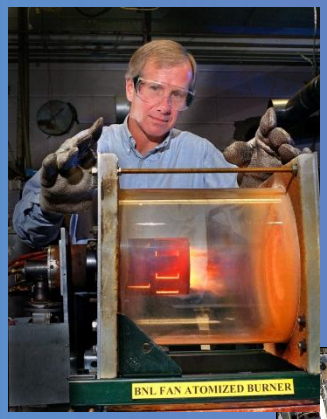
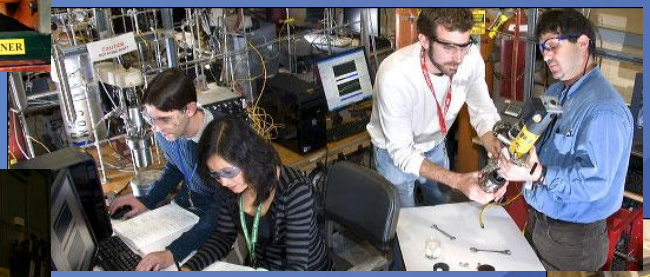
GARS ESH Management Review

GARS Research Operations

November 29, 2011





BROOKHAVEN NATIONAL LABORATORY

a passion for discovery

Office of Science
U.S. DEPARTMENT OF ENERGY

Management Review Scope

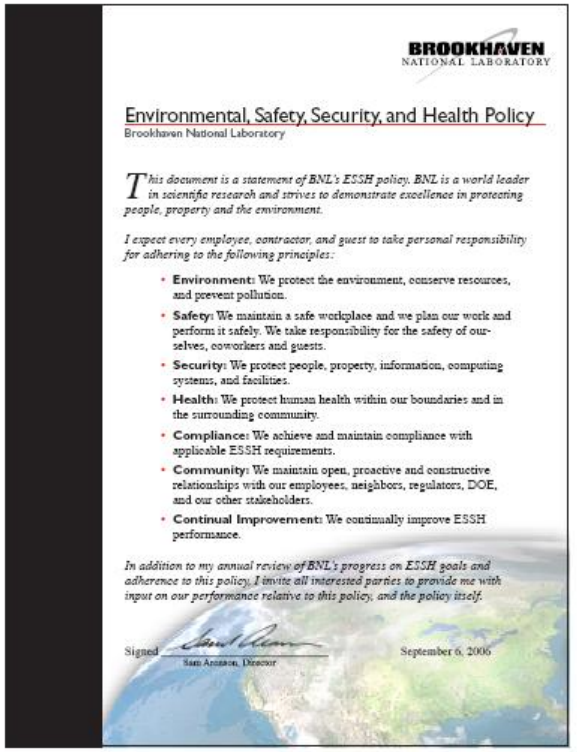
- **Senior Management shall review the EMS and OSH Management Systems to ensure their continuing suitability, adequacy, and effectiveness.**

- **The scope of this review includes the facilities, experiments, and operations of GARS managed by Brookhaven Science Associates at Brookhaven National Laboratory in accordance with the Environmental and OSH Management Systems.**

- **Based on the presentation content Senior Managers shall comment on the need for change or improvement.**

ESSH Policy

- The Policy is posted in all GARS Buildings at designated locations.
- All new staff, guests, and students are made aware of the policy during orientation with their ESH Coordinator.



BROOKHAVEN NATIONAL LABORATORY

Environmental, Safety, Security, and Health Policy

Brookhaven National Laboratory

This document is a statement of BNL's ESSH policy. BNL is a world leader in scientific research and strives to demonstrate excellence in protecting people, property and the environment.

I expect every employee, contractor, and guest to take personal responsibility for adhering to the following principles:

- **Environment:** We protect the environment, conserve resources, and prevent pollution.
- **Safety:** We maintain a safe workplace and we plan our work and perform it safely. We take responsibility for the safety of ourselves, coworkers and guests.
- **Security:** We protect people, property, information, computing systems, and facilities.
- **Health:** We protect human health within our boundaries and in the surrounding community.
- **Compliance:** We achieve and maintain compliance with applicable ESSH requirements.
- **Community:** We maintain open, proactive and constructive relationships with our employees, neighbors, regulators, DOE, and our other stakeholders.
- **Continual Improvement:** We continually improve ESSH performance.

In addition to my annual review of BNL's progress on ESSH goals and adherence to this policy, I invite all interested parties to provide me with input on our performance relative to this policy, and the policy itself.

Signed _____ September 6, 2006

Sam Aronson, Director

Environmental Aspects and OSH Hazards

Environmental Aspects

- Industrial Waste
- Hazardous Waste
- Mixed Waste
- Radioactive Waste
- Atmospheric discharges
- Liquid discharges
- Storage/use of chems/rad
- Nanomaterials

OSH Hazards

- Compressed Gas Work
- Machine Shop
- 90-Day Area
- Cryogens
- Lasers
- Electrical
- Tower Work
- Elevated Work
- Autoclave Use
- Chemicals (Hazardous)
- Chemicals (Routine)
- Noise
- Nanomaterials
- Office
- Hand/Power Tools
- Mechanical Material Handling
- Manual Material Handling
- ODH
- Pressure Vessels
- Radiation Generating Devices
- Sealed Source Use
- Rad Dispersibles
- Thermal
- Radiation (non-ionizing)
- MP320 Neutron Generator
- Transporting Chemicals/Rad
- Operating Vehicles On Site and Off Site
- Outdoor Work
- Confined Space

Issue: Is the current OSH Hazard - Chemical (Hazardous) sufficient for corrosive etches?

Action: Consider adding Corrosive Etch as a new hazard.

ESSH Related Assessments

	Assessment	Due date	Findings	Comments
1	EMS/OHSAS Internal	Feb. 22 - Mar. 5, 2010	No Findings	Noteworthy – Communications/Lessons Learned
2	ESH Multi-Topic Compliance Audit	Feb. 22 - Mar. 5, 2010	Several	Lab Level Findings for Compressed Gas use
3	EMS/OHSAS External (NSF)	1-May-11	NA	GARS not selected this year
4	Lockout/Tagout (Required Line/Internal)	August, 2011	No Findings	Complete
5	BHSO Chemical Management	27-Jul-11	No Findings	Minor Observations
6	BHSO Assessment of Inspection and Acceptance Tracking	June, 2011	No Findings	
7	IH Surveillance; HF, Corrosive Etch, Asbestos, Heat Stress	July – Sept., 2011	No Findings	
8	Records Management	April 29, 2011	No Findings	OFI – identification & inventory of electronic records needs to be addressed

Hazard Validation Tool

Bldg	Walk Down Complete	Database entry for GARS Space	Placards	Critical Equipment Identified	Alarm Response	Comments
130	Y	Y	NA	N	NA	All areas entered for GARS and F&O
179	Y	Y	NA	N	NA	All areas entered for GARS.
197	Y	Y	Y	Y	Secure Area alarmed to LPD	All areas entered for GARS.
490D	Y	Y	Y	Y	NA	All areas entered for GARS.
526	Y	Y	Y	Y	NA - Local alarms only.	All areas entered for GARS and F&O
750A	Y	Y	Y	Y	Secure Area alarmed to LPD	All areas entered for GARS.
815	Y	Y	Y	N	NA	All GARS areas entered.
821	Y	Y	Y	N	NA	
830	Y	40%	Y	Y	NA	GARS and NSLS II Office areas to be done.
836	Y	Y	Y	N	NA	All GARS space entered.
RadTec	Y	Y	Y	N	NA	All GARS space entered.

Issue – Need to re-assess space and ensure that all hazards, controls, and critical equipment have been identified. RSMs/CSMs need the ability to update the HVT in real time.

Action – iPads have been purchased for GARS RSMs and CSMs. GARS ESH Coordinators will accompany RSMs/CSMs on walk-throughs to assist and train them on the process.

GARS Hazard Information Placards

HAZARD INFORMATION PLACARD/EMERGENCY INFORMATION
Safety, Health & Environmental Information

Bldg: 0815 Room: C-4		Contact Information		
		Name	Work #	Cell/Home
Dept: ST Sustainable Energy Technologies Department		Primary: Erdonmez, Can	8398	617-710-8737
NO FOOD OR DRINK ALLOWED NO SMOKING	Rev. Date: 09/16/11 2:22 PM	Alt. #1: Celebi, Yusuf	4013	631/205-8364
		Alt. #2: Gerlach, Louis	7876	631/291-6097
	ESR / SWP / RWP / PI: 93 & 137 Mahajan 195 Graetz			

PROTECTIVE EQUIPMENT REQUIRED FOR ENTRY
Area Designation: Unbound Nanomaterial Laboratory

SAFETY GLASSES · LAB COAT · LONG PANTS · FULLY ENCLOSED SHOE

HAZARDS OF THE AREA

FLAMMABLE SELF REACTIVE PYROPHORIC ORGANIC PEROXIDE · SELF REACTIVE ORGANIC PEROXIDE · CARCINOGEN RESPIRATOR SENSITIZER REPRODUCTIVE TOXICITY · DERMAL SENSITIZER · HIGHLY ACUTE TOXIN

OXIDIZER · CORROSIVE · GAS UNDER PRESSURE · NANOMATERIALS · STARTLE HAZARD

The Hazard List for this entry is incomplete as CMS shows this room as having the following hazard(s) but they are not entered on this record. Please review.

