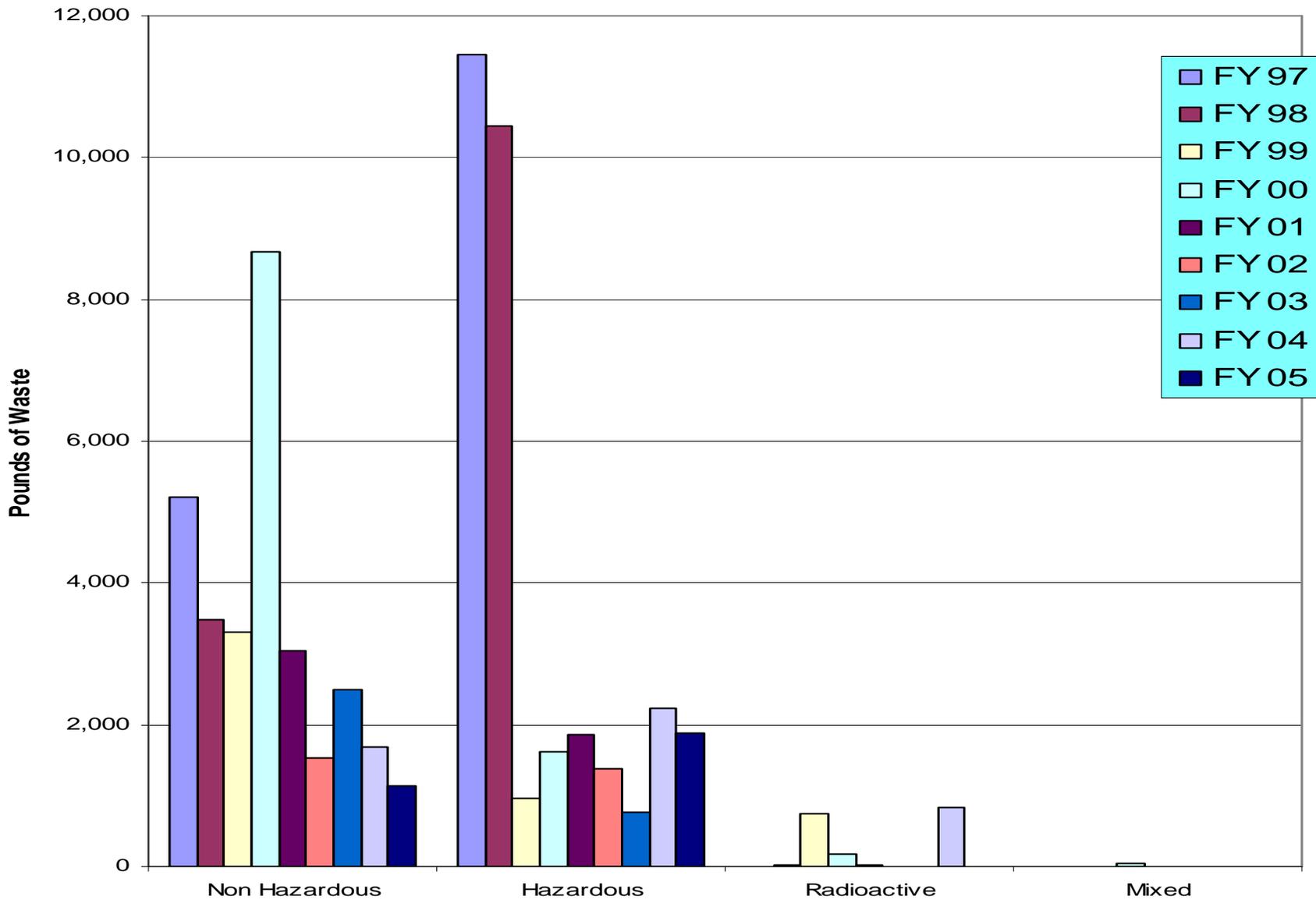
NSLS Waste Totals as of 9/6/05



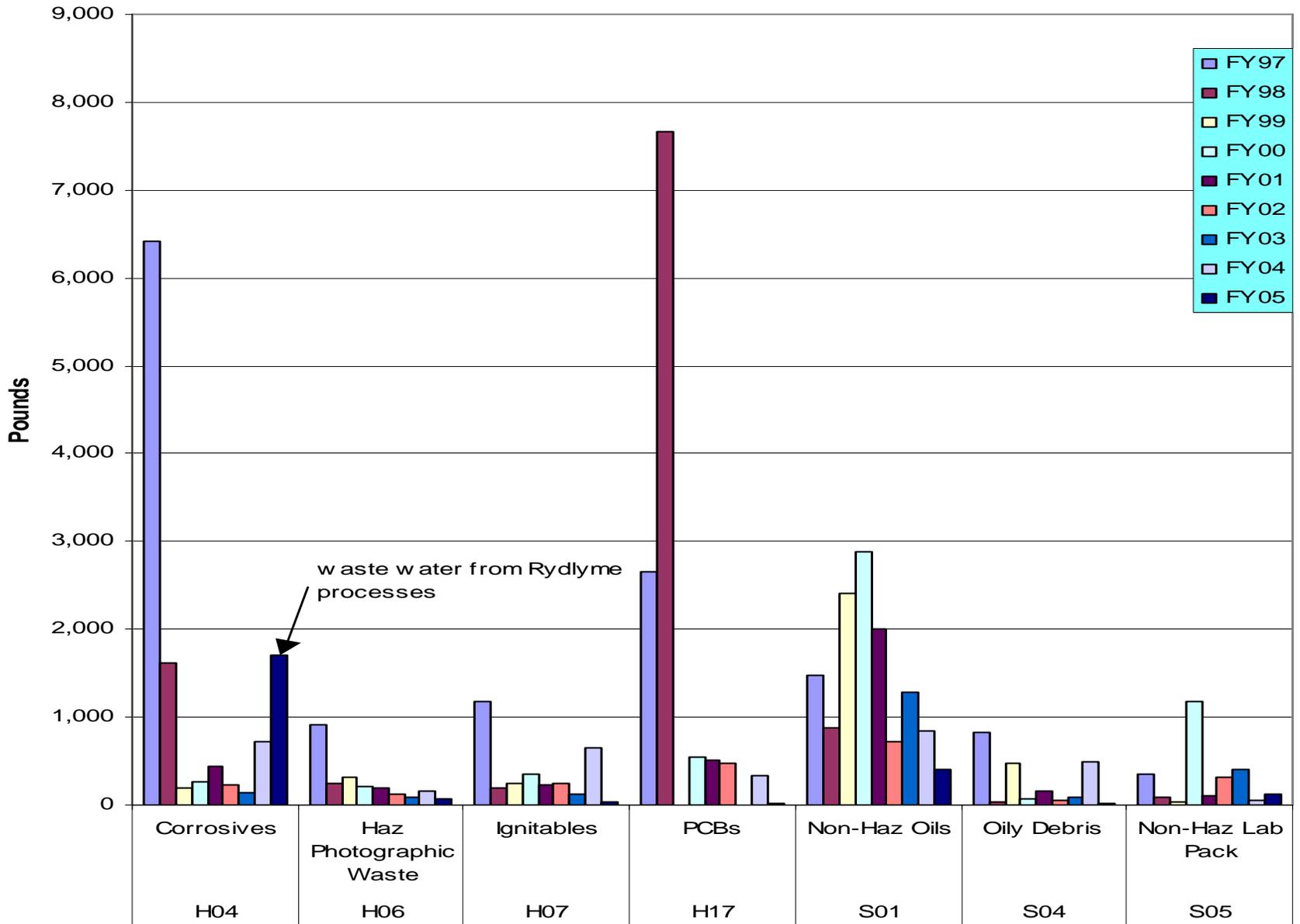
Waste Totals FY05



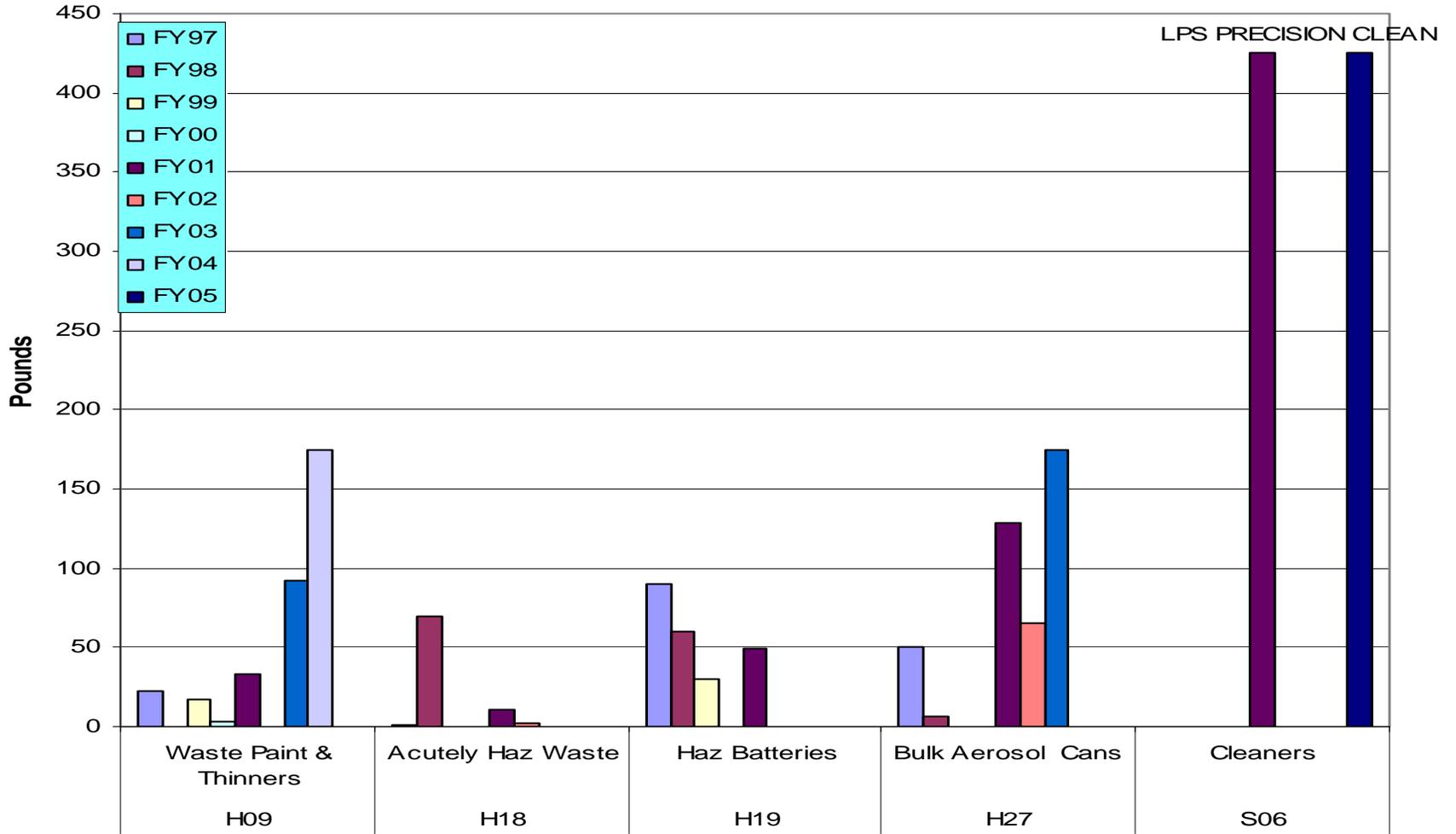
NSLS Waste History as of 9/6/05



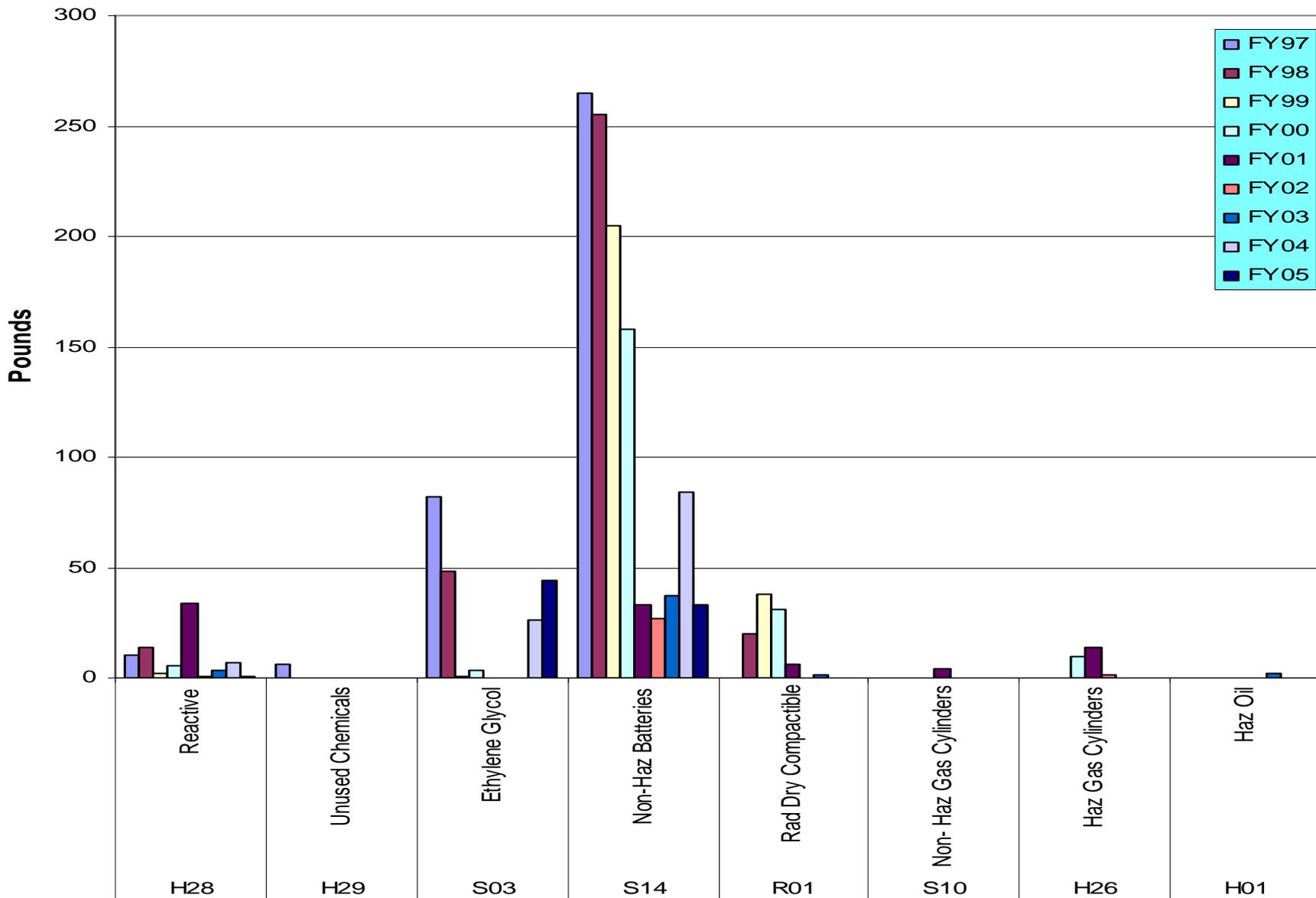
NSLS Waste Streams as of 9/6/05



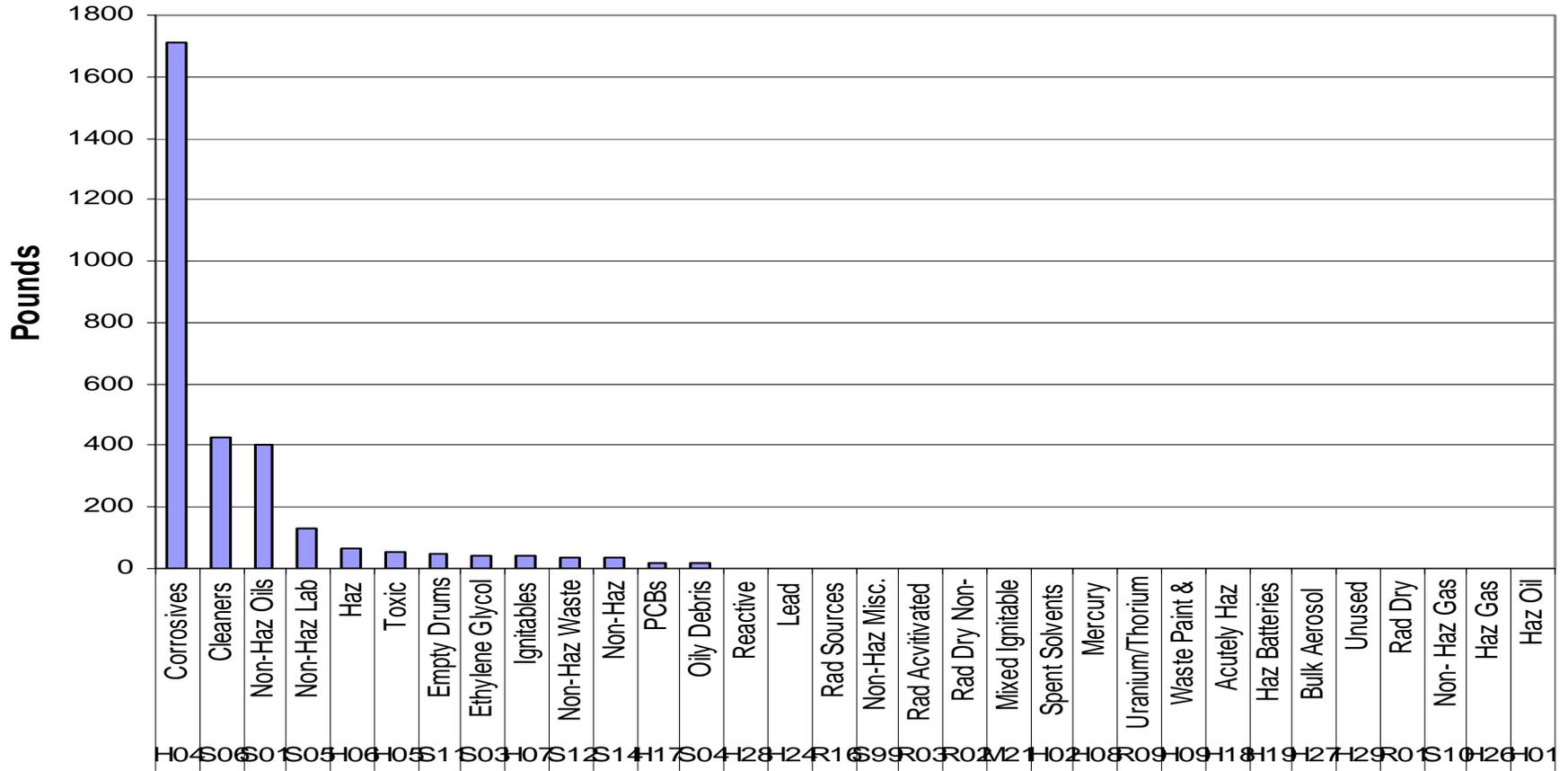
NSLS Waste Stream as of 9/6/05



NSLS Waste Streams as of 9/6/05



Summary of Waste Streams in FY 05



Spill History

- No spills in FY 2005 or in FY2001-2004