- Explosive

ADDITIONAL INFORMATION

ISOLATION LOCATIONS FOR UTILITIES (IF APPLICABLE)

Electric:
Gas:
Steam:
Ventilation:

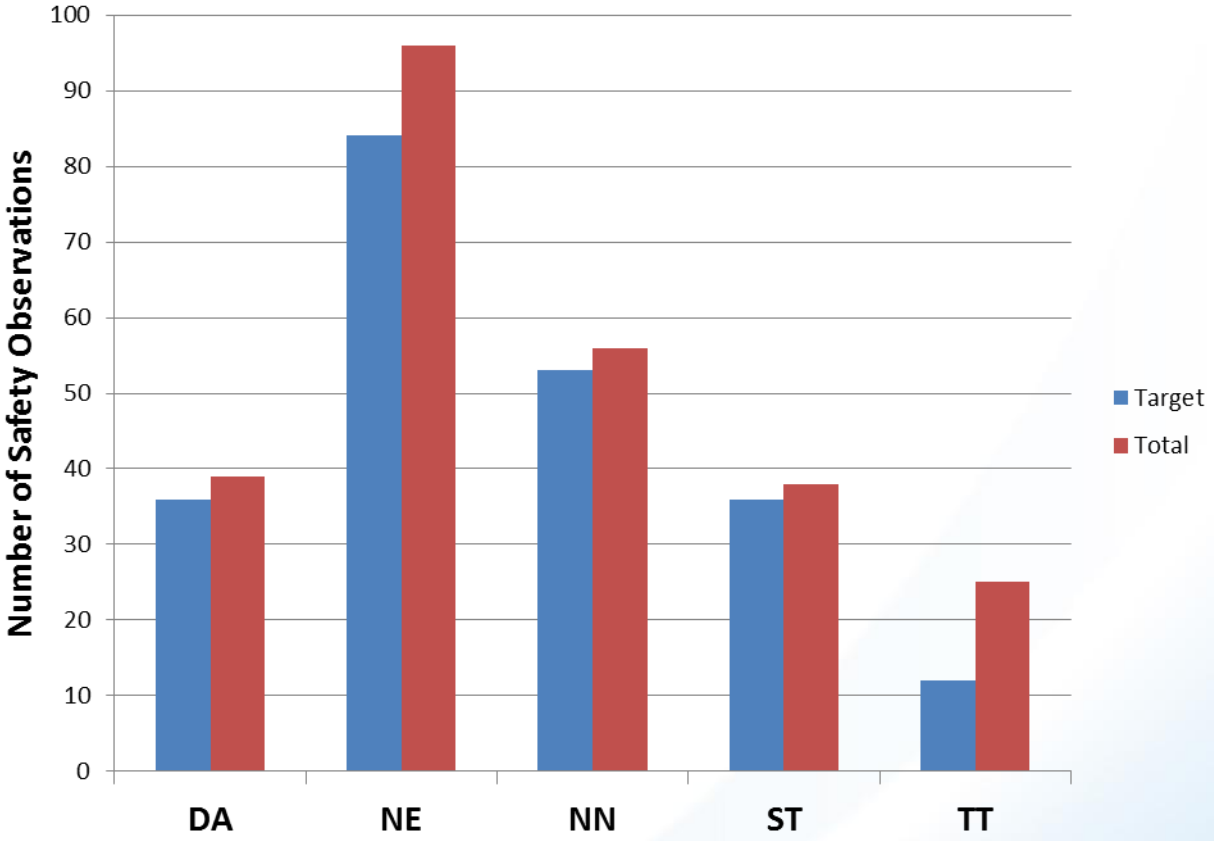
Issue – PPE entry requirements still need to be embraced.

Action – RO and Managers continue to work with staff to improve compliance with Area-Based PPE Program

Issue – CMS inconsistencies.

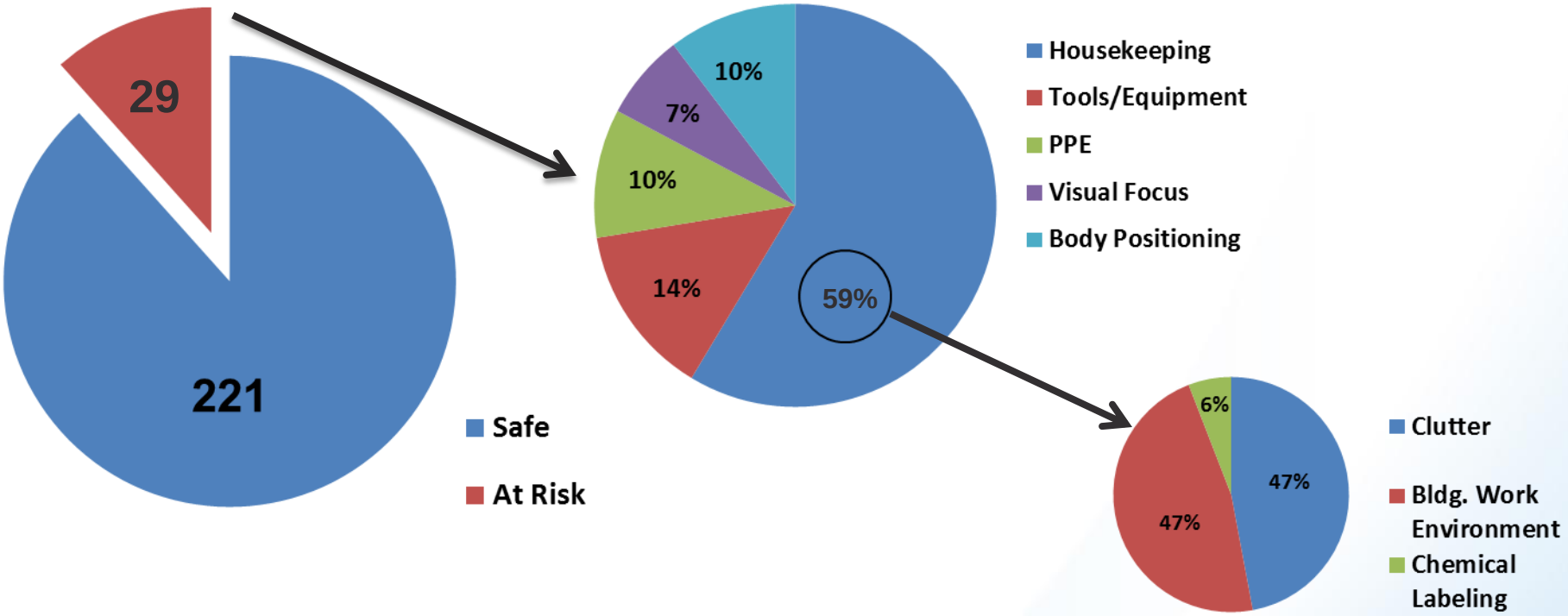
Action – RO and SHSD Rep to work with CSMs and PIs to correct/update CMS and placards.

Management Safety Observations



GARS Managers exceeded the required number of observations.

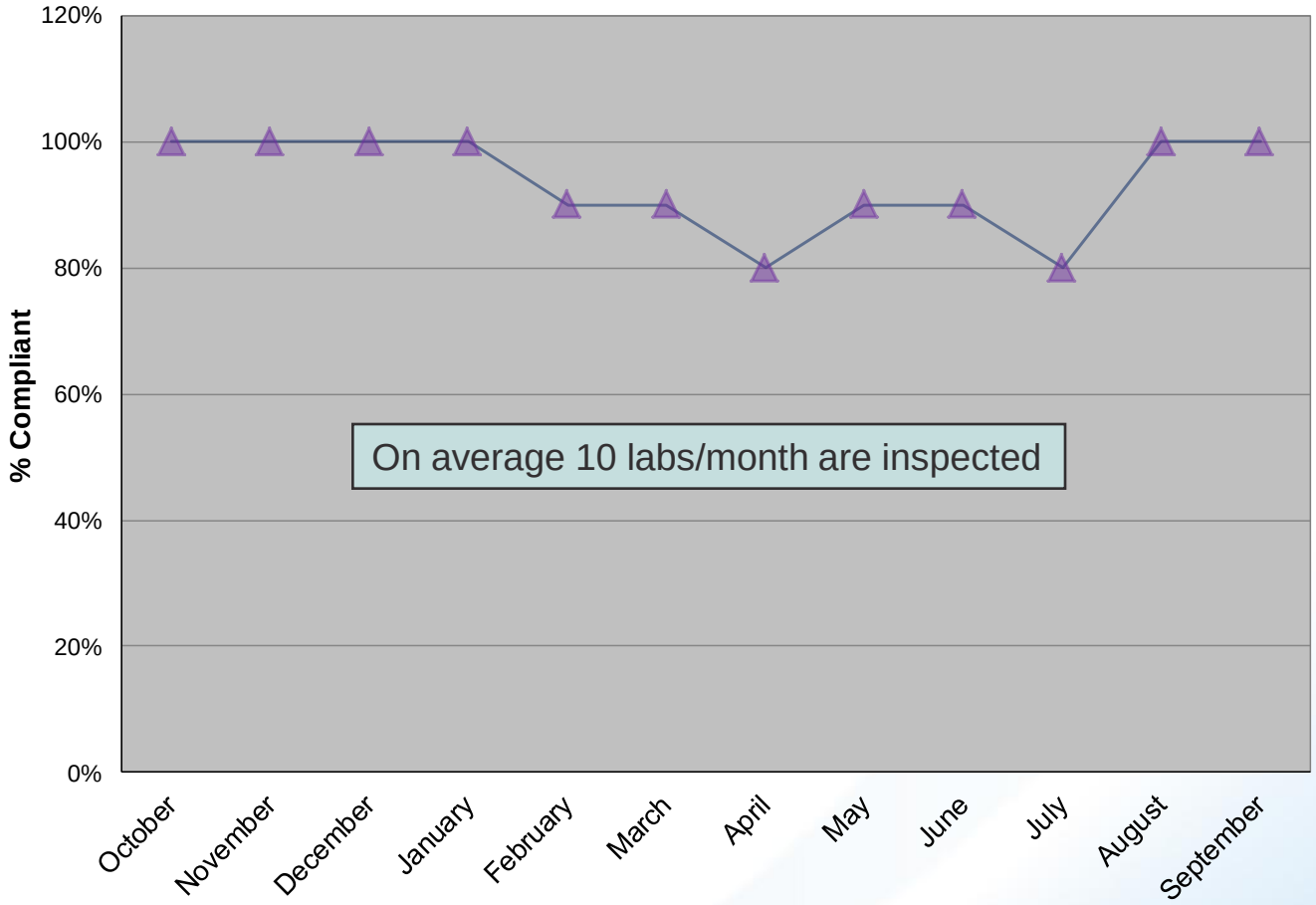
“At Risk” Management Observations



Issue – Housekeeping is the most prevalent “at risk” observation. Due to limited categories, many “at risk” observations are identified as Housekeeping (e.g., chemical labeling, electrical, or fire safety).

Action – Better categorization would allow better trending.

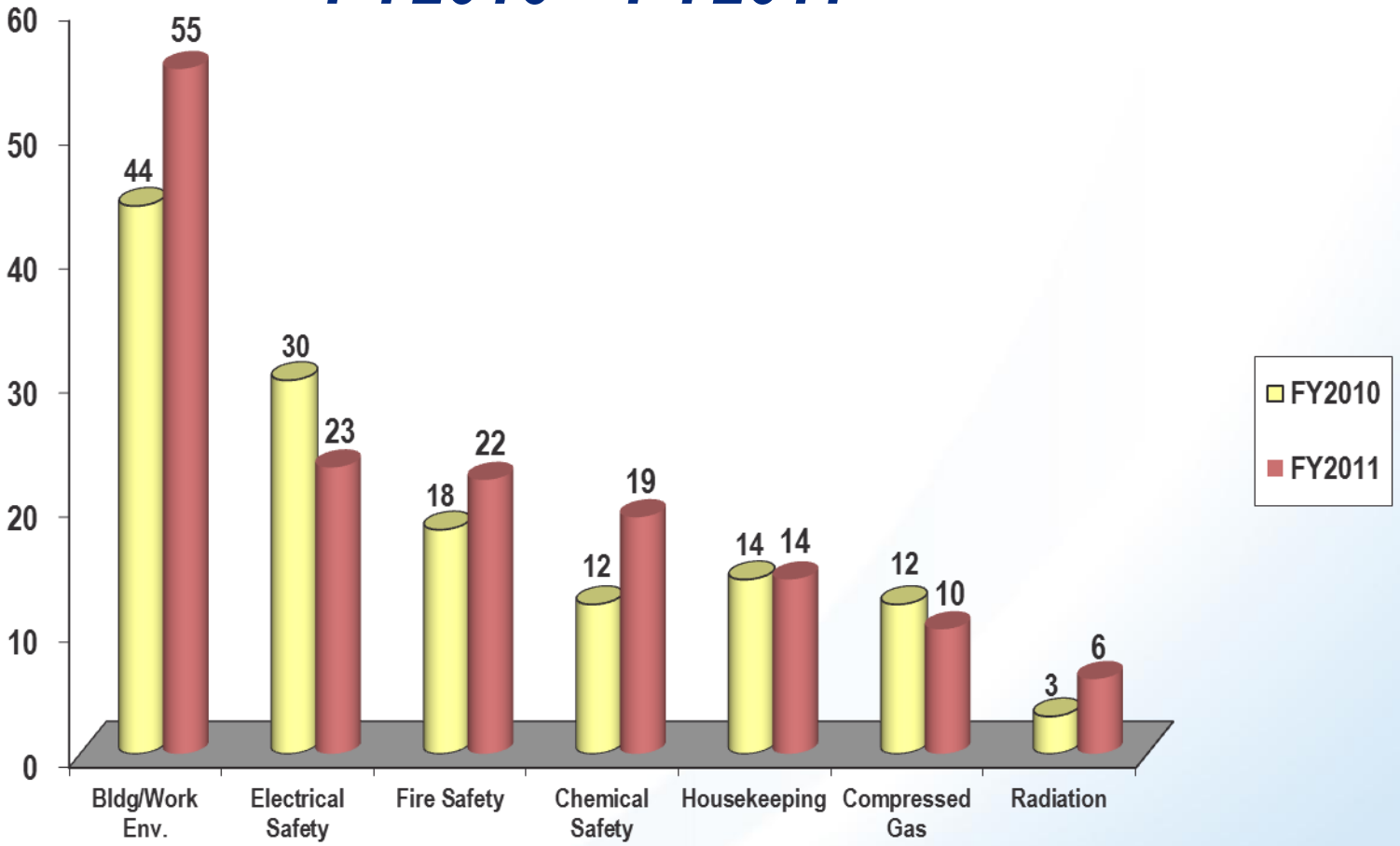
GARS - Satellite Accumulation Areas



Issue – Compliance dropped below 90% only during April and July.

Action – ECR will continue to track and work with CSMs to monitor SAAs.

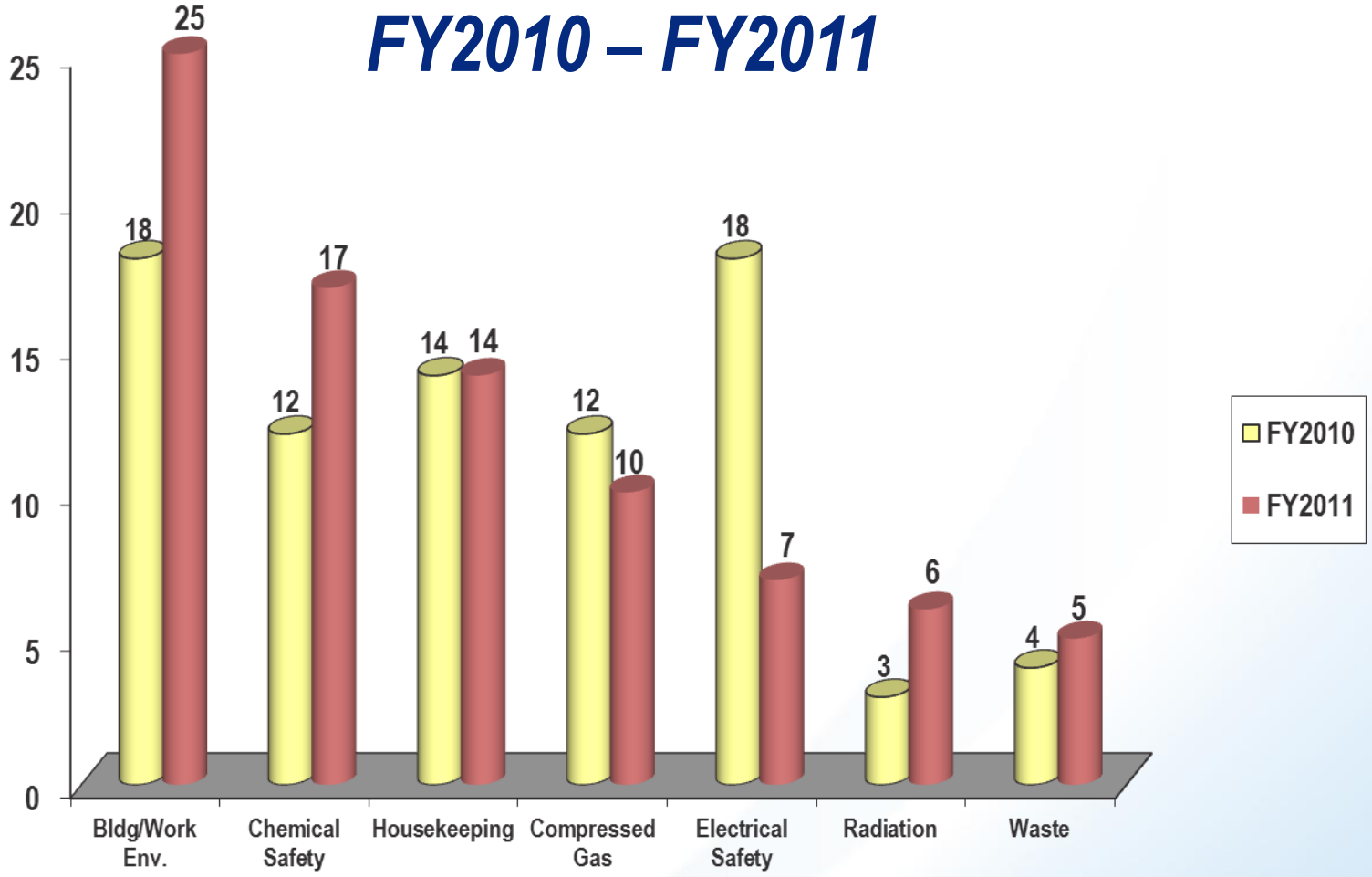
Top 7 Tier 1 Issues (GARS & F&O) by Deficiency FY2010 – FY2011



Issue – What is the best method to track the F&O related findings?

Action – IFM and Line Organizations to review/resolve.