- 1 spill in FY 2000 (PCB oil spill from capacitor)
- Emergency Plan drill annually – response to simulated spill on two occasions in recent years

Stakeholder Involvement

- Outreach to external and internal stakeholders continues as a major priority within NSLS through concerted effort to tell our story on web pages and in articles
- NSLS has active tour program for visitors and has annually takes part in the Summer Sunday program.
- NSLS has an active education program for high school and college students
- Considerable information on the NSLS, including the Environmental and OHSAS Management Programs, is available on Web.

Stakeholder Involvement (cont.)

- Considerable outreach to internal stakeholders (NSLS staff and users)
 - ESH Improvement Committee has been formed
 - Staff involvement in all ESH committees
 - Extensive safety stand-down meetings in FY 05. Comments and concerns expressed during safety stand-down were published on web and are being tracked
 - Prominent safety visibility on NSLS home page
 - Workshop at annual users meeting on NFPA 70E and NRTL issues
 - Joint safety presentation at plenary session of annual users meeting
 - Safety presentation at all User Town Meetings
 - Regular discussion at Weekly User Meetings

Stakeholder Involvement and Recognition

- 1 staff member received Lab Environmental Stewardship Award for creating paperless office environment
- 2 staff members submitted to S2 program – one selected for funding this year
- 1 staff member submitted to P2 program – not funded but will be resubmitted this year
- One staff member organized ASSE course “Hazard ID for Engineers”; attended by ~ 45 BNL staff members
- 2 staff members received Spotlight awards for safety related efforts

FY 2005 ESH Costs

- Total Direct Cost (Not including NSLS ESH salaries) ~ \$700K
- RCD Program Costs
 - RCD Support & Oversight (~ 2.5 FTE) ~ \$300K
 - Dosimetry - \$157K
 - Instrument Calibration and Maintenance - \$20K
- EMS Implementation Costs
 - ECR support ~ 0.3 FTE (paid by Lab overhead)
 - Direct charges for waste disposal ~ \$100 K