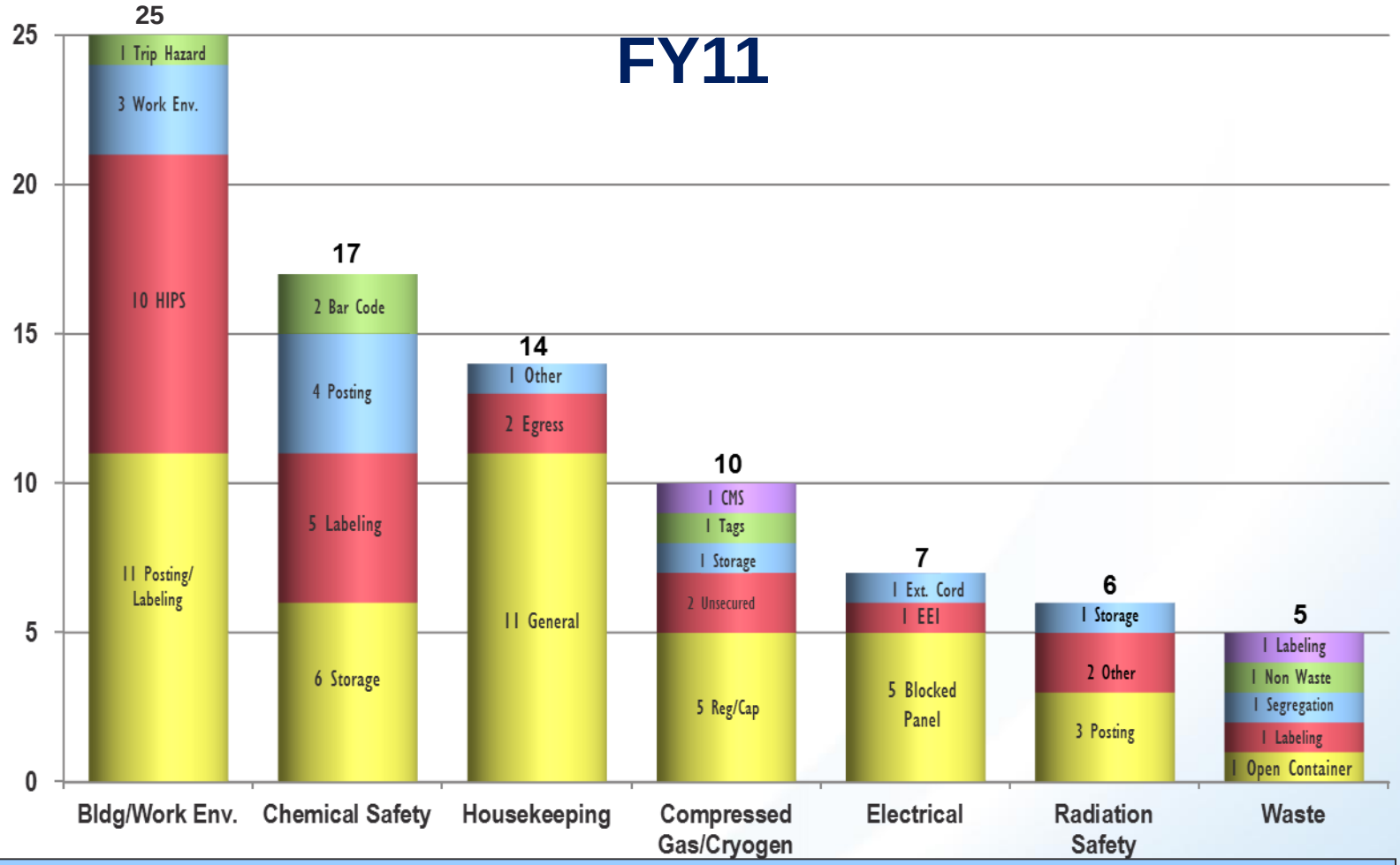
Top 7 GARS Issues by Deficiency FY2010 – FY2011



Issue – FY11 O&T Reduce Tier 1 Findings (Comp. Gas and Electrical)**.**

Action –Thanks to working with the CSMs, Sm. Sci. Working Group, Users, and SME Analysis, findings are down in those areas.

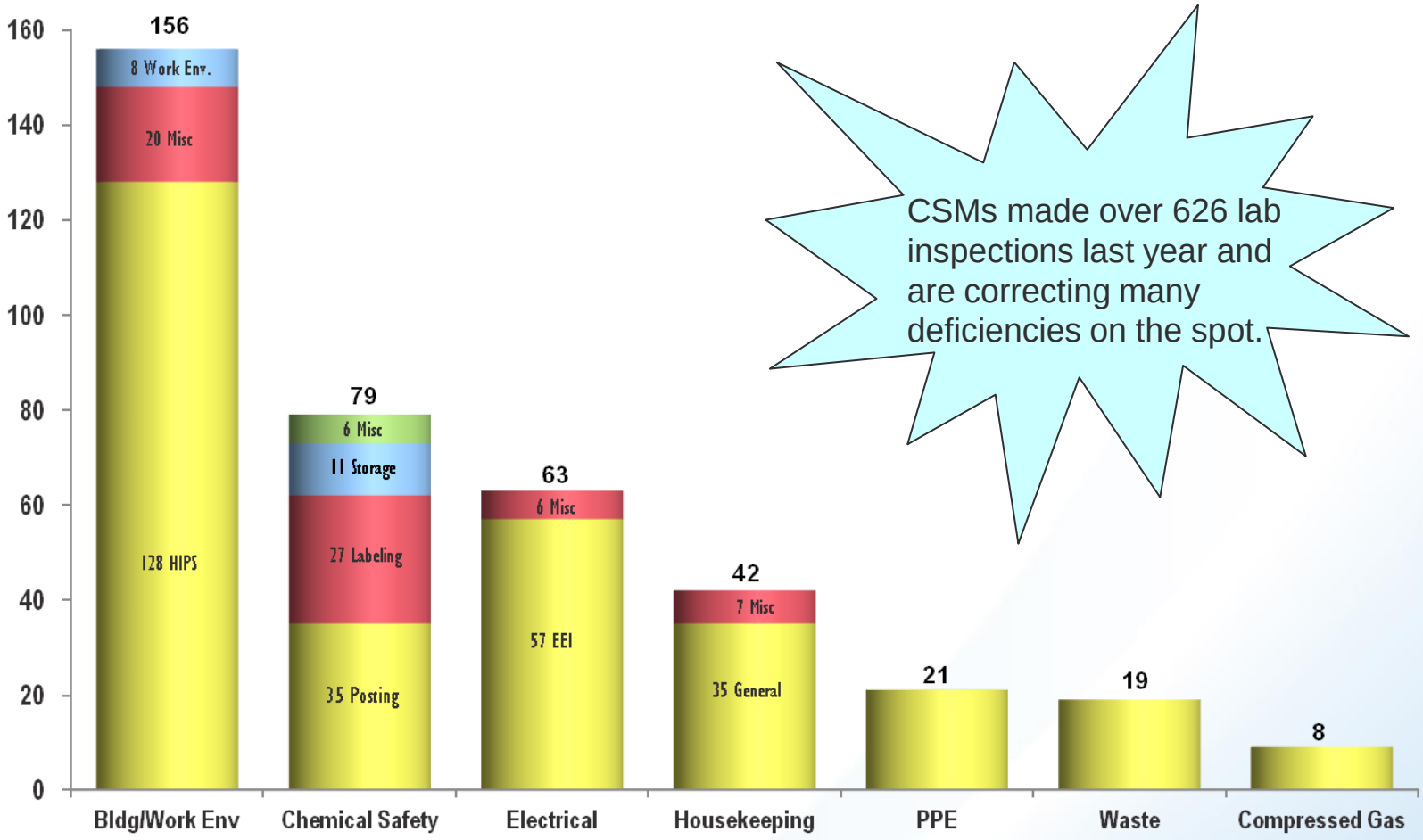
Top 7 GARS Tier I Issues by Deficiency



Issue – Increase in Bldg/Work Env. findings largely due to new Placards. Chemical Safety increase over last year's findings - no clear trend.

Action – Continue to work with Staff and CSMs.

CSM Checklist Observations



CSMs made over 626 lab inspections last year and are correcting many deficiencies on the spot.

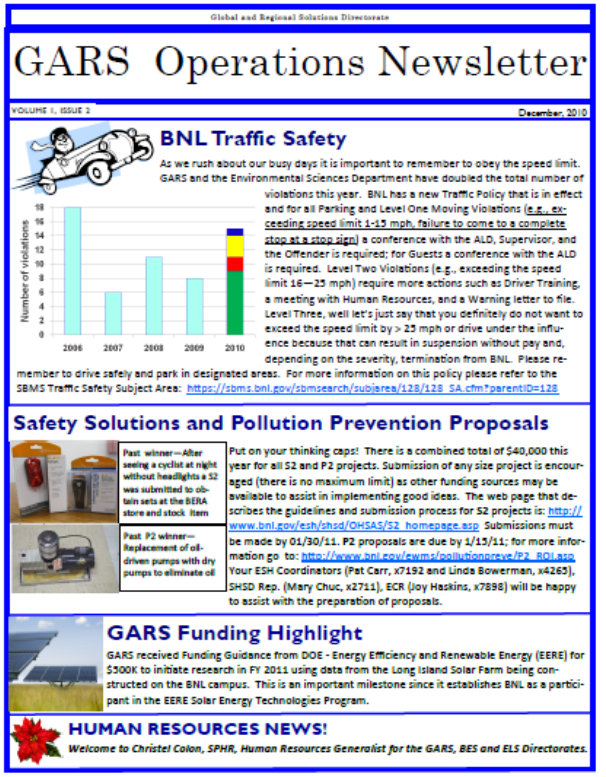
Note – CSM findings are similar to the Tier 1 Team Findings

Communication

- Newsletters
- Directorate Safety Council
- New Employee/Guest ESH Orientation
- Summer Visitor Orientations
- GARS/EE ESH Committee
- CSM and RSM Meetings
- GARS All Hands Meetings
- Updated GARS and RO Websites
- Hurricane Preparedness Checklists

GARS HURRICANE PREPAREDNESS
LABORATORY AND RESEARCH AREA CHECKLIST

☑	Action/Task	Location	Staff Responsible		Notes
			Primary	Alternate	
	Cover and secure or seal vulnerable equipment with plastic.				
	Remove or secure equipment from outdoor and rooftop locations.				
	In areas subject to flooding, relocate or elevate equipment, chemicals, radiological items, and other important items from the floor to prevent damage.				
	Return radiological sources to locked cabinets.				
	Ensure all cylinders are secure and main valve is shutoff. (Cap as needed.)				
	Fill dewars and cryogen reservoirs for sample storage and/or critical equipment.				



Global and Regional Solutions Directorate

GARS Operations Newsletter

VOLUME I, ISSUE 2 — December, 2010

BNL Traffic Safety

As we rush about our busy days it is important to remember to obey the speed limit. GARS and the Environmental Sciences Department have doubled the total number of violations this year. BNL has a new Traffic Policy that is in effect and for all Parking and Level One Moving Violations (e.g., exceeding speed limit 1-15 mph, failure to come to a complete stop at a stop sign) a conference with the ALD, Supervisor, and the Offender is required; for Guests a conference with the ALD is required. Level Two Violations (e.g., exceeding the speed limit 16—25 mph) require more actions such as Driver Training, a meeting with Human Resources, and a Warning letter to file. Level Three, well let's just say that you definitely do not want to exceed the speed limit by > 25 mph or drive under the influence because that can result in suspension without pay and, depending on the severity, termination from BNL. Please remember to drive safely and park in designated areas. For more information on this policy please refer to the SBMS Traffic Safety Subject Area: https://sbms.bnl.gov/sbmsearch/subjarea/128/128_SA.cfm?parentID=128

Safety Solutions and Pollution Prevention Proposals

Past winner—After seeing a cyclist at night without headlights a S2 was submitted to obtain sets at the BERA store and stock item

Past P2 winner—Replacement of oil-driven pumps with dry pumps to eliminate oil

Put on your thinking caps! There is a combined total of $40,000 this year for all S2 and P2 projects. Submission of any size project is encouraged (there is no maximum limit) as other funding sources may be available to assist in implementing good ideas. The web page that describes the guidelines and submission process for S2 projects is: http://www.bnl.gov/esh/shsd/OHSAS/S2_homepage.asp Submissions must be made by 01/30/11. P2 proposals are due by 1/15/11; for more information go to: http://www.bnl.gov/ewms/pollutionprevw/P2_ROI.asp Your ESH Coordinators (Pat Carr, x7192 and Linda Bowerman, x4265), SHSD Rep. (Mary Chuc, x2711), ECR (Joy Haskins, x7898) will be happy to assist with the preparation of proposals.

GARS Funding Highlight

GARS received Funding Guidance from DOE - Energy Efficiency and Renewable Energy (EERE) for $500K to initiate research in FY 2011 using data from the Long Island Solar Farm being constructed on the BNL campus. This is an important milestone since it establishes BNL as a participant in the EERE Solar Energy Technologies Program.

HUMAN RESOURCES NEWS!

Welcome to Christel Colon, SPHR, Human Resources Generalist for the GARS, BES and ELS Directorates.

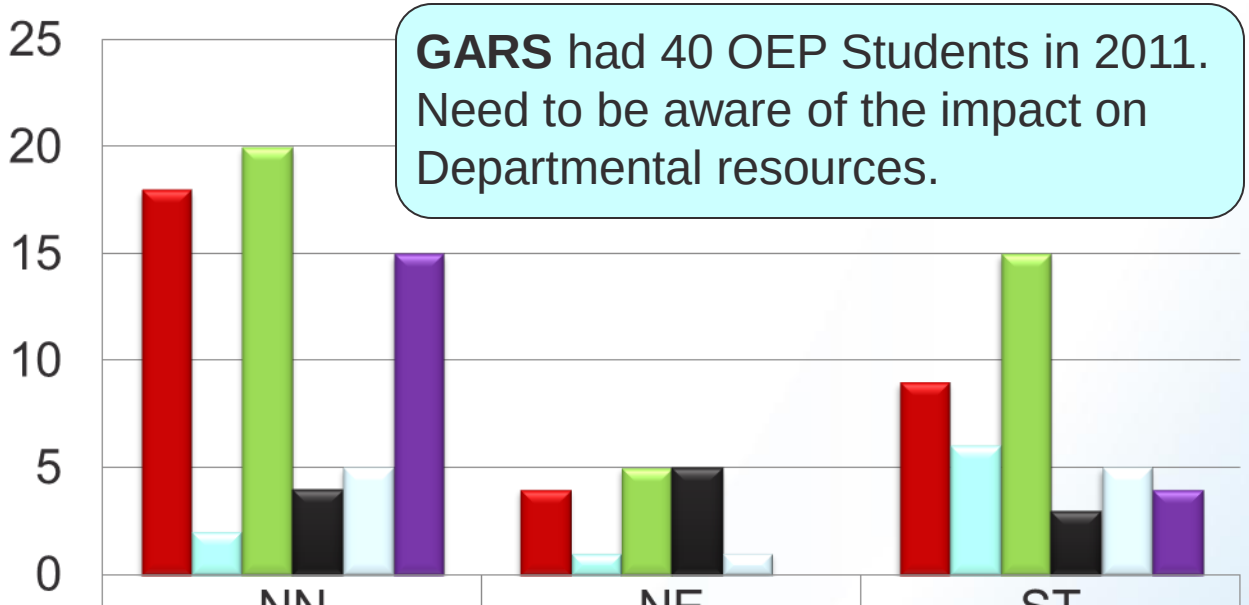
Emergency Preparedness & Response

- All Annual Emergency Evacuation Drills completed
- All Drills - No Notice to Occupants; Evaluated by Team
- An Emergency Management Self-Assessment conducted
- Revisions to LEP Training, New Employee/Guest training, etc.
- Lessons Learned Published in GARS Operations Newsletter
- All Bldg. Emergency Spill Kits Reviewed/Restocked
- Active Hurricane Preparedness Planning for Hurricane Irene

Positive feedback from staff/EM on GARS Drills and RO response and assistance for Hurricane Irene preparations

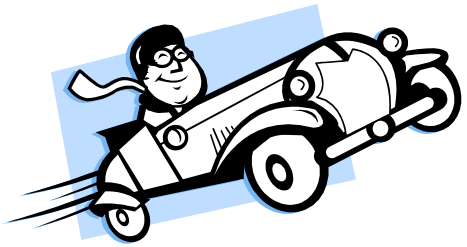
GARS Summer Students

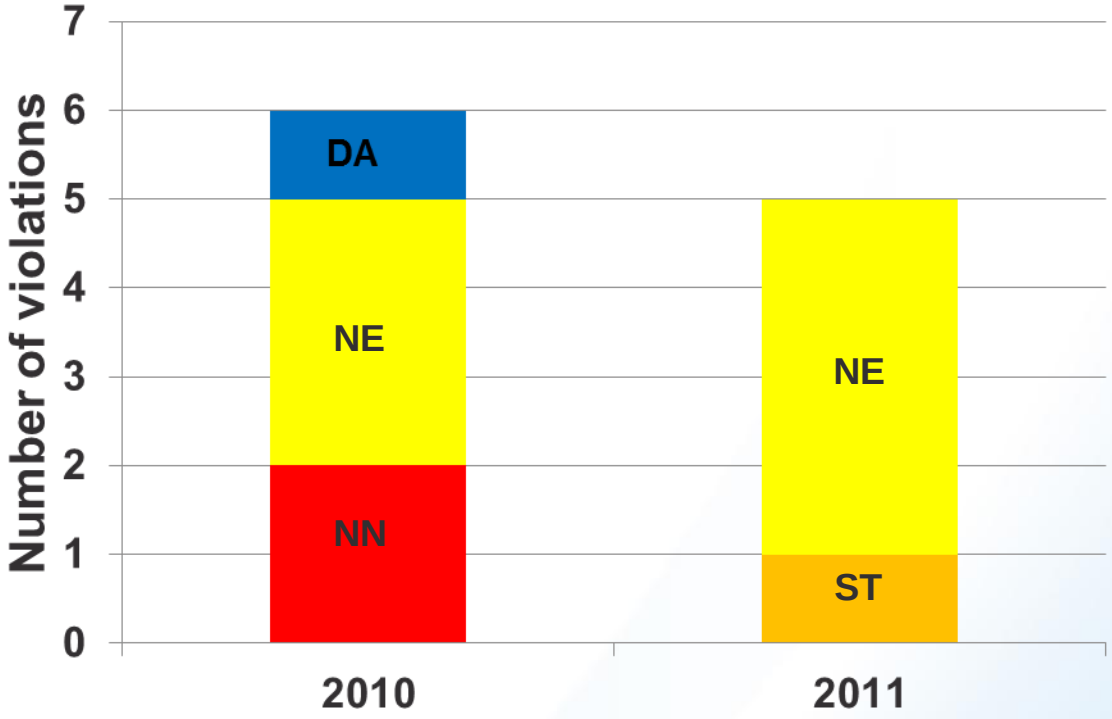
GARS had 40 OEP Students in 2011. Need to be aware of the impact on Departmental resources.