NSLS FY 2005 ESH Costs

- NSLS ESH/Q Staff - 7.5 FTEs
- NSLS staff – Not tabulated, but significant resources required for:
 - Training
 - Work planning
- OHSAS implementation has required very large staff commitments
- Enormous staff costs associated with 70E implementation and program to identify and label equipment requiring LOTO

Program Summary

NSLS ESH Program Strengths

General

- Well functioning & documented program that is integrated into operations.
 - Experimental review
 - Operational work planning
 - Training
 - Self-assessment, particularly Tier 1 inspection
- Knowledgeable & capable engineering, operations and ESH staff
- Strong worker involvement and management support
- PRT involvement and support continues to improve

NSLS ESH Program Strengths (cont.)

EMS

- Effectively functioning EMS
- No incidents
- Chemicals and wastes are well managed
- High degree of regulatory compliance
- Waste generation has significantly declined
- Effective training for all workers involved in significant aspects
- No significant air or water effluents
- No ground water impacts
- No spills

NSLS ESH Program Strengths (cont.)

OSH

- Injury rates have significantly declined
- Safety issues have high visibility and on-going discussion - OSHAS has added to that
- Safety improvement plans have strengthened:
 - Electrical safety
 - Operation of cranes, hoists, machine shops
 - Lasers
 - Worker qualification program

ESH Program Areas Under Discussion

- Handling of lead
- Implementation of NRTL requirements
- Completion of OHSAS Implementation
- IH monitoring program
- Preparation for ISM assessment
- Maintaining program gains in 70E, equipment hazard identification, work planning, and crane and hoist use

ESH Program Areas Under Discussion (cont.)

- Support and oversight of our visiting users
- Training Issues
 - Supervisor understanding of JTAs
 - Verification that users have completed required training
 - Adequacy of training completion rates by users
 - Appropriateness of lab level training for the general user
- Implication of emergency planning hazard assessment
- High sensitivity fire detectors in interior of X-ray ring foot-print

Current Draft Set of Targets for FY 06

- Evaluate lead handling requirements and current NSLS practices
- Complete OHSAS 18001 program development and successfully pass registration audit
- Prepare for and successfully complete DOE ISM and emergency management assessment
- Ensure that hazardous equipment identification is complete and is maintained going forward for existing and new equipment

Draft Goals (cont.)

- Fully implement NRTL inspection requirements for existing equipment and ensure implementation of NRTL requirements for purchased equipment.
- Ensure that training content for users and completion rate is appropriate
- Complete SAD and ASE upgrade for NSLS
- Complete environmental goals
 - Complete evaluation of synthetic oils for application in vacuum pumps
 - Evaluate substitute for Rydlyme
 - Reduce mercury inventory

Plans for the next fiscal year

- Establish ESH targets based on Lab critical outcomes & NSLS issues during first qtr.
- Develop and implement self-assessment plan.
- Follow performance measures closely – keep line managers aware and involved.
- Continue to communicate and discuss EMS & OHSAS issues with staff and users.

So – the final questions

- Are the NSLS occupational safety and health and environmental management systems effective in achieving ESSH policy commitments?
 - Safe and healthy work place & respect for the environment
 - Compliance to regulatory issues
 - Integration of ESSH into operations and research
 - Pollution prevention
 - On-going involvement with our stakeholders
- Are the NSLS occupational safety and health and environmental management systems effective in achieving NSLS ESH objectives and measures?

EMS & OHSAS Management Questions

- Are the NSLS occupational safety and health and environmental management systems adequate in terms of:
 - Identifying significant environmental aspects, hazards and impacts?
 - Resource allocations?
 - Communication?
 - Organizational issues (e.g staff expertise, procedural requirements)?

EMS & OHSAS Management Questions

- Are the objectives and measures for OSH and E related programs suitable in terms of:
 - Environmental impacts, hazards and current conditions
 - Concerns of stakeholders
 - Current and future regulatory requirements
 - Business interests
 - Technological capability
 - Internal organizational or process changes
 - Should additional measures be established

EMS & OHSAS Management Questions

- Are there any recommended revisions to:
 - ESSH policy and commitments
 - Objectives, targets and measures
 - OSH or E related management systems