	NN	NE	ST
Summer Interns	18	4	9
High School Students	2	1	6
Total Students	20	5	15
Sponsors	4	5	3
Student/Sponsor	5	1	5
Students/ESR	15	0	4

GARS Traffic Safety



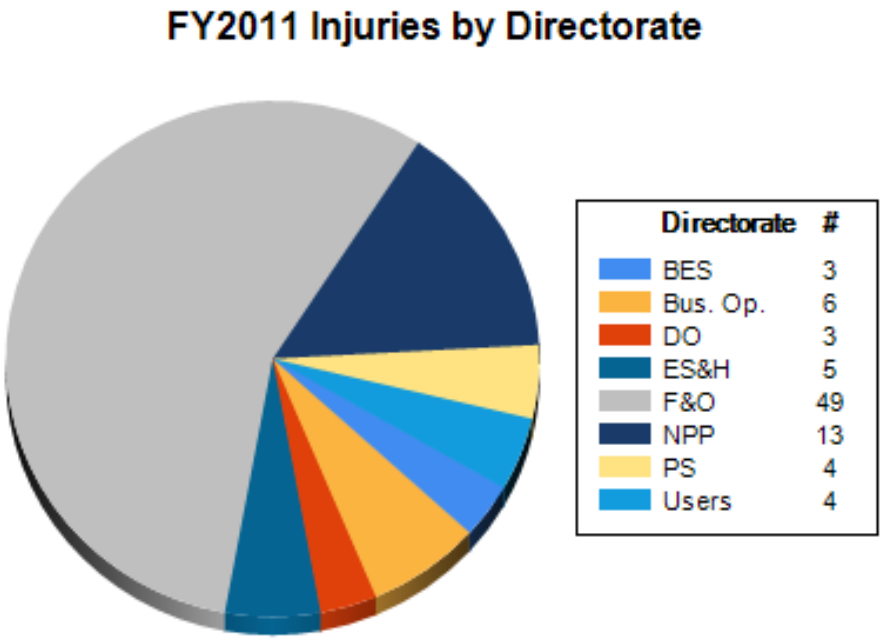


Total traffic safety violations in FY11 are down from last year.

- **Speeding = 1**
- **Cell Phone = 1**
- **Yield to Pedestrian = 1**
- **Failure to Stop = 2**

GARS Injury Data

- **ST: 365 days since last DART**
- **NN: 2116 days since last DART**
- **NE: 5045 days since last DART**
- **TT: 5426 days since last DART**
- **DA: 5426 days since last DART**



No Lost Time in FY11

1 incident with no lost time. Last DART was in 2006

FY11 Events and Issues

1 SC-BNL HF Waste Container Event

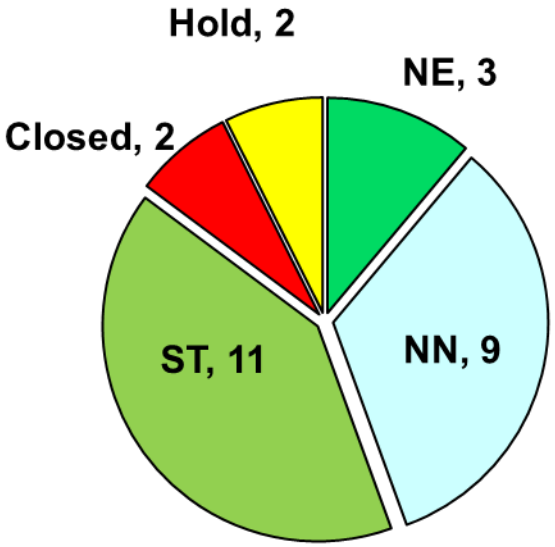
Saucedo Solution

Saucedo Solution ($HF:HNO_3:H_2O:AgNO_3$)		
NAME	Volume Added (ml)	DATE

Issue – A container of HF Etchant (Saucedo Solution) was observed to be outgassing a brown colored gas. The CSM reported this immediately to the ESH Coordinators possibly preventing a bigger problem.

Action – The container was placed in secondary containment, the ORPS Categorizer called, and this was raised to a Management Concern. GARS RO has conducted a Causal Analysis and will work with the group to streamline the process.

GARS Work Planning

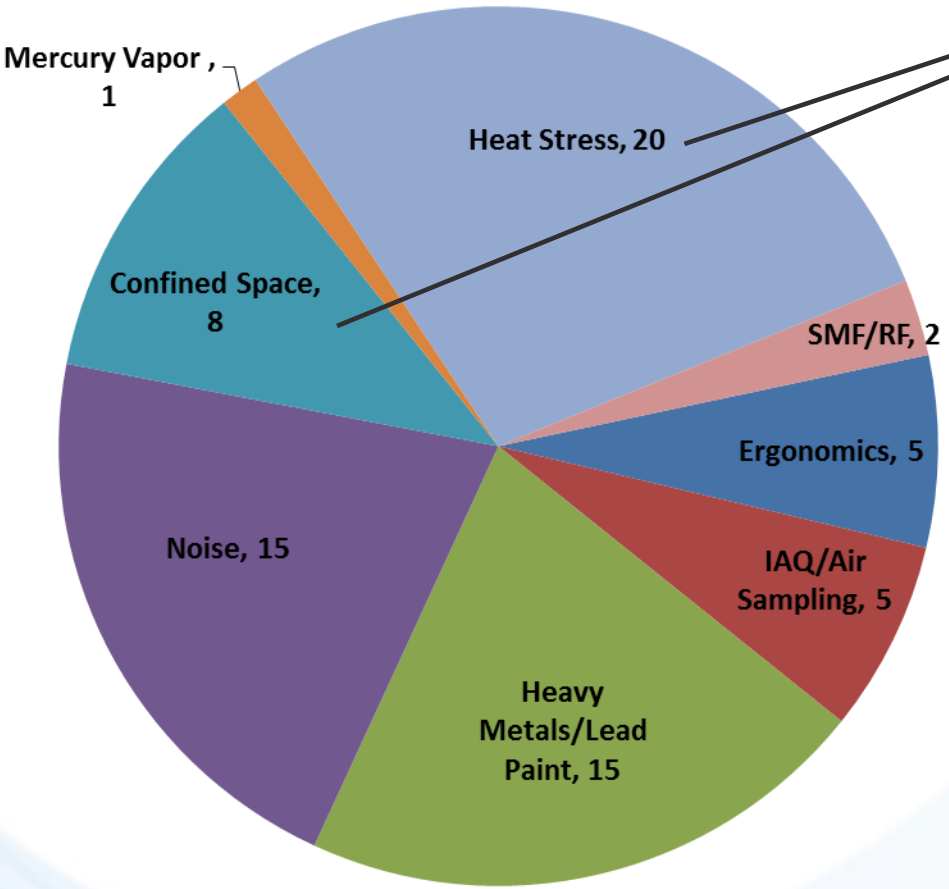


Issue – 100% of current ESRs have been entered into the Web-based format. Training has been presented to PIs and the new system will be utilized exclusively (unless PIs opt out for security reasons).

Action – Staff are using the system, but some suggestions/improvements have been received. Consistent BNL IT Support for the project is still the primary need.

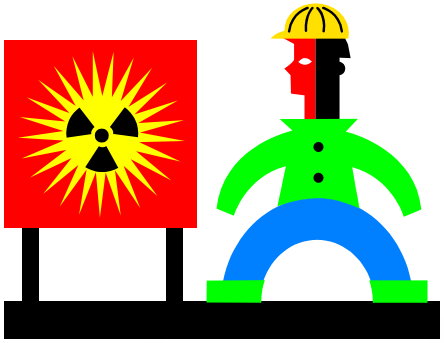
GARS IH Surveys

A total of 71 surveys were completed in FY11



Confined Space and Heat Stress monitoring done in support of the GST Construction, ORE, and Training Program

Radiological Performance



0 PAAA violations

0 Radiological Awareness Reports

New Work:

- ESR 206 – Graphite Sampling Tool
- ESR 207 – BF_3 Detectors

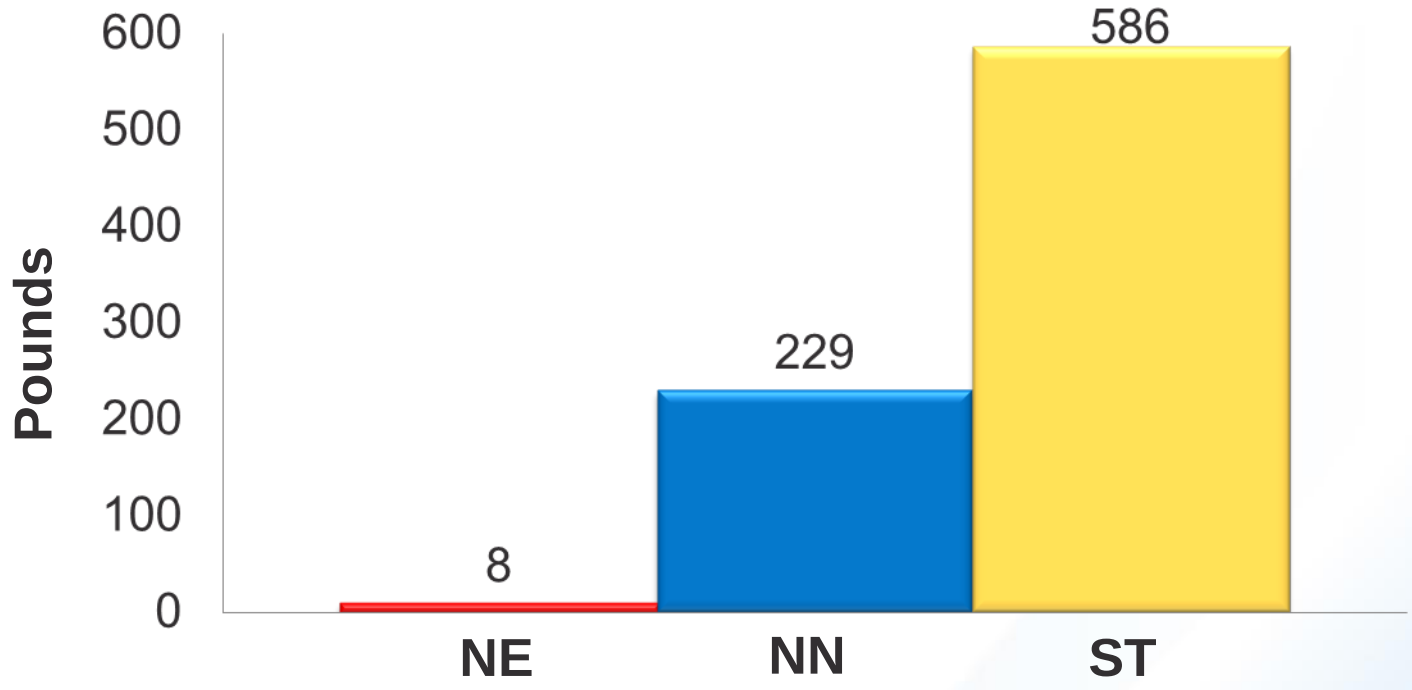
Supported:

- IAEA Inspector Training
- D-wing Renovations
- Confined Space Entry Bldg. 830

No Personnel Contamination;

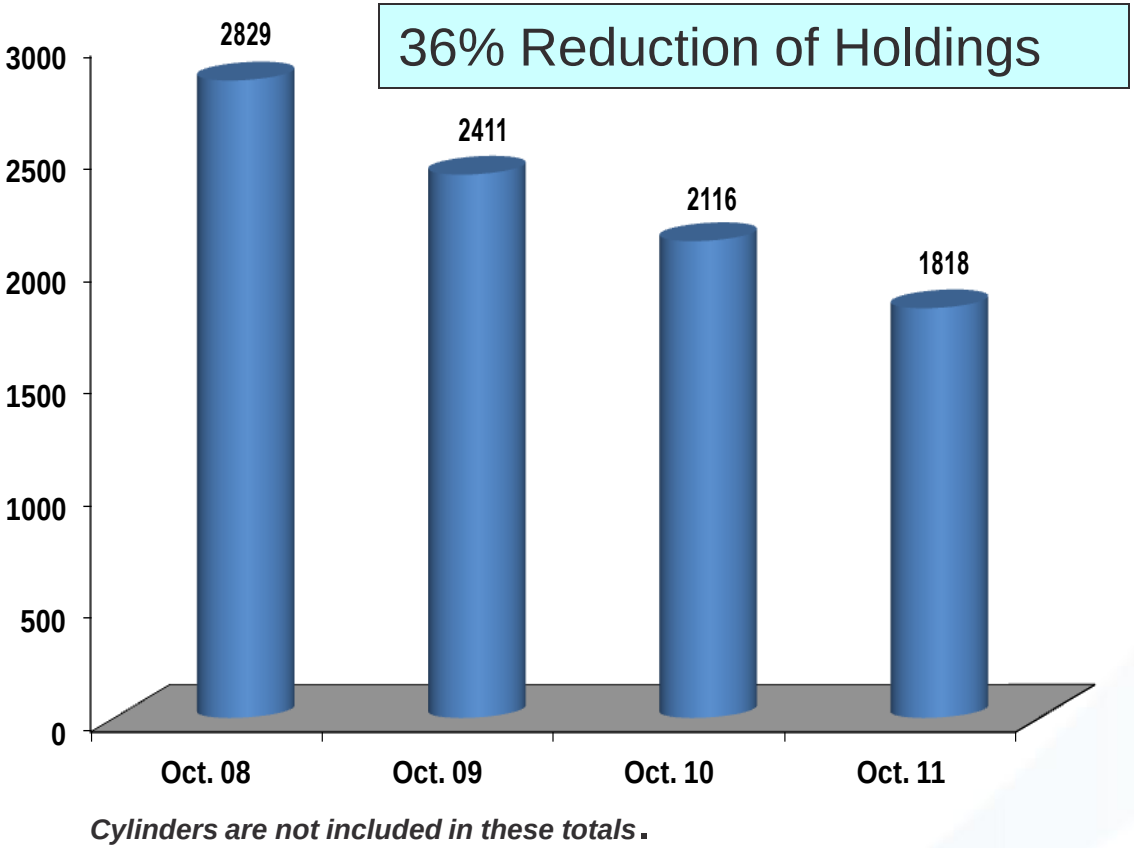
Exposures within individual and collective ALARA Goals!

GARS Waste Generation



43% of Generated Waste was a result of Chemical Cleanouts with assistance from the Housekeeping Project!

GARS Chemical Holdings



Cylinders are not included in these totals.

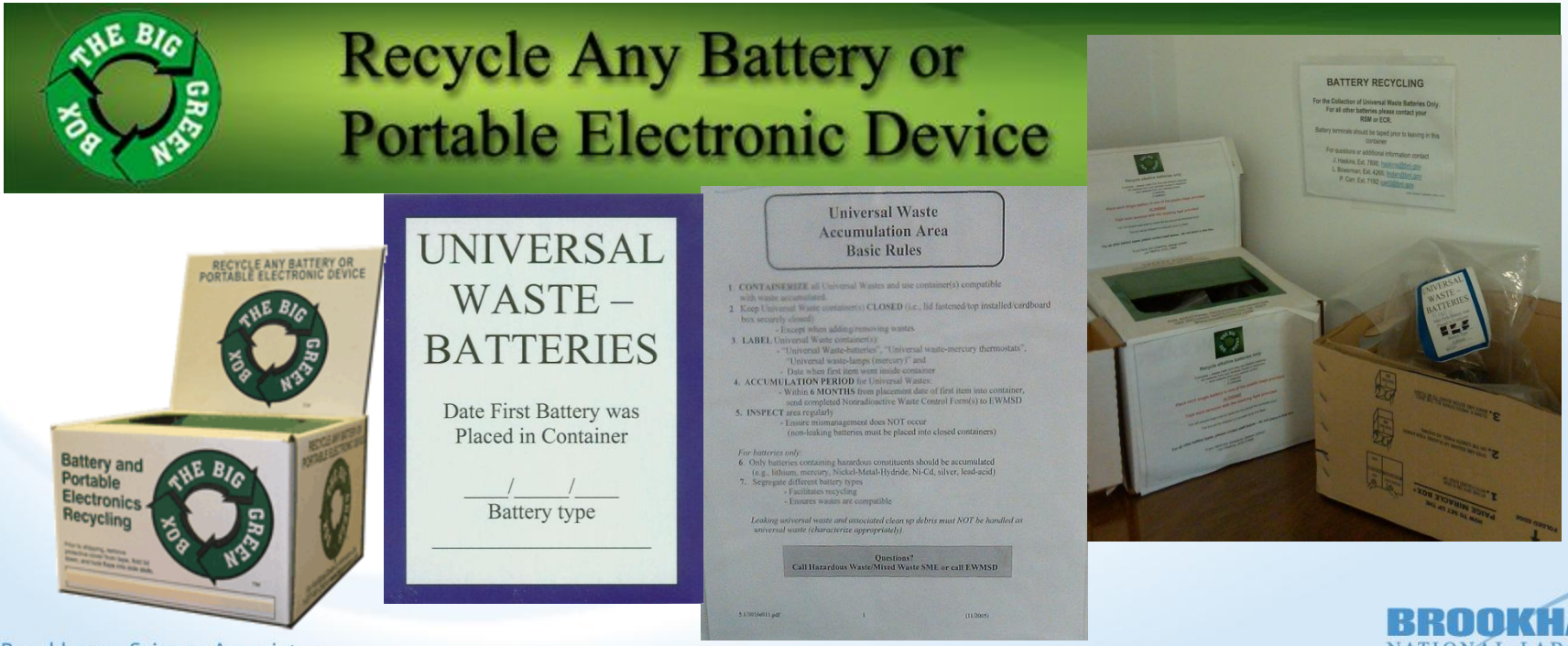
Org Code	FY11 Active Containers	# of Holders
DA	236	2
NE	27	1
NN	131	10
ST	1584	14

Issue – Status/Condition of current holdings?

Action – Review chemicals to determine age, condition, and need.

GARS Recycling Efforts

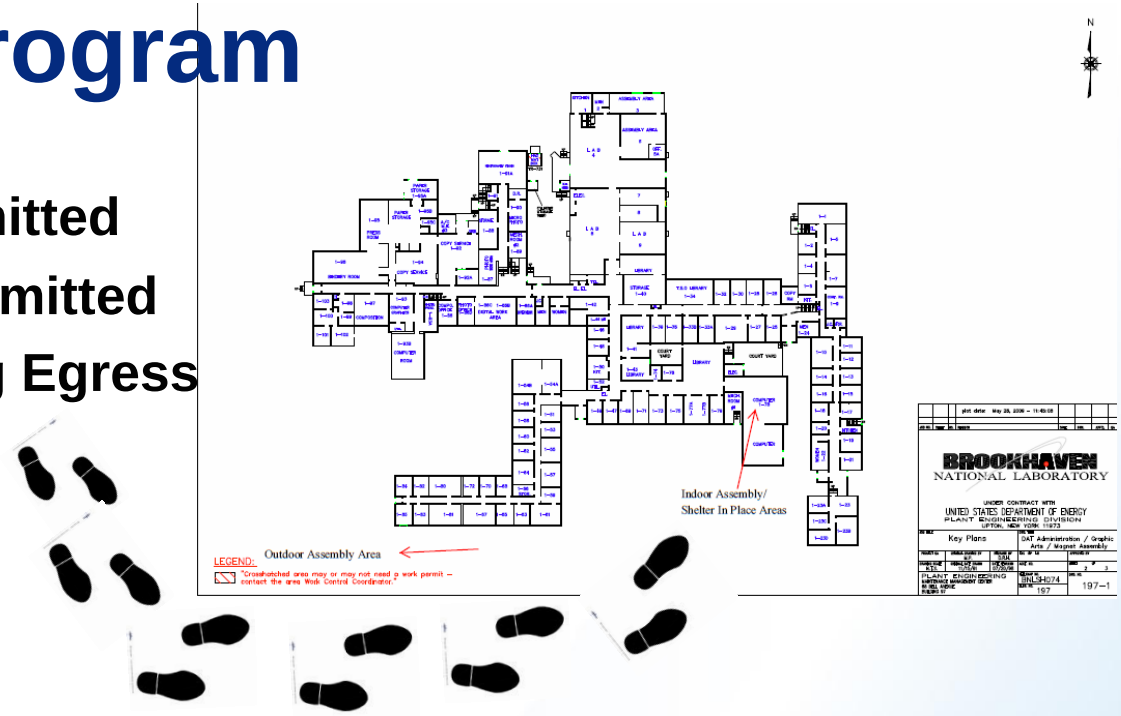
Highlight - Over 110 pounds of batteries were collected for recycling as part of the Universal Waste & Alkaline Battery Collection effort continued from FY10.



GARS S2/P2 Program

BNL S2 - 16 Proposals submitted

- **3 GARS proposals submitted**
- **1 funded - Way Finding Egress**



BNL P2 - 13 Proposals submitted.

- **3 GARS proposals submitted**
- **1 funded - Energy Efficient Lighting in Common Areas**

Issue – Unable to implement the Way Finding Egress Postings in FY11.

Action – Will implement this year with GARS Resources.

GARS Training & Qualification Program

Performing Well -
High % Completion Rate
Maintained by All Departments

Dept.	% Training Complete	Total # of Requirements
DA	100	250
NE	100	816
NN	98	1384
ST	98	568

FY11 Activities included:

- RSM Training
- Creation of GST JTA Training Program
- New INSEC Requirement
- eESR Training for PIs/Team
- IAEA Summer Visitors

Issue - Revised NEO Form and Notification to TCs of new/upcoming courses is needed.

Action – Work with Training Office to improve forms and communication.

GST Team Training

GARS Research Space Managers

ROCO Implementation - RSMs were selected by the Department Chairs.

The RSM position is the tenants' primary interface with IFM and the FPM. And - More focused on managing the facility and its safety and operational envelope, using the FPM as the primary interface to the services of F&O.

Issue - The interface with FPMs is different in each complex (Communication and Prioritization).

Action – Work with RSMs & FPMs to improve communications.

Facility	Name	Research Space Manager (RSM)	LEC
East Complex	**Chris Johnson, FCM X7636 cell 631-872-8983**		
526	**Joe Stanisci, FPM x4639 cell 872-8964**	Y. Celebi x4013 cell 631-205-8364	C. Brown x5730 cell 631-741-4144
821	**John Biemer, FPM x8206 cell 631-466-8436**	R. Doty x5259 cell 631-291-6098	Storage only No LEC
830	**Joann Giambalvo, FPM x7459 cell 631-457-3797**	T. Roberts x3965 cell 631-553-8545	T. Roberts x3965 631-553-8545
836	**John Biemer, FPM x8206 cell 631-466-8436**	Y.Celebi x6143 cell 631-205-8364	Y. Celebi x4013 cell 631-205-8364
RADTEC Field Site	**Joe Stanisci, FPM x4639 cell 872-8964**	T. Roberts x3965 cell 631-553-8545	T. Roberts x3965 cell 631-553-8545
Central Complex	**Mark Davis, FCM x2165 cell 631-831-5498**		
815	**Jerry Guerra, FPM x5201 cell 631-457-3500**	L. Gerlach x7876 cell 631-291-6097	R. Wilke x3932 cell 631-671-1350
130	**Thomas Doyle X7556, Pager 1013 (dial x3456 or 344-3456 & enter pager #)**	L. Fitz x7235 home 631-286-1018	L. Fitz x7235 home 631-286-1018
197	**Jerry Guerra, FPM x5201 cell 631-457-3500**	J. Carbonaro x5139 cell 631-921-7356	J. Carbonaro x5139 cell 631-291-7356
750A	**Stan Sakry, FPM x4406 cell 631-466-8469**	C. Cacace x3422 cell 631-831-8118	E. Hoey x4447 cell 631-356-2463
South Complex	**Tom Roza, FCM x3085 cell 631-872-8992**		
179	**Chuck Schuster, FPM x2705 cell 631-872-5076**	L. Gerlach x2910 cell 631-291-6097	L. Gerlach x2910 cell 631-291-6097
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ESH Financial Investment – Discretionary

Directorate support of discretionary fund to purchase safety equipment/materials, demonstrates a commitment to ES&H (driving improvements in compliance and communication)!

Hurricane Preparedness Supplies

FY10 Mgmt Review Follow-up

Status	Action Items	Comment
	Reduce Tier 1 Findings (Compressed Gas)	Causal Analysis with Users, Small Science WG, and SME (August, 2011)
	Report Traffic Statistics in GARS Newsletter	December, 2010
	Safe vs. Unsafe Observations	FY11 Management Review
	Continue to Address Chemical Holdings/Clean-ups	FY11 Management Review and ongoing
	Work Toward Smooth Transition to IFM	Meetings organized for each complex to facilitate communications between GARS RSMs, FCMs, and FPMs to review information relating to facilities (e.g., LEPs, Run Cards, & FRAs)
	Complete Remaining Stand Down Issues	FY12 before/after D-Wing move

GARS FY11 O&T Highlights

Target	Action(s)	Program	Status
Implement New Area-Based PPE Policy	Review and re-post all areas with new Area-Based PPE requirements	OSH	
Improve Compliance in one of the Top Tier I Cats.	Conduct Analysis to drive improvement in the Compressed Gas Tier I Category	OSH	
Meet Energy Efficiency Goals of EO	Participate in the development of the BNL Site Sustainability Plan	EMS	
Improve Facility Safety	In support of Blueprint Initiative: Implement the Hazard Assessment Tool	EMS/OSH	
Reduce Legacy Materials/Waste in Four Priority Areas	Clean-up priority building via the BNL Housekeeping Project – Bldg. 815	EMS/OSH	
	Re-inventory chemicals ensuring current CMS inventory during move into renovated Bldg. 815 D-wing laboratories	EMS/OSH	
Improve WP&C - ESR Process	Transition to the Web-based ESR for 100% of the ESRs and provide PI Training	EMS/OSH	
Investigate Electrical Usage Reduction Opportunities	Track electrical usage and create a baseline of usage for the current FY to identify improvement opportunities in Bldgs. 197, 130, and 815	EMS	
Facilitate CSM Communication with RO	Conduct two CSM Meetings during FY to help facilitate communication, improvement opportunities, and lessons learned	EMS/OSH	

All O&T on schedule or will be completed in the near future.

Significant Issues

Status	Issue	Action
	Requirements Management	Many requirements changes to SBMS without input from the Line or adequate implementation plans. *(slides 20, 21 & 22)*
	BNL IT Systems	Lab Level IT System Architecture and Prioritization addressing Organizational needs. *(slides 6,7,11 & 21).*
	IFM Communications	Improve communications between IFM and Research Operations in ESH matters. Continue to facilitate communication between RSMs and FPMs and the joint prioritization of Work Orders. Need to understand the role of the ESH Rep for the Complexes. *(slide 29)*
	HVT	GARS needs to complete B. 830 and review all building entries. The HVT Program needs to be formalized. *(slides 6 & 7)*
	Area Based PPE/ Placards	CMS issues hamper the ability to have correct chemical hazard information. PPE entry requirements still need to be *embraced* by staff. *(slide 7)*
	CSMs and RSMs	Are doing a great job and RO looks forward to working with them in 2012. *(slides 14 & 29)*

Proposed FY12 ESH Objectives and Targets

- **IMPROVE COMPLIANCE**
  - **Chemical Safety**
    - Review condition, age, and need of highly toxic chemicals (PHS)
  - **Safety Engineering**
    - Inventory Pressure Vessels
  - **Pollution Prevention**
    - ID/Facilitate Chemicals for Disposal and Housekeeping Projects
- **IMPROVE OPERATIONAL PERFORMANCE**
  - **Radiological –**
    - Evaluate/Reduce Sealed Source Inventory
    - 100% Reconciliation of TLDs
  - **Emergency Preparedness**
    - Hurricane Preparedness Kits
  - **Corrosive Etch**
    - Containers/Labels/Sheets for Chemicals/Wastes
- **IMPROVE COMMUNICATION & AWARENESS**
  - Facilitate additional RSM and FPM Focus Meetings

GARS O&T will be further addressed at the December DSOC meeting.

Senior Management Feedback

- **Was the GARS ESH Program Effective**
  - Have we identified ESH hazards and impacts of GARS activities?
  - Have we set realistic/consistent ESH goals?
  - Do we incorporate operational controls to prevent/mitigate hazards?
  - Are we monitoring ESH performance?
  - Do we report and track non-conformances appropriately?
  - Are we allocating resources for achieving performance goals?
  - How well do we inform staff of ESH responsibilities?

Please complete questionnaire

A Special Thanks to

Research Operations Staff

- **Pat Carr**
- **Rob Doty**
- **Lou Gerlach**
- **Jeanne Madaia**
- **Sallie Crick**
- **Ellen Fredrickson**
- *Paul Philipsberg*
- *Joy Haskins/Joe Pavlak*
- *Nick Contos*
- *Mary Chuc*

GARS ESH Committee

- **Bill Brown**
- **Pat Carr**
- **Jeanne Madaia**
- **Paul Philipsberg**
- **Mike Furey**
- **Vatsal Bhatt**
- **Tom Watson**
- **Lynda Fitz (new member)**
- *Joy Haskins*
- *Nick Contos*
- *Mary Chuc*

GARS Safety Council

Gerry Stokes, Bill Horak, Carol Kessler, Pat Looney, Walter Copan, Bob Lofaro, Michael Cowell, B.J. Carreras, Christel Colón, Pat Carr, Rob Doty, Bonnie Sherwood, Linda Bowerman